Volume II

# PROCEEDINGS

## OF THE

# GLOBAL ASSEMBLY OF WOMEN AND THE ENVIRONMENT

## "PARTNERS IN LIFE"




With Updated
SUCCESS STORIES
OF
WOMEN AND THE ENVIRONMENT

## Volume II

# PROCEEDINGS

## OF THE

## GLOBAL ASSEMBLY OF WOMEN AND THE ENVIRONMENT
## "PARTNERS IN LIFE"

## November 4-8, 1991

Edited by:

Waafas Ofosu-Amaah, WorldWIDE Network
Wendy Philleo, WorldWIDE Network



October, 1992

## ABOUT THIS BOOK

This book is the second of the two volumes of proceedings from the Global Assembly of Women and the Environment designed to support women's involvement in environmental management.

This Volume contains the 218 success stories presented at the Assembly and a description of the success story identification, review and validation processes. Volume I contains the keynote speeches, background papers and participants' findings, recommendations and action plans. Other Global Assembly publications include:

- A Global Assembly "Green Book"- a how-to manual to support the convening of National Assemblies of Women and the Environment;

- An analytical review of the success stories to assist mentor institutions to integrate women and the environment into their sustainable development strategies, policies and programs.



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## TABLE OF CONTENTS



* Environmentally-friendly systems, products and technologies

## FOREWORD

We are pleased to present the second volume of the proceedings of the Global Assembly of Women and the Environment: "Partners in Life" that was held in Miami, Florida, November 4-8, 1991. The Assembly was convened under the sponsorship of the Senior Women's Advisory Group (SWAGSD) to the Executive Director of the United Nations Environment Programme (UNEP). This volume contains the success stories presented at the Global Assembly and information related to the process leading to their selection; and presents compelling testimony as to what women can do to contribute to a sustainable future.

The Global Assembly culminated four regional assemblies of women and environment held in Zimbabwe, Tunisia, Thailand and Ecuador, by the women of Africa, West Asia/Arab World, Asia/Pacific and Latin America/Caribbean between February 1989 and March 1991. They were convened as UNEP's programmatic response to the 1985 World Conference to Review and Appraise the Achievements of the United Nations Decade for Women: Equality, Development and Peace, held in Nairobi, Kenya.

The purposes of the **regional assemblies** were to: (a) engage women in an assessment of the environmental conditions in their respective regions; (b) advance the development of a women's environmental network for future collaboration and cooperation in each region; and (c) to review regional blueprints for environmental action devised by the ministries in the regions.

In anticipation of the 20th anniversary of the United Nations Environment Programme and the United Nations Conference on Environment and Development (UNCED), the Global Assembly organizers designed the Assembly process to promote cooperation among institutions, men, women and youth to advance environmentally sustainable projects that are affordable, visible, sustainable and repeatable. Such alliances are essential to achieving appropriate development in specific ecosystems.

The Assembly demonstrated how women's capacities in environmental management relate to the global ecological issues of water, waste and energy, and the potential of environmentally-friendly systems, products and technologies.

The success stories were selected from all regions of the world, and demonstrated that environmental degradation was averted or repaired. They also illustrate the capacity of women's leadership in environmental management at all levels of society.

The success story nomination, validation, and selection processes received critical assistance from SWAGSD/UNEP, the *ad-hoc* UN/Financial Institutions Working Group on the Global Assembly of Women and the Environment, the Board of Trustees of WorldWIDE Network, Renew America, the U.S. Peace Corps and many others.

Many governments, corporations, UN agencies, international organizations, non-governmental organizations and individuals provided critical financial and in-kind support. Mentors, representing their institutions, underwrote their own expenses. Many New Generation Leaders raised funds for their participation and worked around the clock

at the Assembly. The assistance of the Miami Hosting Committee was invaluable to our successes.

These proceedings provide us with another opportunity to help promote sustainable development. The successes shared in Miami should inspire others in the UN system, governments, NGOs, academia, corporations and foundations to join together at the national level to convene **National Assemblies of Women and the Environment.**

Joan Martin-Brown
Coordinator, Global Assembly
Associate Regional Director,
North America
UNEP Global Focal Point for Women

October, 1992

## ACKNOWLEDGEMENTS

The organizers of the Global Assembly wish to express their deep appreciation to Dr. Mostafa K. Tolba, Under-Secretary General of the United Nations and Executive Director of the United Nations Environment Programme (UNEP), whose continuing challenge to find workable solutions led to this Assembly.

We would like to thank the following governments, UN agencies, corporations, institutions in the private sector and individuals, who have provided inspiration, resources and auxiliary services to support the Global Assembly and its Special Events: Governments - Canada (Canadian International Development Agency), Denmark (Danish International Development Agency), Finland (Ministry of Environment), Germany (Federal Ministry for Economic Cooperation), Netherlands (Ministry of Development Cooperation), Norway (Ministry of Foreign Affairs), Sweden (Swedish International Development Agency), Switzerland, United Kingdom (Overseas Development Administration), United States (Department of State, A.I.D. and E.P.A.); UN Agencies - International Research and Training Institute for the Advancement of Women (INSTRAW), United Nations Centre for Human Settlements (UNCHS), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Children's Fund (UNICEF), United Nations Development Fund for Women (UNIFEM), United Nations Sudano-Sahelian Office (UNSO), The World Bank; Private Sector - America's Clean Water Foundation, Asea Brown Boveri, Inc, Cargill Fertilizer, Inc, CIBA GEIGY Corporation, E.I. Dupont Nemours and Company, Esprit, Humane Society of the U.S., Institute of Scrap Recycling Industries, Jay Harris, Kmart Corporation, Metro Audio Visual, Inc., Miami Herald, National Geographic Society, Orient Express, Inc., Southwest Florida Water Management District, The Procter & Gamble Company, Waste Management, Inc., World Resources Institute; and Sponsors of Special Events - Ben and Jerry's Ice Cream, Coalition of Hispanic-American Women, Coca Cola Company, Donovan Leisure Rogovin Huge & Schiller, Florida Department of Citrus, Good Housekeeping Magazine, Greater Miami Host Committee, Hirni's Wayside Garden, James A. Brunton, Inc., Kajima International, Mars, Inc., Marriot Hotel, NIMBA, Vizcaya Museum and Gardens, and Westinghouse.

The contribution of the Senior Women's Advisory Group (SWAG) to UNEP, the *ad-hoc* UN/Financial Institutions Working Group on Women, Environment and Development, the Miami Hosting Committee and the Board of Directors of WorldWIDE Network is gratefully acknowledged.

In addition, we would like to especially acknowledge the following individuals who assisted us beyond the call of duty: A. T. Brough,* James Brunton, Polly Cook, Elizabeth Guilbaud-Cox,* Patricia Forkan, Joan Haahr, Angela Harkavy, Gloria Calhoun, Susan Kessell, Daniel Kinnear,* Honorine Kiplagat,* Robert Lamb, Deirdre O'Connell, Jose Lizarraga*, Pam Pierce Chenowith, Jane Linke Morrison, Sally Randel, Paul Ress,* Carol Rist, Tiahoga Ruge, Dr. Anitra Thorhaug, Bruce White and Dr. Charles Ziegler.

Our core staff consisting of Rohit Khanna,* Sheila Kinsella,* Kim Nead, Wendy Philleo, Linda Shotwell and Sarah Yerkovich did a wonderful job of putting this monumental task together. The staff was very ably assisted by volunteers and interns Janet Abramovitz, Anna Awimbo, Rita Bannerjee, Amanda Carr, Ginny Cohn, Mark Delzenne, Cheryl Fox, Alison Hilton, Christina Hoegh-Guldberg, Rachel Kessler, Andrea Kushner, Tracy Lassiter, Christopher Mansfield, Linda Michurski, Kara Page, Amy Smith, Sandra Smith, Martin Smith and Victoria Stanhope. We give Susan McElroy, our Logistics Coordinator, our deepest thanks and appreciation for her impressive professionalism and tireless efforts.

Waafas Ofosu-Amaah
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Washington, D.C.
October, 1992

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## BACKGROUND

The success story nomination, selection and validation processes involved over a year of search and review. Each success story was nominated in response to the mailing of over 10,000 nomination forms. (A copy of this form is reproduced in Appendix I). The nomination forms asked detailed questions relating to the origin, nature, content and impact of the nominated project. We received almost 1,000 responses. Based on the information in the nomination forms and additional background material provided by each nominator, a one-page synopsis of each success story was prepared and returned to the nominator requesting confirmation of its accuracy in reflecting the scope of work and achievement.

The nominator was also asked to provide three references familiar with the project. The three references were contacted for further information and verification of the project. Finally, each project was validated by outside reviewers consisting of members of UNEP's Senior Women's Advisory Group (SWAGSD), members of the UN/Financial Institutions Working Group on Women, Environment and Development, WorldWIDE Network's Board of Trustees and experts from throughout the different regions. 218 success stories were finally selected as meeting the criteria of being **affordable, visible, sustainable and repeatable.**

Those selected were invited to present their success stories at the Global Assembly. These presentations served as the core of the Assembly and of the Working Groups, organized by geographic region and subject area, e.g. Europe-Water, Africa-Energy, Asia/Pacific-Waste, etc. As the Global Assembly was a process, guidelines were prepared for the presenters to follow in the Working Groups. Each Working Group included 12 to 15 success story presenters, a facilitator and a rapporteur.

The Success Story presentations were fundamental to advancing the Assembly's goals:

- They demonstrated the capacity of women as effective environmental managers in four global environmental issues from the world's five major regions, at the community level;

- They encouraged major institutions to engage women and to replicate these success stories, as appropriate, to address global ecosystemic problems related to water, energy and waste; and to promote the use of environmentally-friendly systems, products and technologies.

Each success story presenter had 30 minutes to present her project and to discuss it with her Working Group colleagues, with whom she shared a table. The 30-minute period of time, kept by the flow of sand through an hour glass, was allotted for both the presentation and the discussion of the project. This process engaged 16 concurrent Working Groups over two days with the same participants throughout the process.

Mentors - (see Appendix V. for Mentors' Selection Criteria) and New Generation Leaders - NGLs - (see Appendix VI. for NGLs' Mandate) attended the Working Group sessions as "students". Mentors were invited from academia, corporations, foundations, international agencies, national governments, non-governmental organizations and the media. They formed a concentric circle (or square) behind the success story presenters. As "students," they were not present to judge the success stories, but to listen, to learn

and to assess how their respective organizations could be changed to mentor the presenters and such projects. To assist them, each Mentor received Mentor Assessment Guidelines. The NGLs were there to learn, to assist the Assembly Secretariat and to report to their sponsoring institutions what they had learned as well as to prepare a statement on inter-generational cooperation to support to women in environmental management.

Both Mentors and NGLs could move in and out of the Working Groups, at the completion of each success story presentation and related discussion. Mentors and NGLs were encouraged to circulate among the Working Groups so as to better understand the various cultural and ecosystemic contexts represented by each region and subject area.

The presentation of the success stories provided the basis for the recommendations prepared by 4 drafting committees and institutions represented by the Mentors. The success stories also provided the basis for the development of the five regional strategies and action plans presented in Volume I of the Proceedings of the Global Assembly in November, 1991.

This Volume includes an updated edition of the compilation of the success stories presented at the Assembly. In the late spring of 1992, we sent a letter went to the presenters to provide them with the opportunity to update their stories. The postscript added to the summaries provide the relevant information relating to developments in the projects since November 1991, when the Global Assembly took place.


# SUCCESS STORIES
# OF WOMEN AND THE ENVIRONMENT


## SUCCESS STORIES

| Region | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| AFRICA | 12 | 4 | 18 | 17 | 51 |
| ASIA/ PACIFIC | 16 | 15 | 20 | 10 | 61 |
| EUROPE | 4 | 4 | 10 | 0 | 18 |
| LAC | 13 | 14 | 17 | 4 | 48 |
| NORTH AMERICA | 12 | 14 | 11 | 3 | 40 |
| TOTALS | 57 | 51 | 76 | 34 | 218 |

*Success Stories Presented at the*
*Global Assembly of Women and the Environment*
*November 4-8, 1991*

## SUCCESS STORIES FROM AFRICA

## SUCCESS STORIES FROM ASIA/PACIFIC

## SUCCESS STORIES FROM EUROPE

## SUCCESS STORIES FROM LATIN AMERICA/CARIBBEAN

## SUCCESS STORIES FROM NORTH AMERICA

# DESCRIPTIONS OF SUCCESS STORIES FROM AFRICA

## REGIONAL BREAKDOWN OF AFRICA

| Country | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| Botswana | 1 | | 1 | | 2 |
| Burkina Faso | | | | 1 | 1 |
| Cameroon | | | 1 | | 1 |
| Egypt | | 1 | 1 | 1 | 3 |
| Ghana | | | 2 | 3 | 5 |
| Kenya | 4 | | 4 | 3 | 11 |
| Lesotho | 1 | | | | 1 |
| Madagascar | | | 1 | 1 | 2 |
| Mali | | 1 | | | 1 |
| Mauritania | | | | 1 | 1 |
| Morocco | | | 1 | | 1 |
| Nigeria | 1 | | 1 | 2 | 4 |
| Rwanda | 1 | | | | 1 |
| Senegal | 1 | | | | 1 |
| South Africa | 1 | 1 | | | 2 |
| Sudan | | | 2 | 1 | 3 |
| Swaziland | | 1 | | | 1 |
| Tanzania | | | | 2 | 2 |
| Uganda | | | 1 | | 1 |
| Zambia | | | 1 | | 1 |
| Zimbabwe | 2 | | 2 | 2 | 6 |
| | 12 | 4 | 18 | 17 | 51 |

## SUCCESS STORY: Villages Pilot Project Combats Soil Erosion in Dawa, Ghana

**Presenter:** Beatrice Adela

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Fax:

**Country:** Ghana

**Region:** AFRICA

**Subject:** EFS

**Problem:** Soil erosion was a problem in the town of Dawa, particularly at the school compound and the market. The soil was being washed away. This rendered farmland infertile and created gullies that threatened building stability.

**Solution:** An education campaign was initiated to inform women's groups about the environmental problems and their effects. Tree seedlings were transplanted in areas affected by erosion, and gullies were filled with stones.

The Cairo Plan for African Cooperation was adopted in 1985. Under this plan institutions were formed and measures were taken to address the problems of the African environment. One of the measures adopted involved rural pilot projects to address the problem of food and energy security. Each of the 50 African countries was urged to select three villages for pilot projects. This success story focuses on the pilot project implemented in Dawa, Ghana, a community of six villages where erosion is a serious problem for most of the inhabitants. It caused destruction at the school compound and at the market, and it disturbs households as well. A house-to-house survey reveals that gullies are forming around most structures and threatening building stability. Moreover, erosion is rendering farmland infertile, and farmers are forced to use manure and chemical fertilizers to increase yields.

With the assistance of village leaders, the project was organized in May 1990 through communal labor, with mostly young people and women participating. The project involved the collecting of stones to fill the gullies, and the planting of trees and grass to prevent erosion. The types of trees planted - acacia and rosinia - also help to improve soil fertility. As part of the project, educational sessions were conducted through mass meetings and rallies. Local women's groups have participated actively in this project.

The projects are accomplished in a very orderly fashion. The Chief beats the gong to inform citizens about the prevailing problem. Leaders are invited to discuss the problems. Decisions made are channeled through unit leaders to their various units. Unit leaders inform their people of the days set for communal labor and ensure the presence of adequate labor at the site. Deviant citizens are fined. Most of the materials are donated by foreign donors and government departments such as the Forestry Department. The tree seedlings are paid for and provided by the Environmental Protection Council. The grass is gathered from areas where erosion does not occur. Labor is provided by the people.

The most beneficial impacts of this project are that it prevents buildings from collapsing and helps maintain the fertility of the soil. The stones have stopped the deepening of gullies at the market and the school compound. The trees are flourishing, and are checking the direct downpour of rain on the land. Grass planted by the community is slowing down the running water that washes the soil away.

**Postscript:** The stones in the gullies have helped to halt soil erosion. The trees that were planted help to maintain the fertility of the soil.

## SUCCESS STORY: *Forum Maghrebin pour l'Environment, Comite des Femmes* Mitigates Deforestation in Morocco

**Presenter:** Fatima Alaoui

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**Country:** Morocco

**Region:** AFRICA

**Subject:** EFS

**Problem:** Deforestation was a serious problem in Morocco. The progressive denudation of the country had led to desertification, which undermined the agricultural productivity of the land.

**Solution:** Women from *Forum Maghrebin pour l'Environment, Comite des Femmes* organized an information campaign on deforestation. The group mobilized women and financiers to initiate a tree-planting project.

The progressive destruction of trees at a rate which far outstripped afforestation efforts led to increasing rates of desertification. Desertification decreases the agricultural productivity of the land, a serious concern for a developing country like Morocco.

*Forum Maghrebin pour l'Environment, Comite des Femmes*, which has 2,000 members, is the first nongovernmental organization of this scale organized to mobilize various development organizations to take concrete steps towards sustainable development. In March 1990, the group launched an ambitious tree-planting project; its goals were to check desertification, to create and protect green spaces and to integrate environmental issues into formal and non-formal education. Five hundred women belonging to *Forum* implemented the project, assisted by specialists from the Office of Water and Forests in the Ministry of Agriculture. The project was officially inaugurated by the president of *Forum*, Fatima Alaoui, in the presence of the Directors of Water and Forest Management in Morocco and representatives of the international development community. The group then proceeded to plant trees in public areas and at schools throughout the Rabat metropolitan area. In the primary schools, the schoolchildren were responsible for planting and nurturing the trees. Forum committee members and school staff supervise the school tree-planting programs. Handicapped children have participated in tree planting activities organized by the group.

The day after the inauguration in Rabat, *Forum* organized a similar event in Benslimane, a small village adjacent to the capital, in order to launch the rural phase of the tree-planting project. Each woman in the rural area was encouraged to plant two trees; one for fuelwood and one for the enhancement of green space. This had symbolic as well as practical significance. The project's long-term goal for the province of Benslimane is the plantation of 792,000 trees. The Water and Forests Office donated trees for the project's activities in the town of Benslimane. *Forum* members donated the trees planted in the metropolitan area.

As a result of the project, many trees have been planted in rural and urban areas of Morocco. Schoolchildren have developed an awareness of environmental issues, particularly regarding the importance of trees.

**Postscript:** The tree-planting project has helped to slow desertification. The information campaign has succeeded in raising the consciousness of women and others in the participating communities.

## SUCCESS STORY: SWAG-Ghana - Senior Women *Mobilize Support* for Environmental Management Activities

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**Country:** Ghana
**Region:** AFRICA
**Subject:** EFS

**Problem:** The environment has been degraded due to droughts, desertification and the use of inappropriate agroforestry practices that degrade vegetation and soils.

**Solution:** Women from various professions formed SWAG-Ghana. They drew up a three-year plan of action aimed at sensitizing the public, and women in particular, about the state of the environment and the need for appropriate protection measures.

In recent years, environmental degradation has reached crisis proportions in Ghana due to natural disasters, drought conditions, desertification and unsound agricultural and forestry practices that degrade soil and vegetation. The combined forces of these problems have had a devastating impact on the entire continent of Africa. The Environmental Protection Council of Ghana, in response to the Cairo Action Plan, was instrumental in mobilizing citizens for the protection of the environment in the Ghana subregion. Representatives of various professions and interests were invited to form the Senior Women's Advisory Group-Ghana (SWAG-G), modeled after the United Nations Environment Programme's (UNEP) SWAG. The group's steering committee includes professional women from a variety of organizations including the National Council on Women and Development.

SWAG-G initiated a three-year plan of action aimed at sensitizing the general public, particularly women, about the state of the environment. The group has been involved in successfully implementing the Village Pilot Projects in four villages in Ghana. The aim of these projects is to ensure food and energy self-sufficiency. Formation of women's groups was encouraged in all of the project villages. SWAG-G steering committee members conducted meetings in the villages to discuss topics ranging from environmental sanitation to sound agricultural practices.

So far the project implementors have established agroforestry projects; introduced fuel-efficient stoves (which are now being used in most homes); constructed a dam for harvesting rainwater; and introduced better methods of food processing, packaging and storage. With the introduction of agroforestry programs, the villagers have established woodlots. These will save the women time that is now spent walking long distances to find fuelwood. The time saved can be used to involve women in other activities such as attending functional literacy classes and other educational classes on family planning and environmental sanitation. In addition to its work with the Village Pilot Projects, SWAG-G has participated in various television and radio programs to discuss such topics as water and soil conservation. These programs reach sectors of the population which might not otherwise receive the information. SWAG-G has also collaborated with the Accra Metropolitan Authority on a seminar on the privatization of waste management in Accra. SWAG-G members are also initiating projects on their own.

**Postscript:** Four Village Pilot Projects have been established. In addition, the group has been active in the media, at international conferences and with schoolchildren to promote environmental awareness.

## SUCCESS STORY: Besongabang Women Mokok - Aghem Association Combats Soil Erosion in Cameroon

**Presenter:** Egbe Esther Besong

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Tel: 011 237 341272
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**Country:** Cameroon

**Region:** AFRICA

**Subject:** EFS

**Problem:** Soil erosion occurs during the rainy season. During the dry season, the soil becomes dry and hard. Under these conditions, food crops are difficult to grow. The dense tropical forest regions are particularly affected.

**Solution:** Women were organized into small groups to work on solving the problems. Participants were urged to practice soil conservation techniques such as contour farming on sloping land and using manure to increase soil fertility.

The *Besongabang Women Mokok - Aghem Association* decided five years ago to do something to alleviate the hunger caused by declining food output from their farms, especially during the dry season. Many young people were migrating out of the village. The main problem was to combat soil erosion during the period of heavy rains, and to prevent the soil from drying and hardening during the dry season, because these conditions inhibit the growth of crops. Deforestation is a problem, since land under forest cover is less affected by harsh weather conditions. Under traditional farming systems, soil is only fertile for two to three years and then is left fallow. The population in the area is increasing and thus land pressures are also increasing. Hence, it is imperative that the inhabitants learn to sustain existing farms.

When Egbe Besong first realized the problem, she contacted the government departments involved in agriculture and community development. She took the advice of the officials there and organized the women into 10 groups, with 20-30 women in each group for easy management. The groups were first organized on a *Djanji* basis. (A *Djanji* is a social group in traditional society which makes financial contributions for the benefit of members.) Group members make contributions, solicit funds and put on exhibits. Members of the groups work under elected leaders and provide labor for the projects. They have worked to prevent soil erosion and preserve soil fertility by contour farming on sloping land and by making mounds on which to plant where the land is level. They have applied techniques to prevent the soil from drying in the dry season such as using leaf mulch and leaving cassava and other perennial crops only partially weeded to prevent excessive baking of the soil by direct sunlight. Other techniques include irrigating during the dry season to increase soil moisture and using kitchen waste and animal manure to fertilize gardens. The groups urge farmers to farm the same piece of land rather than looking for "greener pastures." The groups meet monthly to report on their farm work.

Crop yields have been improving. Women who did not belong to any of the groups are impressed by the results and are now seeking admission for membership, or forming their own units and requesting assistance. The Association is aware that they can grow foodstuffs if they can provide irrigated water during the 3-4 month dry season. The Association has recognized another significant problem that they are addressing: lack of good roads makes it difficult to get fresh produce to nearby markets; consequently, during the rainy season excess produce rots.

**Postscript:** The implementation of the project has resulted in environmental and economic benefits to the participants and to the economy as a whole. The primary benefit has been the increase in food production and supplementary income. The organizers recognize the central role of women in the project as the key to its success.

## SUCCESS STORY: Nile River Reforestation Project, Sudan

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**Country:** Sudan
**Region:** AFRICA
**Subject:** EFS

**Problem:** Desertification was a widespread problem. Increasing time was spent by villagers in the search for fuelwood. Dust and drifting sand created health risks for children. Women were isolated from participation in reforestation projects.

**Solution:** Female extension workers assisted villagers in nursery work and plantation of woodlots and shelter belts.

Deforestation and desertification plagued the communities along the Nile River in Sudan. Due to a lack of fuelwood, the surrounding forests were being depleted. The resulting sand encroachment had disrupted the local ecosystem and increased the risk of respiratory tract infections and eye diseases. A significant portion of the villagers' time was spent searching for fuelwood.

The United Nations Sudano-Sahelian Office aided the communities through an afforestation and reforestation project. Through seminars and lectures with audio-visual presentations, an educational campaign was waged to increase awareness about the environmental degradation. The extension service helped the communities in building and managing tree nurseries and woodlots. Fuel-efficient cooking stoves were introduced as well. At the outset, the project was hindered by traditional taboos that did not allow the male project staff to work with women. With the employment of female extension officers like Ms. Ebeid, this isolation of women was overcome. Women's committees were established in all villages. The women were trained in forestry techniques and in planning and supervising works.

The project has enabled the communities to begin to reverse the degradation of the surrounding forests and promoted the concrete participation of women in natural resource management. Tree nurseries have been created. The establishment of woodlots has contributed to a decrease in the blowing sand and an increase in environmental awareness. Participants gained valuable skills in forestry and management, as well as more free time. Women's involvement and leadership has enabled the project to make significant gains in restoring the environment.

**Postscript:** Women are now actively involved in the reforestation project. Tree nurseries and plantations have been established. Sand drifting has diminished. Environmental awareness has increased. Ms. Ebeid won UNEP's 1992 Global 500 Award for her work in environmental protection.

## SUCCESS STORY: The Cross River National Park Project Promotes Conservation and Health in Nigeria

**Presenter:** Ubleni Arikpo Ettah
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Fax:

**Country:** Nigeria
**Region:** AFRICA
**Subject:** EFS

**Problem:** The rain forest in Cross River State is being deforestated due to indiscriminate tree felling. Shortages of fish, game animals and reliable water sources have led to nutritional problems. Water-borne diseases such as typhoid have been introduced.

**Solution:** Dr. Ettah offers free medical services to residents of villages surrounding the park. Her program has become an integral part of a larger project attempting to save the rain forest by educating residents about conservation and addressing their needs.

Cross River State contains the largest undisturbed area of tropical rain forest in Nigeria. It is considered to be one of the most biodiverse areas in all of Africa. The surrounding population is affected by shortages of fish and game as well as reliable sources of water. Water-borne diseases such as typhoid and bilharzia have been introduced due to reduced stream flows. Illegal logging threatens the existence of the park and the livelihood of the villagers.

The Cross River National Park Project, together with the contiguous Korup National Park in Cameroon, is an effort to save the rain forest in a way that takes into account the needs of the people who live in and around the forest, and who use its resources. It seeks to involve the communities in the development of the park and in solving the problems of rapid population growth, poor health and malnutrition. Feasibility studies have been conducted by World Wildlife Fund for Nature (WWF). The British Overseas Natural Resources Institute (ODNRI) provided funding, with matching funds coming from the British Overseas Development Administration (ODA).

A medical program which Dr. Ettah initiated in May 1990 has become an integral part of the Park Project. Dr. Ettah applied to the Cross River State chapter of Nigeria Conservation Foundation (NCF) to offer free medical services in her spare time to the inhabitants of the Boshi/Okwango division of the park. The NCF accepted her offer and gave her tremendous support and encouragement. She began her efforts with a small sum of money (N1,000) for drug purchases and the use of a project landrover vehicle. Dr. Ettah arranges meetings with the village heads to schedule a time for her to visit. Upon visiting the village, she gives talks and counsels the villagers on health and family planning, as there was little access to information on these topics. She also administers medicine at a low cost to villagers and organizes group visits to water sources and sites of waste disposal to inform residents on the importance of sanitation. Additionally, classes are offered to residents to help them develop conservation awareness. WWF, the Nigerian Conservation Foundation and the British High Commission fund the project, which costs U.S. $4,000 a year.

Dr. Ettah has reached out to isolated communities which otherwise would not have access to medical care. The program has been so successful that the British Council in Lagos, Nigeria has donated an ambulance to transport medical staff and patients to government-owned hospitals which are at least 50 kilometers away over rugged terrain.

**Postscript:** Due to the success of this initiative, community members are participating in local health care programs. The Health Education Programme is now offering short-term training in basic health care for women, and park service training for men.

## SUCCESS STORY: Erosion Control in Katheka, Kenya

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**Region:** AFRICA
**Subject:** EFS

**Problem:** Land ill-suited for agriculture was increasingly used for farming due to population pressures. This land was not suited for cultivation without terracing because of its aridity and slope. Consequently, alarming rates of soil erosion were occurring.

**Solution:** The Assistant Chief of Katheka, appointed by the government in 1973, reinstituted *mwethya* - traditional self-help groups. Each group consisted of 25-35 community members, mostly women, who had an interest in solving local agricultural problems.

Soil erosion is a major environmental problem in Kenya, largely because of erosion control measures enforced during the colonial period. The forced nature of these measures bred resentment and caused a long post-independence hiatus from traditional terracing. Moreover, land not suited for agriculture without terracing is increasingly cultivated due to population pressures. Consequently, Kenya is losing a large share of topsoil, especially in the semi-arid lands. Gully and wind erosion are common. High rates of soil loss (up to 32 tons per hectare per year) have been recorded.

This success story focuses on soil conservation in Katheka Sublocation in Machakos District. The sublocation is about 11 square kilometers in area and includes three villages of approximately 1,000 residents each. The area is classified as semi-arid. The sparse vegetation and porous soil offer little protection when torrential rains cause excessive water runoff and massive soil loss. Soil loss is compounded by hostile attitudes toward soil conservation practices, a legacy of the forced terracing. Following independence in 1963, soil conservation stopped and soil erosion increased in Katheka.

Since his appointment in 1973, the new Assistant Chief for Katheka has bolstered local institutions, the most visible of which are traditional voluntary self-help groups known as *mwethya* groups. These mostly-female groups consist of 25-35 members from the same farm neighborhood or household cluster. Their interest in participating in these groups stems from their responsibility for feeding their families. In 198,7 a total of almost 400 members belonged to the 12 established *mwethya* groups. All but 40 of these group members were women.

The *mwethya* groups have become the backbone of Katheka's resource management activity. Survey data suggest that the results of the *mwethya* groups' efforts have been significant. Yearly construction of terraces to prevent soil erosion totals as much as 20 kilometers, and accomplishments in check dams and cut-off drains are equally impressive. The success gave the community confidence to tackle other problems. In the early 1980s, work began on several water projects such as the construction of a small dam measuring six meters by three meters and the installation of a hand pump in a well.

* For detailed information about this success story, please see *Traditional Village Institutions in Environmental Management: Erosion Control in Katheka, Kenya*, a World Resources Institute publication.

**Postscript:** Katheka's resource management activities have shown to be effective. They have constructed terraces, check dams and cut-off drains to prevent soil erosion. The groups have also tackled water problems.

## SUCCESS STORY: Women in Mupata Village Organize Themselves into Food Societies to Earn Money and Help Implement Water Project

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**Subject:** EFS

**Problem:** Drought conditions resulted in a lack of water to meet agriculture and food production needs in Mupata Village. The general standard of living was low, and residents had no way to raise their incomes.

**Solution:** A self-help community group was organized to produce food and to identify and use sources of technical advice and assistance such as the Ministry of Women's Affairs.

Mupata Village in Gutu, Zimbabwe faced a variety of problems such as a shortage of fresh water, malnutrition and a general lack of both access to financial resources and the organizational skills to identify such sources of assistance.

This project was initiated in 1989 by an organization of women engaged in self-help projects. The self-help groups began with meetings to discuss the problems and identify sources of help. They then approached Agritex (Agricultural Technical and Extension Services) and the Ministry of Women's Affairs for assistance. Their main objective was to rear chickens to meet immediate family nutritional needs and supplement the income of group members. The main sources of funding are the 10 "self-help collective societies." These societies, consisting of eight members each, sell members' crops and chickens. The Ministry of Women's Affairs helped mobilize the women to implement such projects, and encouraged them by holding training sessions. The average selling price per bird is $6-10 (Zimbabwean currency). The higher average selling prices are obtained during periods of little rain, when grain is hard to come by. It costs an individual about $600 to raise 100 birds, and this includes the cost to build the chicken run ($200) and the cost to feed and transport the birds ($400).

With the help of the Ministry of Water and Energy, the women also were able to provide their community with water through the drilling of boreholes. The ministry helped secure money from donor agencies to fund the drilling of the boreholes. A company was contracted to drill the wells, which were then fitted with manual pumps. Ten boreholes were drilled; six are running. The Ministry maintains the facilities with its own funds.

Due to the high cost of living in Zimbabwe, raising chickens is very advantageous - it assures access to food and enables the farm family to generate income through the sale of surplus birds. Malnutrition has been greatly reduced, if not eliminated. The general standard of living is greatly improved, as it is true that where there is hunger there is disease. Moreover, the chicken manure can be used to fertilize maize fields. The community used to rely on well and river water which was unsafe for human consumption; however, with the drilling of the 10 boreholes, residents now have better access to clean water. By combining their resources, the women have achieved a higher standard of living for themselves and their community.

**Postscript:** With the assistance of the Ministry of Water and Energy, 10 boreholes were drilled, providing the community with access to clean water. "Food societies" were organized to engage in poultry farming. The manure from the poultry farms was used to fertilize maize fields. The project is being expanded to include cattle rearing.

## SUCCESS STORY: Zambian Women Build Improved Storage Facilities to Enhance Food Security in the Luangwa Valley

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**Subject:** EFS

**Problem:** The lack of appropriate technology for food production, preservation and storage in Luangwa Valley undermined food security and resulted in malnutrition and starvation.

**Solution:** Women were targeted for a project to build improved storage bins, since traditional methods were insufficient to store and preserve a new variety of hybrid maize that was introduced into the community.

Families in the Luangwa Valley in Zambia lacked appropriate and adequate food storage facilities. As a result, harvested grain, especially a new variety of hybrid corn which was introduced in the community, often perished or was destroyed by rodents when stored using traditional methods. Thirty-five percent of the households in the Luangwa Valley are headed by women, and the food shortages caused by storage problems exposed women and children to the risk of hunger, malnutrition and starvation. Most women in the community are subsistence farmers who grow food under very difficult circumstances such as flood and drought conditions. Crops are threatened by animals and tsetse fly infestations.

The Women's Program, a component of Luangwa Integrated Resource Development Project (LIRDP), initiated a project to construct effective storage bins for grain. The project was initiated in May 1990. The project targets 6,000 farm families and is funded by the Norwegian Agency for Development Cooperation (NORAD). The funds cover wages for instructors and the purchase of tools and materials. The construction materials include bamboo poles and various types of clay that are available locally. Through "popularization" meetings and film shows, women were taught new and improved methods of constructing traditional grain bins. Women and their families collect materials and, with help from instructors, build the bins on their own. It takes about two weeks to build a bin, and the average size bin holds seven 90-kilogram bags of shelled grain, the female farmers' average production. From May to September 1990, eleven bins were constructed and stocked with grains for the current season. Women from nearby villages have visited Luangwa to learn some of these new methods.

Many women in the community have come forward to construct the new bins. The women are more enthusiastic about growing hybrid corn, since they now have evidence that hybrid corn can be stored for more than one season using the improved storage techniques. This ability to safely store grains for more than one season allows the farmers to maximize the benefits of the hybrid corn and helps ensure food security for residents throughout the year.

**Postscript:** Many people in the community adopted the new variety of hybrid maize. The implementation of new storage techniques protects the grain from rodents and insects, thereby preventing the spread of disease and improving the health of the community. The storage techniques enhance year-round food security.

## SUCCESS STORY: Tree Nursery Groups in Mutoko, Zimbabwe Plant Over 38,000 Trees in One Year Alone

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**Subject:** EFS

**Problem:** Deforestation was a problem in the Mutoko Communal Area.

**Solution:** Savings clubs were formed. These well-organized groups and the District Forest Officer cooperated to establish community-based tree nurseries, to plant and protect the seedlings.

In 1988, the Mutoko Agricultural Development Project (A.D.P.) encouraged cooperation between peasant farmers and the Zimbabwean Forestry Commission with the aim of addressing the serious deforestation and ecological degradation of Mutoko Communal Land, a former homeland. A group of 50 farmer representatives and agricultural and forest extension staff were taken on a "look and learn" visit of the Shurugwi Rural Reforestation Project, where trees are raised at the village level.

The idea was taken back to Mutoko, where nine of the 30 farmer representatives found some savings clubs in their village which were prepared to establish a tree nursery. The farmer representatives are central in the approach used by Mutoko A.D.P. They are volunteers elected by their village and act as mobilizers and intermediaries between their community and the service institutions (NGOs, government workers, private companies, etc.). There are over 100 savings clubs in Mutoko District, with a total membership of over 3,000 (83% are women) thanks to training efforts by the Self-help Development Foundation (a local NGO) and the follow-up by Mutoko A.D.P. Members are granted access to a savings account through the club, saving a few dollars per week which would otherwise be dissipated. The bookkeeping system ensures that each member gets back what belongs to her. Ms. Mukoki, an agricultural extension worker, mobilized the people in her ward to start five tree nurseries.

Within the project implementation team of the Mutoko A.D.P., farmer representatives, district forest officers and agricultural extension staff have been meeting regularly to plan the activity and to agree on the practical organization. By June 1990, nine nursery groups were established and had received the necessary inputs and training. They managed to produce and plant over 38,000 trees. Only 7,000 trees have been planted in group woodlots; the rest was shared among the members. This tree sharing provides incentive and is ecologically interesting: the women plant some trees in their yards and others along fences, in contour bunds and in their vegetable gardens. Thus, the trees have been a linking element in the landscape. In the farming system they play multiple roles: for erosion control, providing animal fodder, windbreaks, and promoting soil improvement. In 1990 the following species were raised: eucalyptus, jacaranda, leucaena, acacia, albida and paw paw, of which only the acacia is indigenous. The "Tree Nursery Groups" activity of Mutoko A.D.P. is a good example of cooperation between the farming community, NGO staff and government staff, with a synergistic effect which leads to encouraging results.

**Postscript:** The concept of "tree sharing" is influencing the government policy which should evolve from separating arable land and woodlots to promoting a situation where each family plants and protects trees throughout its own farm.

## SUCCESS STORY: A Couple Revives Neglected Plot of Farmland Outside Nairobi, Kenya

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**Problem:** Overgrazing, charcoal burning and neglect left farmland barren and unproductive. Soil erosion also posed a problem.

**Solution:** The Mwendwas improved their own plot of land in order to set an example for their neighbors. They experimented by planting trees, bench terracing to prevent erosion and using zero-grazing techniques

In 1979, Justina Mwendwas and her husband bought a farm 120 kilometers from Nairobi. The farm is located in a semi-arid region, and the condition of the soil is poor as a result of overgrazing, charcoal burning and general neglect. After purchasing the property, the Mwendwas immediately set themselves to the task of improving the environmental condition of the land by first planting trees and by putting bench terraces in place to prevent soil erosion. The couple planted napier grass on the bench terraces, which surprised the many people who thought napier grass could only grow near rivers.

The couple encountered problems in their pursuits. Their land was not fenced in, and stray goats and cows destroyed their young trees. White ants, destructive to young and mature plants alike, posed a problem as well. Both husband and wife work full-time in Nairobi and thus could only spend limited time on the weekends working on their farm improvements. Friends discouraged them, telling them they were wasting their time. Determined to succeed, the couple overcame these "roadblocks" and went ahead with their work. They borrowed money from the bank in order to fence off their land to keep the animals out. Insecticides solved the white ant problem. They put the few cows and goats they had on a zero-grazing regime, keeping them penned and stall-fed rather than allowing them to roam. In all, the project has cost the Mwendwas the equivalent of U.S. $15,000, which they were able to borrow for farm development.

Inspired by the 1985 Women's Forum in Kenya, Justina Mwendwa tried to team together a group of women in Nairobi who owned land outside of the city like herself, in order to initiate similar activities on a large scale. Fund raising efforts fell through, however, because the women do not own land together as a group. As a result, Ms. Mwendwa has focused only on her own plot. Every rainy season she and her husband plant fruit trees. They have established a small tree nursery which they hope to expand in order to have enough trees to share with others. The couple have solved the soil erosion problem on their plot and produce a surplus of food which they sell locally.

The Mwendwas teach by example. Passers-by remember what their land looked like before the Mwendwas transformed it into a green zone and admire the fruits of their labor. Some have followed their example in an effort to keep up with the Mwendwas.

**Postscript:** Justina Mwendwa has embarked on a couple-to-couple campaign to encourage other families to improve the local environment. She is also involved in the Kenya Forum of the WorldWIDE Network (AWIDDE-K), which has created a tree nursery for the local community.

## SUCCESS STORY: Kenyan Women's Group Constructs Shelter and Home Gardens for Community

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**Problem:** There was a lack of food and adequate shelter for the community. Women and children were particularly affected by the adverse situation.

**Solution:** The women organized themselves and grew food crops on small plots of unused government land. With the help of Shelter Afrique, they were trained to make blocks for constructing houses.

A community located outside of Nairobi, Kenya suffered from poor nutrition and a lack of adequate shelter. Residents' incomes were not sufficient to buy enough food for their families.

In 1987 the women in this community started cultivating garden plots on unused government land. The women cleared and tilled the land themselves. They then planted all types of crops including maize, beans, potatoes, wheat, millet and bananas. That same year, Emily Ndungu escorted the coordinator of Shelter Afrique through the area. The coordinator talked with community leaders. After five meetings between the community, the coordinator and her team, some of the community members were trained in different skills to participate in a project to construct cement blocks with which to build houses.

The building block project was started in 1989 and is still ongoing. The cost of constructing one house is 40,000 Kenya Shillings. Shelter Afrique provided funding for the project. Women pay back the money to the organization at a subsidized rate when they are finished constructing their homes. Women were trained to work in factories where they construct six by six-inch blocks from a mixture of sand, cement and concrete. Factory equipment was provided by Shelter Afrique as well.

The gardening activities have improved the health of the community, and residents have become more productive in their daily work. The women save money since they do not have to buy food and they even have a surplus of food to sell. The building block project has resulted in the disappearance of clusters of make-shift houses, which were prone to catching fire and destroying property. One hundred cement block houses have been built in their place so far. Through this project, the women have acquired skills that they will teach to their children. They have also created employment for themselves and for other members of the community.

**Postscript:** Food cultivation solved problems of malnutrition and starvation in the community. The project has improved the overall health of the community. The surplus produce is sold and has created a source of income.

## SUCCESS STORY: Kibwezi Women's Integrated Rural Development Program - A Model for Community Self-Help Activities, Kenya

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**Problem:** The area was affected by waves of drought following the Sahelian disaster. By 1981 residents of Kibwezi, mostly women and children, subsisted on famine-relief rations.

**Solution:** The implementors approached the women of Kibwezi through their traditional leaders. The women received training in bee-keeping, goat-keeping and other trades over an eight-year period.

The town of Kibwezi experienced an influx of immigrants from surrounding areas in the late 1960s, when waves of drought forced people to seek greener pastures. After they had settled on the land, many of the men left to find paid work in Nairobi or other towns. About 14,000 families, almost all headed by women, remained in Kibwezi. In 1974, at the height of a severe famine, many turned to Catholic Famine Relief for food rations. In all, about 100,000 destitutes were living in the town.

The Sisters from Catholic Famine Relief wrote to the Council for Human Ecology-Kenya (CHEK), a nongovernmental organization interested in improving the quality of life in rural areas. They sought assistance for the people in Kibwezi. Several meetings were held between Erica Mann (the CHEK Vice-Chairman), Dr. Maria Mullei (then a member of the CHEK Executive Committee), Sister Albertus (with Catholic Famine Relief) and some 81 women community leaders. The object of these meetings was to develop a plan to accomplish two goals: to improve family well-being and health by increasing food production and cash income; and to create a model for the integrated development of rural enterprises that include women, which could be used in policy formation by the Government of Kenya. The women needed to learn ways to help themselves and improve their common condition.

Funds were received from UNCHS (Habitat), the Laing Foundation (U.K.), CIDA (Canada) and GTZ (Germany), among others. CHEK succeeded in acquiring security of tenure for the women, who formerly had no property rights. In 1981 it arranged for 60 women to be trained in bee-keeping, traditionally a male trade. Another group of 60 women received training on how to manufacture sun-dried, cement-stabilized earthen blocks. CHEK provided the equipment needed by this group. Other successful projects include the establishment of fish, goat and rabbit-breeding groups, a knitting group and a group that makes traditional baskets for export. The bee-keeping, honey processing and wax processing activities - including construction of the refinery and canteen buildings - have cost the group 750,000 Kenya Shillings.

CHEK and other groups were the main catalysts, but the women have become self-reliant and sure of their own potential. They no longer rely on technical or financial assistance; the projects have become self-supporting.

**Postscript:** The small town of Kibwezi has tripled in size and importance. The women's group is self-sufficient and produces enough to meet their basic needs for food, shelter and a cash income.

* For additional information, see *Women of Kibwezi*, a UNCHS (Habitat) publication.

## SUCCESS STORY: Environmental Education for Students at all Levels in Madagascar

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**Subject:** EFS

**Problem:** Madagascar's forests are being depleted at an alarming rate. At one time the island was completely forested. Presently only one-tenth of the original forest remains. Deforestation has caused an attendant soil erosion problem.

**Solution:** Education programs were initiated to inform adults and children of the environmental problems. Agroforestry projects were implemented in cleared areas. Charlotte Rajeriarison promotes research on environmental topics at Antananarivo University.

Madagascar has a number of environmental problems. The island was once entirely covered by forests. At the present time, only one-tenth of the original forest remains. Official statistics show that 300,000 hectares of forest disappear every year, mostly due to the fact that farmers burn the vegetation before cultivating the soil. This farming method works for one or two years, but after that, the soil is depleted of its nutrients. During the heavy rains in the summer, there is no vegetation to hold the soil in place. This erosion problem is especially pronounced in the highlands of the middle of the island. As a professor in the Botany Department at Antananarivo University, Charlotte Rajeriarison thinks one of the solutions to these problems is to educate people on how to implement agroforestry systems, so that they will no longer find it necessary to burn the forests.

Ms. Rajeriarison started an environmental education program in the primary school for children between the ages of 6-12 and in the high school for students aged 12-18. Students learn about plants and animals and the benefits that they offer. They learn how to use natural resources in a rational way. The program teaches students agroforestry techniques, and they actually implement them in their fields under the direction of a specialist, who also works in the village community. Farmers are taught how to use animal manure to fertilize their land instead of burning the forests for nutrients.

Professor Rajeriarison also participated in a seminar on environmental education for primary school, high school and university students held in Antananarivo from November 5-7, 1990. Moreover, she has been the head of the Botany Department at the University since February 1989 and has directed her students research, most of which has been done in the environmental field. Several papers on deforestation, soil erosion and related topics have been defended under her direction. She continues this activity. Some of the larger projects have been funded by international organizations such as World Wildlife Fund, Swiss Technical Cooperation, Conservation and Development (a French organization) and National Center about Environmental Research (a Malagasy institution).

**Postscript:** The education of children, teenagers and adults has increased awareness on the need for environmental protection. The agroforestry systems provide better crops and harvests. Ms. Rajeriarison received UNEP's 1992 Global 500 Award.

## SUCCESS STORY: Pollution Control in Lake Maruit, Egypt

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**Subject:** EFS

**Problem:** Lake Maruit was becoming dangerously polluted due to the discharge of industrial pollutants and domestic wastes into its waters. Fish became unfit for human consumption. Fishermen suffered a variety of maladies.

**Solution:** Dr. Saad has been involved in a project to demonstrate the treatment of industrial pollutants, water recycling and possible by-product recovery.

Lake Maruit in Egypt is surrounded by a community of more than a half a million people. About 10,000 people are employed as fishermen in the community. A number of industries that generate pollutants such as acids, alkalies, heavy metals and organic wastes are located along the shores of the lake. These include a match manufacturing company, a starch and yeast company, textile companies, petroleum and natural gas industries, and gas liquefication, recycled paper and salt production industries. No waste treatment facilities existed in the community. Fishermen faced a variety of health problems such as skin infections, allergies, eye diseases, gastrointestinal troubles, liver fibrosis and severe anemia. Dr. Saad, a member of the Sewage Authority Board, supervised research on lake fish populations such as tilapia nilotica, a species of fish consumed by many people because of its high protein value and low cost. The results indicated that the fish had accumulated pesticides and heavy metals and were unfit for human consumption. A majority of fishermen began to look for work in other fields.

Dr. Saad, in collaboration with the chairpersons of the industries involved, decided to demonstrate the possible treatment of industrial effluents discharged into the lake. Studies were also conducted on the possibilities of water recycling and of recovering by-products from industries. Initially, treatment technology was introduced to an industrial complex at a pilot scale. Management at the complex began to accept the ideas of in-plant control, waste minimization and end-of-pipe treatment as avenues to be pursued to reverse the adverse conditions in the lake.

Fifteen large-scale industries have been implementing in-plant control measures to curb the amount of waste discharged into the lake. The industries will be diverting their discharge to a new waste treatment plant located on the west side of Alexandria. In addition, industry operators have been providing training to their employees on in-plant pollution control measures and the selection of waste treatment technology. The ministries of irrigation, housing and health have been involved in the project as well. As a result, the aquatic environment of the lake is on a slow road to recovery as the sources of pollutants are gradually being reduced.

**Postscript:** Industries have become aware of the problem and are implementing measures to reduce the amount of waste discharged to the lake.

## SUCCESS STORY: The Women's Office of the Natural Resources Protection Group (NARP) Educates Sudanese Women About Dangerous Pesticides

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**Subject:** EFS

**Problem:** Pesticides, pharmaceuticals and cosmetics present health risks to women and children in Sudan. Women are targeted as consumers for products like cosmetics and contraceptives, but lack awareness of their dangers.

**Solution:** NARP's Women's Office organized workshops and used the mass media to educate women on dangerous pesticides and pharmaceuticals. They also lobbied the government of Sudan to ban or control dangerous pesticides and pharmaceuticals.

Women in Sudan were not aware of the dangers associated with the use of pesticides, drugs and cosmetics, although they are often targeted as consumers of these products. Meanwhile, pesticides banned elsewhere have found their way to Sudan through donations and sales, and many pills donated by international nongovernmental organizations (NGOs) are of unknown origin. Expired, badly stored and hazardous drugs are sold over the counter. Although skin-lightening products containing heavy metals are illegal, they are smuggled over the border and used by Sudanese women. When these harmful pesticides, drugs and cosmetics are used by pregnant or lactating women, the dangers increase.

The Natural Resources Protection Group (NARP) is an environmental NGO in Sudan. In January 1990, Yassmin Abu Samra and others in NARP's Women's Office initiated a program to inform and educate women on hazardous chemicals. They organized two week-long workshops. "Pesticides and Alternatives" covered hazardous uses of pesticides, laws and legislation, poisoning cases (pregnancy, miscarriages, infant deformity, etc.) and alternatives. Teachers, farmers, officials, housewives, refugees, NGOs, etc., shared their knowledge and documented problems relating to pesticide usage. The workshop entitled "Women and Pharmaceuticals" elaborated on the abuse of multinational drug sales, the denial of women's basic rights to contraceptive choice, useless and hazardous international donations, poisoning of mother and child by bad cosmetics, etc. Cosmetic saleswomen, students, a judge, family planning officials, nurses, researchers, social workers and physicians participated in this workshop. NARP made a point of including public officials, inviting the Plant Protection Directorate (PPD) Director and Vice-Minister of Health to inaugurate the workshops. The PPD plays a key role in chemical pesticide importation and legislation.) NARP also increased public awareness through effective use of the mass media, distributing information and lobbying public officials. Small-scale Dutch Fund, NOVIB, Oxfam-America and DANIDA funded the U.S. $12,000 program.

Progress has been made against the health threats posed by pesticides, pharmaceuticals and cosmetics. The public is more aware of the issues, and policy changes have occurred. A variety of hazardous pesticides have been banned or suspended. PPD officials are more concerned about and aware of the hazards of the use, handling and distribution of chemical pesticides. Although they once regarded NARP activists as rivals, they now relate to NARP on friendly and open terms. In the domain of drugs and cosmetics, the Division of Drug Analysis was upgraded to a department in the Ministry of Health. Its director is a NARP Women's Office steering committee member. More people recognize the importance of screening imported drugs.

**Postscript:** Significant changes in government policy occurred regarding pesticide imports. The public became better informed on the dangers of using various chemical pesticides, pharmaceuticals and cosmetics. A working relationship developed between NARP and formerly hostile public officials.

## SUCCESS STORY: *Thusano Lefatsheng* Promotes Sustainable Harvest of Veld Products, Botswana

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**Subject:** EFS

**Problem:** Due to the drought-prone climate, economic and household food insecurity are major problems. There was a strong need for diversification away from livestock production and arable production for both economic and ecological reasons.

**Solution:** *Thusano Lefatsheng* helps to meet the need for alternative sources of income, especially for rural women, by promoting sustainable exploitation of veld products, specifically indigenous food and medicinal plants.

In the past, rural households in Botswana relied upon livestock and arable agriculture for a significant part of their livelihood. Given the nature of the climate, household food insecurity and economic insecurity were major problems. "Drought-proof," self-reliant and sustainable livelihood strategies were urgently needed, particularly for women. There was a strong need for diversification away from livestock production with its reliance on a single market and its destructiveness to the rural ecology, and away from arable production with its high annual variability. Veld products are adapted to the harsh and variable climate, so that any income/employment/food benefits generated from their utilization will be less variable than those generated from arable crops. Moreover, harvesting and processing of such products will provide income to women, who generally do not control income from the main cash crops. Since control over income by women is a major determinant of family nutritional well-being, the whole community benefits.

*Thusano Lefatsheng* is a small nongovernmental organization that was set up in 1984 because of the growing awareness that veld products, specifically indigenous food and medicinal plants, are an under-exploited resource in Botswana. *Thusano Lefatsheng* has a small research farm called *Thusego* and is involved in a range of activities. They purchase, process and market indigenous veld products, particularly the Kalahari Devil's Claw plant, a well-known medicinal plant. *Thusano Lefatsheng* also develops, processes and promotes other indigenous products as new cash crops. These include Morula fruit, Morula kernels, Morama tubers and Morama beans. The group provides significant employment opportunities for rural women through its harvesting and processing activities. It also promotes ecologically sound harvesting techniques and protection of wild vegetation through development of successful cultivation techniques at the research farm. Finally, *Thusano Lefasheng* has developed a profitable and sustainable farming system whereby traditional crops, new crops, medicinal plants, trees and livestock are integrated to become a stable ecological system. Initial funding was mainly from HIVOS from the Netherlands, with support from UNICEF in 1990 for expansion. The project will become fully self-supporting in 1993.

By 1989, 1,500 harvesters and 10 processors were involved in these activities. Most of them are women from areas of extreme poverty. A 1989 study showed that this was one of the most profitable agricultural enterprises in the country. There is a demand for the veld products both on the domestic markets and in Europe. Reorganization and expansion of the project took place in 1990 to increase commercial production, processing and marketing activities, and to further develop research and extension activities.

**Postscript:** This project has had a remarkable impact. Rural women have increased their economic and household food security. Promotion of ecologically-sound harvesting techniques, protection of wild vegetation and diversification away from environmentally destructive methods of livestock farming are some of the other considerable benefits.

## SUCCESS STORY: Soil Erosion Control in the Community of Sagitwe, Kisoro Subdistrict, Uganda

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**Subject:** EFS

**Problem:** In a densely populated area, steep hillsides were being cultivated. Migration from Rwanda added to overuse of cultivated and pasture areas. Traditional farming methods left erosion largely unchecked. There was a lack of surface water sources.

**Solution:** Since the 1930s, farmers in the region have built grass, band and bench terraces to prevent erosion and to catch water runoff. Farmers in Sagitwe have practiced these methods more consistently and effectively than other farmers in the region.

The community of Sagitwe, a sub-parish consisting of five villages, lies in the hilly southwestern corner of Uganda in Kisoro Subdistrict. Population pressure on the land in southwestern Uganda began after the area's transition from pastoral activities and shifting cultivation in the 19th century to settled agriculture. This pressure on the land increased during the colonial era. Migration from neighboring Rwanda placed a further strain on the land.

In the 1930s, local extension officers and colonial powers worked with chiefs and residents to institute soil erosion controls. A district bylaw was passed requiring farmers to institute terracing in order to preserve the soils in this hilly region. Because residents in Sagitwe could see the need for such controls, they adopted them. The land in this area was unusually steep and densely populated with farmers. Thus, the need for such soil erosion controls was obvious to the farmers; they could see the results of soil loss in one season if they did not practice terracing. Tree planting also came into practice around the same time. The people of Sagitwe have continued to use soil and water conservation techniques up to the present time. Less well organized communities in the district have let their conservation practices slip.

Conservation practices consist of a variety of techniques. In band cultivation, cultivated bands across hillsides alternate with fallow bands. In grass or strip terracing, terraces are planted with napier grass to catch eroding soil. The grass terraces are broken down periodically to redistribute the soil. In band terracing, farmers physically cut a permanent, level terrace into the side of the hill. In bench terracing, crops are continuously cultivated through crop rotation and mulching. A series of sociocultural, economic and physical characteristics of the land determine which of these various types of terracing farmers practice. For example, an individual with a larger plot of land is more likely to find band terracing an acceptable option. Land in Sagitwe is individually held through customary tenure. Decisions about demarcation of plots are made collectively by the farmers.

Thanks to the community of Sagitwe's active interest in soil conservation, the soils in this area have been preserved and support such crops as wheat, beans, bananas and potatoes. Usually, enough crops are produced to feed the population, with some left over for sale.

**Postscript:** The villagers in Sagitwe have preserved the rich, volcanic soils on their hillsides. They produce enough to feed their families and also have a surplus to sell.

## SUCCESS STORY: The Women's Development Centre in Alban Gadeed, Sudan Uses Solar Energy and Promotes Backyard Gardening

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**Region:** AFRICA
**Subject:** Energy

**Problem:** The community of Alban Gadeed suffered from malnutrition and a lack of adequate energy sources.

**Solution:** A women's development center that uses an integrated approach to development was established. The center promotes cultivation of fruits and vegetables in backyard gardens and uses solar-generated electricity to support its activities.

Alban Gadeed, a rural community in the western state of the Sudan, suffered from malnutrition, partly due to the scarcity and high price of fruits and vegetables. Lack of adequate energy sources, especially electricity, was also a problem.

Three years ago, a women's development center designed to provide an integrated approach to development was set up in Alban Gadeed in collaboration with local women leaders and local institutions. The center is a community-based volunteer organization owned by the community and supported by the project. All of its beneficiaries, administrators and trainers are women, as are most of the project executors. The cost of this activity was approximately U.S. $17,000. Local NGOs and the Ministries of Health, Agriculture and Education collaborated with the center to implement the program. UNFPA/ILO provided funds and equipment. The regional Ministry of Agriculture, through the agricultural extension department, is responsible for the field coordination of these efforts at the state levels. Health visitors, midwives and doctors from the Ministry of Health were seconded to conduct training for health care workers and to deliver maternal and child health services to the community. Rural extension workers and teachers of adult education also were seconded to the project to provide training. The National Population Committee coordinated project implementation for the various institutions. Activities of the center included raising women's awareness about development and health issues, introduction of solar energy and the effective management of local resources. Women were trained on cultivating crops and the Agricultural Bank provided seedlings for backyard gardens. The local National Energy Committee provided solar equipment to generate electricity for lighting in the center and neighboring houses, as well as for video equipment, a refrigerator and a television.

As a result of the project, women started cultivating backyard gardens (*jubrakas*) with okra, cucumber and karkadi (a citrus fruit). The community benefited from the income generated by this activity and from the reduction in local market prices of fruits and vegetables: household food expenses decreased by 30%. Solar-generated electricity provided refrigeration for vaccines and enabled the use of video and TV for health education. Solar-powered lighting permitted the center to extend its hours and increase its level of activities.

**Postscript:** The women's gardens provide cash savings, better nutrition and additional income. Introduction of solar energy enabled the center to expand services and to double the intake of women trainees from 90 to 180 per course. The women are expanding their successful agricultural activities to include a variety of crop and seed production.

## SUCCESS STORY: Dezendani Women's Group Initiates an Afforestation Project in Paga-Kazugu, Ghana

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**Subject:** Energy

**Problem:** The Paga-Kazugu community faces severe deforestation and desertification. Women in particular suffer from a lack of wood for fuel.

**Solution:** The Dezendani Women's Group launched an afforestation project in conjunction with the United Nations Development Programme (UNDP).

The Paga-Kazugu area, in the upper east region of Ghana, is one of the most overgrazed and dry areas in the country. Deforestation is severe. Fuelwood shortages are both a cause and an effect of this deforestation. Paga-Kazuga does not have clean drinking water or access to a road. The area has a very low average rainfall.

The Dezendani Women's Group at Paga began in 1980 with 15 members. The group wanted to educate themselves about women's health issues and income-generating activities. Presently, the group has 85 members and has a president, vice president, secretary, treasurer and two trustees. Since women rely on wood for fuel, they resolved to initiate an afforestation project to protect the area and women, in particular, from further suffering. With the help of the United Nations Development Programme (UNDP), they have initiated an afforestation project. The implementors initiated the project to help open up the area and to reduce the suffering of women and children who are victims of the deprived area. The UNDP works through the Rural Women Association, of which the Dezendani Women's Group is a member. The group bought a donkey, a donkey cart and 20 buckets to help them in the tree-planting process. (The cart is used to transport water to young trees.) The project started in 1990 with 45 people. The sources of funding for the project are UNDP, the monthly dues paid by group members, donations from individuals and income-generating activities such as basket weaving and shea butter extraction. The total cost for the 1990 project was cedis 114,000. This year a total of cedis 20,000 was ear-marked for transplanting trees and cultivating groundnut farms.

The most beneficial environmental impact of the project is the prevention of desertification, which is fast approaching the Paga-Kazugu area, and the provision of fuelwood. In addition, the donkey cart has been very helpful for carting goods and thereby saving people from carrying loads on their heads. The group plants groundnuts for the extraction of groundnut oil for sale as an income-generating venture.

**Postscript:** The project is helping in the effort to halt desertification in the area and is supplying fuelwood.

## SUCCESS STORY: Evergreen Club of Ghana (ECOG)

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**Subject:** Energy

**Problem:** Deforestation and lack of education about the problems were prevalent.

**Solution:** The main objective of the Evergreen Club of Ghana (ECOG) was to increase people's awareness of the need for environmental protection through tree-planting exercises, seminars and drama.

Sakeena Bonsu is the president of ECOG, a Ghanaian nongovernmental organization committed to environmental protection. From its humble beginnings in 1987 as a local tree-planting club for schoolchildren, the association now boasts a very dedicated membership of both adults and children very eager to champion the crusade for environmental protection. Members unanimously agree that there can be no sustainable development if people do not understand the workings of the environment around them. ECOG adopted the objective to create awareness among the public on environmental problems and the need to protect the environment. Young people became the target group for ECOG's educational programs and projects. About 60% of the group's 400 members are schoolchildren. These young people were drawn to the group through tree-planting exercises, seminars and dramas.

On Saturday mornings adult members of ECOG meet at Garison Primary School in the Accra suburb of Burma Camp for talks, tree-planting exercises and discussions of programs and projects with schoolchildren from various schools. Regular biweekly meetings for adults take place on Wednesdays. Tree-planting projects have been undertaken in a number of schools in Burma Camp. The project has been sustained despite the threat of stray sheep and goats who eat the fresh leaves. Another complication arose as irresponsible community members removed fences built around the trees for protection. Despite these obstacles, the children have continued to protect their trees, most of which are thriving.

With help from adults, some young people developed a children's variety show for national television. The show consisted of a "talking point" on river pollution, a drama on combating poor sanitation in schools, and songs and poetry recitals warning humankind of the dangers of neglecting the environment. A one-week festival was planned in support of environmental protection. It was scheduled to coincide with World Environment Day, June 5, 1991. The week of seminars, tree-planting activities and membership drives cost about U.S. $5,000. Sources of funding for the project come from adult members of the club/association, individuals in the community and most recently, Africa 2000 of the UNDP. Lately emphasis has been placed on global warming and sanitation because these have a particular impact on African children.

The most important environmental impact of the project is that it has instilled in children the desire to accept the challenge of halting environmental degradation within their communities.

**Postscript:** The project enhanced environmental awareness among children and youth. It has instilled in them a desire to do something about environmental degradation, as demonstrated in their response to the tree-planting exercises and seminars.

## SUCCESS STORY: Small-Scale Gas Stove Production in Nigeria

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**Subject:** Energy

**Problem:** Excessive use of firewood for cooking caused air pollution and deforestation in the northern part of Nigeria. Moreover, women who used the traditional wood stove suffered from health problems because of the smoky conditions in the cooking area.

**Solution:** Grace A. Faoye designed a gas stove using local technology and available materials. She encouraged women to buy and use the stoves, disseminating information at village meetings.

In Nigeria, extensive use of firewood for cooking caused deforestation and air pollution. Some women suffered from reactionary conjunctivitis from smoke inhaled using traditional stoves. In 1984 Grace Faoye came up with the idea of designing a gas burning stove using local technology in order to remedy these problems. She knew a competent welder and noticed the availability of steel scraps from accident vehicles. Ms. Faoye believed that a stove could be designed to improve the unhealthy conditions in which women must work, especially when cooking large family meals during ceremonies. She learned of a commercial stove made in Japan which she wanted to buy but was told it was no longer available in Nigeria as a result of the declining economy. Undaunted, Ms. Faoye sketched a sample design and asked the welder to design a stove that could accommodate the large pots used for big meals in Nigeria. The welder produced a small, square stove that was well-matched to the needs of local women.

Production of the stoves began in 1988. All material used to build the stoves is obtained locally except for the gas control device, which is imported from Italy. Ms. Faoye reached women (mostly married women between the ages of 30 and 50) through village meetings where she urged them to buy and use the stoves. The stoves come in three sizes: small, medium and large. The cost of production is U.S. $10, $20 and $60, respectively. The funds to start production were obtained by a loan granted by a cooperative bank. The welder's shed in Ibadan was transformed into a stove "factory." Apprentices who came to learn how to fabricate the stoves became employed after they "graduated" and were able to start their own workshops. Most apprentices have been young men between the ages of 16-21. Distributors of the product also earn some income. The stove uses liquefied natural gas (lng), which is available in Nigeria at local petrol stations. At the present, attempts are being made to produce biogas from animal dung and farm waste. The International Institute of Tropical Agriculture (IITA) is pioneering this project, which cost U.S. $2,500. Technical assistance was provided by ILO.

More than 1,000 stoves have been sold since production was started. Women who bought the stoves use less firewood. The cooking atmosphere is less smoky, especially during the rainy season when the firewood is wet. Hence, one of the benefits of the stoves is that the health of women using the stoves has improved. In addition, women who use the new stoves save time since, compared to firewood, gas cooks food more quickly. Large-scale production of the stoves is prevented by a lack of funds. Ms. Faoye recommends mass production of the stoves through a government subsidy.

**Postscript:** Ms. Faoye has now become active with Solar Box Cookers International and is working to promote the use of solar energy in her community. She founded a Solar Energy Promoters Club to create awareness and has collaborated with the Federal University of Technology to build solar cookers. There are plans to establish a Nigerian Forum of the WorldWIDE Network and to hold a National Assembly of Women and the Environment.

## SUCCESS STORY: *Kwayedza* Community Woodlots Project in Zimbabwe

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**Region:** AFRICA

**Subject:** Energy

**Problem:** Deforestation in Zimbabwe, particularly in communal areas, has led to soil erosion and severe shortages of fuelwood and timber. Women must walk long distances to collect fuelwood or pay progressively higher prices for this critical commodity.

**Solution:** The *Kwayedza* Farmers Club held conservation awareness meetings, sought expert advice from Agritex, the Forestry Commission, the Natural Resources Board and NGOs, and initiated the *Kwayedza* Community Woodlots Project.

The majority of Zimbabwe's agricultural land consists of communal areas, most of which are located in the poorest climate zones, where soil is generally poor, sandy and arid. These overpopulated areas suffer from widespread deforestation. Many trees have been indiscriminately cut to make room for roads, housing and agricultural activities. The ever-increasing demand for fuelwood and building materials has also contributed to the over-exploitation of the forests. Thus, women must walk long distances to collect fuelwood. Other effects of deforestation include rapid soil erosion, the lack of fencing materials, the lack of windbreaks and shade trees in the villages and the rising price of fuelwood due to its scarcity.

Mbiru village in Chivhu District suffers from serious deforestation problems and fuelwood shortages. The village has a farmers association known as the *Kwayedza* Farmers Club. Olivia W. Hozheri is the group's secretary. The *Kwayedza* Farmers Club held conservation awareness meetings and sought advice from Agritex (Agricultural and Technical Extension Services) officials and the Forestry Commission. When the group became motivated and understood conservation methods, they initiated the *Kwayedza* Community Woodlots Project and planted woodlots. Among others, the goals of the project were to lessen women's workload by establishing woodlots for fuel; to enable women to obtain fuelwood for cooking; to provide poles for building and fencing; to check soil erosion; to provide windbreak and shade trees; to improve the organization of women and encourage their participation in decision-making processes; and to increase women's knowledge and self-awareness through education and training. Agritex provided extension services, and the Forestry Commission provided seedlings for trees and education on how to grow trees. The Natural Resources Board promoted conservation of natural resources. The Village Community Worker, elected from the community and by the community, assisted the project and liaised very closely with the ward community worker, Agritex, Forest Commission, Natural Resources Board, NGOs, etc. The afforestation activities quickly expanded to other groups in the area, district and province. To date, 1,915 farm group members belonging to 21 groups have planted 57 individual woodlots, 3 school woodlots and 21 group woodlots. Most of the participants are women. Self-reliance provided $8,696 of the $26,812 needed to fund the woodlots project.

As a result of the project, soil erosion has been greatly reduced and the participants do not have to buy fuel or walk long distances to collect fuelwood. The woodlots also provide building materials for cattle pens and fencing for vegetable gardens. The project, which won first prize on conservation at the provincial level in 1991, stimulated many groups and individuals to establish woodlots.

**Postscript:** The *Kwayedza* group has expanded its activities: an orchard of fruit trees has been established; new groups have created gardens; gum trees have been planted; a bee keeping project has been started; and young people have constructed fish ponds. The establishment of paddocks have reduced the heavy burden of women who herd cattle while children are at school. Drought has slowed progress on some projects.

## SUCCESS STORY: Woman Promotes the Use of More Efficient Wood Stoves in Burkina Faso

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**Region:** AFRICA

**Subject:** Energy

**Problem:** The area surrounding the village of Faramana, Burkina Faso was being deforested, partially due to the cutting of trees for fuelwood. Consequently, women had to walk increasing distances to gather fuelwood.

**Solution:** An improved wood stove extension project was designed and implemented. Later, the women established nurseries and cultivated forest seedlings, vegetables and fruits, selling the produce for the benefit of the group.

Deforestation was a major environmental problem in Burkina Faso. Most household energy, which constitutes a large share of overall energy use, was supplied by wood. Moreover, the use of modern fuel by the urban population was very limited. The industrial production of wood in Burkina Faso (6-7 million tons per year, 2.5 of which was used as fuel) was far lower than the total consumption of fuelwood. The shortage was compensated for by bringing new forests from preserved areas into cultivation. By causing large-scale deforestation, the imbalance between supply and demand of fuelwood posed a threat to the country's fragile ecological balance. Had nothing been done, the trend would have worsened due to population growth and increasing urbanization. The shortage of fuelwood affected women in particular.

The UNSO *Foyers Améliorés* Program (Improved Stoves Program) was begun in 1984. The program is directed by Marguerite Kabore and covers approximately 15% of the Burkina territory and 22% of the whole population. The improved wood stoves extension project began working in the village of Faramana in 1986. The women of the country, especially in Faramana, wanted to be more involved in politics, and the project inspired them to increase their involvement in "organized participatory policymaking" through sensitization campaigns, meetings and grassroots action. Thus, they readily responded when the government adopted a new policy promoting natural resource management. In interaction with the new government policies, the improved wood stoves extension project developed an integrated strategy, adding such activities as organized fuelwood cutting, forest management techniques, bushfire-reduction campaigns, multi-purpose seedling production and tree planting. The women established nurseries and cultivated forest seedlings, vegetables and fruits, selling the produce for the benefit of the group.

Many urban homes (36%) now use more efficient stoves, enabling people to reduce their wood consumption by 40%. In rural areas, the population is more sensitive to environmental issues and is able to make efficient wood stoves as a result of the Improved Stoves Program. Seedling, fruit and vegetable sales supplemented village incomes, and trees were planted in public places and yards. Authorities help to coordinate women's tasks with respect for the environment. The reforestation program, increasingly led by women, involves 200 women in Faramana in a seed-bed project. On the whole, the entire country has increased its consciousness about environmental threats, and women are more integrated into the society.

**Postscript:** Women are actively involved in natural resource management. The new stoves save wood. Seedling, fruit and vegetable sales supplement village incomes, and trees have been planted in public places and yards. The women of Faramana won first prize on World Environment Day, June 1992 in the "best nursery" contest organized each year in Burkina Faso.

## SUCCESS STORY: Tono-Vea Agroforestry Project in Ghana Checks Desertification

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**Region:** AFRICA

**Subject:** Energy

**Problem:** Population pressures had caused an acute fuelwood shortage and imminent localized desertification in the Sudan-Sahelian region of Ghana. Reduced tree cover caused accelerated sedimentation and siltation of dams.

**Solution:** UNDP and the Government of Ghana funded an agroforestry project that mobilized 19 community groups of women farmers to plant fast-growing species of trees in woodlots, in alley-cropping orchards on farms, along boundaries and streams, etc.

Birth rates of 3.5-5.0% in the Sudan-Sahelian region of Ghana led to large population increases, raising demand for both farmland and fuelwood. As a result, many trees were cut down to clear land for agriculture or for firewood. Frequent bush fires and high demand for wood as a roofing material further stressed the natural resource base. By 1988 these factors had reduced tree cover in the area of the Tono and Vea Irrigation Dams to less than 30%. This lack of vegetation caused severe fuelwood shortages, a decline in land productivity, and accelerated siltation and sedimentation of dams. Localized desertification was imminent.

In February 1988, UNDP and the Government of Ghana initiated a massive agroforestry project for the Tono and Vea areas to address these problems. ICOUR Limited - the company administering the two dams - is the implementing agency for the project, which costs U.S. $490,000. ICOUR implements part of this huge project through 19 groups of women farmers, including the Korania Women's Group headed by Benedicta Kamboe. Project implementors initially talked to women farmers about the problem of severe fuelwood shortages, environmental degradation and reduction in land productivity, and organized them into local women's groups for action. In some communities, local chiefs and elders helped mobilize the women. Once formed, the groups were sensitized on environmental issues via educational talks. The project encourages and assists the women to plant fast-growing species of trees in woodlots, in alley-cropping orchards on farms, and along streams and boundaries. The project ploughs members' farms free of charge and provides free tree seedlings. The problem of women's lack of access to land was overcome by allocating the women's groups land for their afforestation activities. Even so, in 1989 most of the community groups were not actively planting trees until the project organized a study tour for 11 women leaders to Burkina Faso to see what other women were doing.

Thousands of trees have been planted by the 3,400 women farmers participating in the project. This has checked localized desertification and erosion, and improved soils degraded by the lack of tree cover prior to the project. When the trees mature, women who have established woodlots will spend less time and money obtaining fuelwood. In addition, those who have improved soil fertility and soil structure on their farms by alley cropping will save on fertilizer costs.

**Postscript:** Erosion and localized desertification have been checked, and previously degraded soils improved. Once mature, the woodlots will allow women to spend less time and money obtaining fuelwood. Farmers who have alley-cropped their farms will have reduced fertilizer needs in the future.

## SUCCESS STORY: Green Islands Program in Ruiru, Kenya

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**Region:** AFRICA
**Subject:** Energy

**Problem:** Fuelwood was scarce in the Ruiru area of Kenya.

**Solution:** Sophia Kiarie started the Bellerive Foundation's first tree nursery program. She developed a successful approach to distributing, planting and nurturing seedlings through schools and organizations in her community.

Ruiru, Kenya is semi-arid and has limited agricultural potential. Fuelwood, water and vegetative cover are scarce. In 1981 Sophia Kiarie became involved with the work of the Bellerive Foundation, a new NGO that was working to conserve fuelwood in Kenya. Her family offered their land as the site for the Foundation's first stove-making facility. These stoves conserve fuelwood, and in an effort to get to the heart of the problem of decreasing fuelwood supply, Sophia Kiarie started the Foundation's first tree nursery program. She began raising seedlings and encouraging local people and groups to plant the trees in their plots. She established the first "Green Island" in 1985, using her own land, but tree planting activities did not mushroom until 1988, when she began targeting schoolchildren and youth for afforestation projects.

Ms. Kiarie organized tree-planting days for primary schools, engaging the participation of school headmasters, teachers, students and their parents. The Foundation's nursery provided the tree seedlings and wire fencing, and each family provided a fence post. Parents dug holes for planting and fencing. Every child planted a tree and became its nurturer. Since 1988, Ms. Kiarie has arranged planting activities for the establishment of Green Islands in 15 primary schools, 5 secondary schools, 2 universities and 3 government institutions. She also arranged tree-planting activities for Ruiru Town, the center reservations of roads and public places with the Boy Scouts, Girl Guides and university students.

Ms. Kiarie has developed a highly successful approach to distributing, planting and nurturing seedlings with the help of schools and other organizations. Sixty Green Islands, each with 500 to 5,000 trees, have been established. The project also helped farmers to plant tree belts in their farms. Small forests of many species flourish where before there was only barren ground. Altogether, the program has resulted in the planting of 2,000,000 trees by 100,000 people since 1982. The two million trees planted since 1982 provide fuelwood, shade, windbreaks, beauty and soil conservation. They also enhance soil fertility and moisture content. The Green Islands Program emphasizes the nurturing of tree seedlings to maturity; as a result, the trees have a survival rate of 50-95%. Green Islands demonstrates that when a problem like fuelwood scarcity is addressed at several levels with widespread community participation, extraordinary success is possible.

For her environmental work, Ms. Kiare received UNEP's 1987 Global 500 Roll of Honour and IUCN's Tree of Learning Award. She has also been locally recognized by the Hindu Council of Kenya.

**Postscript:** Sophia Kiarie has received favorable press coverage of her work, including a *Newsweek* article and a video produced by Transteel Television Network of Germany. She continues to organize more "Green Island" establishments in schools, colleges, government prisons and farmer's lots.

## SUCCESS STORY: The Green Belt Movement of Kenya

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**Subject:** Energy

**Problem:** Soil erosion and deforestation had created an acute shortage of wood, the major source of energy (fuelwood and charcoal) for over 90% of Kenya's rural population and low-income groups in the urban areas.

**Solution:** Through community groups, women's organizations, schools and church-affiliated associations, the Green Belt Movement was organized to encourage tree planting and to promote environmental conservation and sustainable development.

The Green Belt Movement of Kenya is an indigenous grassroots environment organization with tree planting as its basic activity. Although its objectives are many and varied, the Movement has used the tree as the focal point around which other environmental issues are discussed and brought to the attention of the public and decision makers. The Movement has been in existence since 1977. The main problems that its founders sought to address were desertification, the fuelwood and food crises, poverty, unemployment and underemployment, overpopulation, mismanagement of natural resources and the effects of these on the overall well-being of communities. The project was developed under the auspices of the National Council of Women of Kenya to adopt a holistic approach to development and to build on local expertise and abilities.

Green Belt Movement organizers have focused on tree planting, encouraging soil rehabilitation, water harvesting, reforestation and the protection of catchment areas, many of which have been deforested. Project organizers make tree planting an income-generating activity, especially for women. They encourage extensive tree farming by private small-scale farmers. They promote zero-grazing and organic farming as a means of improving soil fertility and food production. In addition, they have embarked on a campaign to promote indigenous trees and shrubs as well as indigenous initiatives in order to encourage self-reliance. They organize seminars, conferences, workshops, etc., on environmental management and sustainable development. There has been very little financial funding from within Kenya; however, enormous practical support for the movement has been given by the rural people in terms of labor, time and initiative. Financial aid has been received from the governments of Norway, Netherlands and Finland as well as from nongovernmental organizations in the U.S. and Germany.

The accomplishments of the Green Belt Movement have been far-reaching: over 1,000 tree nurseries have been established, and about 50,000 women are involved at these tree nursery sites. In the last 10 years, over seven million trees have been planted, with a survival rate of about 70-80%. Millions of tree seedlings have been issued to small-scale farmers, schools and churches. Women are beginning to harvest fuelwood from their own trees. Fruit trees are bearing fruit, a direct benefit to the family units. Fuel and water have become more readily available for domestic and public uses. In addition, the Movement has provided employment to young people. In coming together to plant trees, women have addressed other environmental concerns having to do with national development. The Green Belt Movement has been introduced in 12 African countries.

**Postscript:** Over 50,000 women have been involved in planting trees and over 1,000 tree nurseries have been established. Millions of tree seedlings have been issued to small-scale farmers, schools and churches, and the movement is being replicated in other African countries.

## SUCCESS STORY: Tree-Planting Campaign in the Dodoma Region of Tanzania

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**Region:** AFRICA
**Subject:** Energy

**Problem:** Drought, deforestation and unproductive land were the major environmental problems.

**Solution:** Zuhura Mdungi arranged a meeting for women in the community and invited a guest speaker from the Forestry Department. The group discussed several ways to address the environmental problems. The women formed tree-planting groups and conserved fuel.

During her visit to Dodoma Municipality in Central Tanzania in May 1985, Zuhura Mdungi discovered that most of the land was dry, empty and dusty as a result of the cutting of trees for firewood. The situation was quite serious; she saw women aged 50 and older carrying small bundles of sticks that they had collected four kilometers from their homes. In other parts of the village, she saw maize plants that were thin and dry due to lack of rain.

In response to the problem, Ms. Mdungi arranged a women's meeting and invited a guest speaker from the forestry division. The women learned that cutting down trees for firewood causes drought. They discussed the problem at length and eventually came up with a proposed solution. The project officially started in June 1985 when the group was supplied with 2,000 tree seedlings of different species. Out of the total, 500 seedlings were given free of charge by the forestry division, while the rest were purchased at five Tanzanian shillings per seedling. The estimated total cost to start the project amounted to 20,000 Tanzanian shillings. These costs were shared jointly among the Village Council, the Forestry Division and women's groups. They covered animal manure, transportation charges for seedlings, and tractor rental charges for tilling the dry land. When the seedlings were big enough, trees were planted all over the village, and each participant was assigned approximately 50 trees to care for. This number was quite big for one person to attend to, so it was decided to reduce the number of trees each villager had to care for to five, the villagers' main duty being to make sure that the tree survived.

After three years, the results were visible. The trees grew well, the land was green again, and rainfall increased. Soils have improved; they are naturally rich in plants and easier to keep productive. At the present time, no trees can be cut down for firewood because the trees planted are still young. In the meantime, women still have to walk far to collect firewood. They also use other sources of energy like charcoal, husks, sawdust and cow dung in special stoves designed to minimize the amount of energy used for cooking tasks. The project has been a success and of benefit to the women of Ntyuka village. They are happy with the project's outcome because the improved soils are being used for agriculture, especially for cropping and pasture. The most beneficial environmental impact of the project is that it has helped preserve the land against drought conditions. The danger of deforestation is slowly diminishing. Women play a big role in the tree-planting campaign in the Dodoma region, particularly in the rural areas. They have adopted the saying, *"Panda mti kwanza ndipo ukate mti."* ("Before you decide to cut down a tree, plant one first.")

**Postscript:** Visitors from other parts of the country, as well as government officials, have come to learn from the women of the Ntyuka village. Similar projects are planned for other communities. Zuhura Mdungi and her group have also encouraged local school children to become involved in planting and caring for the trees.

## SUCCESS STORY: Improved Stoves Program Fights *Deforestation in* Mauritania

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**Subject:** Energy

**Problem:** If the alarming rate of deforestation had continued in Mauritania, the majority of the forests would have disappeared within a few years.

**Solution:** The production of new and improved stoves reduced the amount of fuelwood consumption. Education on environmental issues, including the introduction of alternative energy resources, was provided to community members.

Mauritania, West Africa suffers from a significant shortage of wood resources. Population growth and the subsequent need for greater amounts of fuelwood exerted pressure on forests to supply this resource. The forests, most of which are concentrated in the south of the country, cover only 8.9 million acres of the country (3.5%) and are often sparse (steppes and savanna). Demand for fuelwood far outstripped supply in the country. The trend toward deforestation would have had disastrous effects if left unchecked. The lack of forestry services, appropriate technology, experts on environmental issues and clear environmental policies hindered resolution to the problems. Moreover, the living conditions of citizens, especially women, needed improvement.

Since 1987, the Mauritanian Government has been fighting desertification. With financial help from UNSO (United Nations Sudano-Sahelian Office) and UNIFEM, the Improved Stove Program was initiated to reduce charcoal consumption by promoting the use of more efficient stoves. These stoves save wood resources, thereby reducing the pressure put on forests due to energy needs. Information campaigns were crucial for the success of the project. It was also important to train people to manufacture the reliable, efficient and cheap stoves. The cost to manufacture the stoves was kept low so that most inhabitants could afford them. Different measures have been taken to accelerate the diffusion of stoves into households, especially in Nouakchott. For example, a private commercial network accelerated the popularization of the stoves.

The results of the project initiated four years ago are now visible. Thirteen thousand stoves called *malasha* have been distributed. The savings of charcoal in Nouakchott is estimated to be nearly 5,800 tons. Approximately 7,200 hectares of forest have been preserved. In monetary terms, these savings amount to about U.S. $2,175,000. Moreover, the models are appropriate to the needs of women. So far 180 people, 10 of whom are handicapped, have been trained to manufacture the improved stoves. For the handicapped, stove manufacture provides a source of income and an opportunity to be integrated into the society. In addition, it has been shown that use of the stoves will undoubtedly reduce domestic expenses for fuel and alleviate the burden on women to collect firewood for cooking. However, the ultimate benefit of promoting the use of the stoves is the preservation of the environment in Mauritania.

**Postscript:** Initiated in 1987, the national program to reduce fuelwood consumption and to control deforestation has already shown its efficiency in dealing with both the environment and the living conditions of the inhabitants.

## SUCCESS STORY: Reforestation Project Initiated by the Inner Wheel Club of Calabar, Nigeria

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**Subject:** Energy

**Problem:** The forests were being cleared for construction purposes. Consequently, soil erosion was a problem for the community.

**Solution:** An existing social club mobilized their members to work as a team to identify a solution to the problem. They have engaged in tree-planting activities to provide shade and to replace those that are cut down.

Calabar, a seaport in Cross River State, Nigeria, has serious erosion problems. The many gullies in the area threaten lives and property when there are heavy downpours, especially during the rainy season (May-October). Clearing forested land for buildings and roads has accelerated the pace of the erosion. People have been known to drown in floodwaters during heavy downpours. Fuel shortages are often a problem because the city is located far from oil depots. When fuel shortages occur, people scramble for firewood, further clearing the forests and exacerbating erosion.

An existing social club called the Inner Wheel Club of Calabar, Nigeria mobilized their members to work as a team to identify a solution to the problems. The group was founded in 1983 and is a branch of the Nigerian body, which in turn is part of a worldwide organization. Members are wives of Rotarians. One of their objectives is to promote international understanding.

Through public lectures to members of the club, Stella Ogbuagu challenged the women to participate in an afforestation project to make a lasting difference in the city. This project is one of several aimed at making life a little more tolerable for the city's inhabitants. The entire membership (all women) initiated and took part in tree-planting activities to provide shade and to replace those that had been cut down. They got the Military Governor of Cross River State to participate by planting the first tree. The project has been in existence for four years. It is funded by membership dues and generous donations from the government and individuals.

The club has been successful in organizing and mobilizing their resources. Trees are growing, and the club has handed the project over to the municipal government to maintain.

**Postscript:** The community has benefited from the decreased soil erosion. The trees are thriving and the municipal government is now taking responsibility for the continued care of the trees.

## SUCCESS STORY: The Pusu Women's Group in Kenya Addresses Energy Shortages With Its Women and Energy Program

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**Subject:** Energy

**Problem:** Community members were unable to meet their needs using the standard methods of subsistence agriculture and cattle raising. These practices had also led to a fuelwood shortage.

**Solution:** The Pusu Women's Group, Heifer Project International and the Ministry of Livestock collaborated to introduce zero-grazing and sustainable farming methods to small-scale farmers. The self-help group also initiated a Women and Energy Project.

Small-scale farmers in the Kadongo area of Kenya were unable to meet their needs by relying solely on the usual methods of subsistence farming and cattle raising. Continuous cropping with constant fertilizer usage had exhausted the soil, so crop yields were low. In addition, with the decline in land productivity, farmers expanded the area under crop production, creating a scarcity of fuelwood. Women were forced to spend more hours looking for fuelwood, hence reducing time spent on agricultural activities. Cattle were kept on open grazing. This exposed the cattle to a higher risk of disease and resulted in overstocking, which lowered milk yields. Thus, the community suffered from insufficient food supply, poor nutrition, low cattle productivity, low incomes and a shortage of fuelwood.

In 1986 the Pusu Women's Group, a self-help group established in 1980, developed a proposal for a heifer project with assistance from a Peace Corps volunteer and the Heifer Project International (HPI) representative. The project, sponsored by HPI in conjunction with the National Dairy Project of the Ministry of Livestock Development, helps group members to introduce and use sustainable farming and zero-grazing methods on their farms. Cattle are confined in a pen with water and feed troughs and a sheltered resting area; this lessens the spread of disease and raises milk yields. The farmer plants bana grass for cattle feed, and intercrops maize, sorghum, sweet potatoes, vegetables and groundnuts for farm family consumption. HPI provided technical assistance and funds for the purchase of cattle and equipment; group members contributed cash and services. Seventy dairy cows are currently distributed among group members thanks to the ongoing project. In 1990 the women's group initiated the Women and Energy Project, distributing 5,000 tree seedlings to their members from the group's own nursery, and selling and installing 175 fuel-efficient stoves.

The project has enabled the participants to establish a sustainable farming system that provides opportunities for improved nutrition and income, while reducing environmental problems. Milk yields under the zero-grazing method are very high. This milk supply improves family nutrition and also provides a good source of income. Crop yields under the sustainable farming system are also good and can sustain a family throughout the year. Thus, the heifer project enables farmers to meet their needs on a small piece of land. This reduces the necessity for conversion of forested land, thereby protecting energy sources. The Pusu Group's afforestation activities and introduction of fuel-efficient stoves also alleviate the local fuelwood shortage.

**Postscript:** The sustainable farming and cattle raising system provides better nutrition and a good source of income. It also reduces land pressures. 275 fuel-efficient stoves have been disseminated in the Pusu area to conserve fuelwood resources. The group's annual seedling distribution has gone up to 6,000/year encouraging afforestation.

## SUCCESS STORY: Esiphezini District in Zimbabwe Plants a Community Woodlot

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**Subject:** Energy

**Problem:** Denudation, a need for fuelwood and imminent desertification adversely affected the inhabitants of the Esphezini District in Zimbabwe.

**Solution:** With assistance from the Women's Institutes of Zimbabwe, Africa 2000 and the Forestry Commission, the community worked together to establish a communal woodlot. In addition, the Ministry of Energy donated 25 coal-burning stoves.

Esiphezini District in Zimbabwe was adversely affected by denudation, imminent desertification and a lack of locally available fuelwood. Women had to walk long distances in search of fuelwood.

Chief Sigola called a meeting *(indaba)* of counselors to discuss the problems and possible solutions. The Women's Institutes of Zimbabwe, an NGO, was invited to give help and advice. The community decided to establish a woodlot that would provide vegetables, fuelwood and building timber. Acting on behalf of Africa 2000 (a UNDP project) and the Women's Institutes (W.I.), Audrey Peel is the coordinator for this project. In April 1990, Africa 2000 supplied funds for goat-proof fencing. With the 1,600 trees W.I. purchased from the Forestry Commission, the community was ready to establish the woodlot.

Wednesdays were designated as community work days. Almost all working-aged people took part, especially women, who provided most of the labor, chaired committees and organized work parties. The community planted the woodlot on undulating land and built small soil "walls" on the downside of each tree to retain water. Beans and tomatoes were planted around the trees. The children of Sigola Primary School built a tree nursery, where sufficient hedging is being propagated to provide live fencing for three additional woodlots. The tree nursery is an ongoing activity that will provide trees to extend the woodlots. The community hopes the nursery will also be able to provide hedging plants and tree seedlings to neighboring areas. The children visit the woodlot regularly to weed and water the trees.

As a result of the project, soil has been conserved. Moreover, rainfall may increase in this area where rainfall is extremely variable and drought conditions often prevail. Agroforestry in the woodlot provides vegetables, permitting cash savings. In addition, when the trees mature in 4-7 years, the woodlot will provide fuelwood and building timber. In the meantime, the 25 coal-burning stoves donated to the community by the Ministry of Energy will help prevent deforestation. Women have acquired leadership skills.

**Postscript:** The Women's Institute has continued its collaboration with Africa 2000 to promote tree-planting and create communal woodlots in the Esphezini District. Field trips and tree-planting days are among the group's new activities to increase conservation awareness among children in urban schools.

## SUCCESS STORY: A Three-Pronged Environmental *Protection Project* in Fenerive, Madagascar

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**Subject:** Energy

**Problem:** Deforestation, lack of community awareness on environmental issues and the low nutritional status of women and children are among the basic problems which this project is addressing.

**Solution:** Nutritional education, through primary school education, provided the entry point for a range of other activities in an integrated environment project.

Deforestation and food insecurity are major problems in Madagascar. Each year, about 150,000 acres of forest are destroyed, with domestic energy requirements contributing to the problem. Another serious problem is food insecurity, which was infrequent before 1978. Chronic protein-calorie malnutrition affects around 70% of the population, while severe malnutrition effects 62% of children in the under-five age group.

The Government of Madagascar is aware that the only way to solve these problems is through a package of coordinated measures in various sectors of the economy such as agriculture, forestry, health and public works. To this end, the Government initiated a project in Fenerive District in Tamatave Province, with support from UNICEF. The project utilized the access to the community provided by the primary schools: a school nutrition education program linked to agricultural production activities in primary school formed the entry point for an integrated environment project. Project activities were aimed at reaching three main objectives: improvement of the health and nutrition status of children and women; promotion of food production, animal breeding and environmental protection; and promotion of community development and skill development for youth. Local NGOs and relevant government ministries (education, agriculture, water and forestry, animal production and fishery, population and social affairs) participated in project implementation.

The project started in 1989, and after two years of implementation it has made considerable progress. The whole community, particularly the women, became involved in the new initiatives and sensitized to environmental issues. Households and communities were sensitized to create local peasants' associations, and association members received training on the establishment of village/household nursery gardens. A wide variety of seeds and plants were provided to target villages and to all primary schools, and new varieties of market garden cultivation and fruit and coconut plants were introduced. Afforestation efforts were aimed at soil preservation; thus, the villagers and children were sensitized to invest more effort in agroforestry and to fight against cultivation on scorched soil. The target villages and all primary schools were provided with gardening equipment and assisted by technicians from the district water and forest departments. The project also promoted improved stoves and ovens through the primary schools. Parents received training to make bricks and build collective stoves and ovens for the local primary schools attended by their children, as well as for the local health posts. The villagers have adopted this innovation since it requires less wood and reduces health hazards. The project revealed that the activities the residents responded to the most were those where women were actively involved in the training, promotion and participation.

**Postscript:** After two years of implementation, the project has made progress on all three fronts. Among other positive developments, villagers initiated agroforestry activities and began to use fuel-efficient stoves. From the successful experience of this project, a new environmental project is being planned for five more districts.

## SUCCESS STORY: Introduction of Biogas Technology in the Dodoma Region, Tanzania

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**Subject:** Energy

**Problem:** In the rural areas of Tanzania, energy needs have led to several problems. Excessive felling of trees for use as fuelwood has caused widespread deforestation. The burning of cow dung and agricultural wastes as fuel has degraded soils.

**Solution:** The Dodoma Rural Energy Project, funded by the Government of Tanzania through the Tanzania National Scientific Research Council, constructed two biogas plants to provide fuel for a hotel run by a women's group and for cooking at a dispensary.

Fuelwood is the main source of energy in Dodoma, a semi-arid region in Tanzania. Almost the entire region suffers from deforestation due to the excessive felling of trees for use as fuelwood. The fuel shortage also results in the burning of cow dung and agricultural residues, depriving agricultural land of much needed fertilizer. The soils available for vegetable gardening are poor.

The Tanzania National Scientific Research Council (now the Tanzania Commission for Science and Technology) initiated the Dodoma Rural Energy Project to evaluate, examine and develop alternative energy technologies based on environmentally sound renewable energy sources. The project's aim was to help alleviate the energy problems affecting the rural communities in Dodoma. Janet Sambali, Principal Scientific Officer with the Tanzanian Commission for Science and Technology, had read about and seen biodigesters used in India. In 1981, a team of four implementors from the Commission, led by Janet Sambali, initiated a biogas project in Msanga village as part of the Dodoma Rural Energy Project. Two biogas plants were constructed. One plant provided fuel for a small hotel and the other provided fuel for cooking at a dispensary. The team carried out the project with the assistance and involvement of the village-level Tanzania Women's Organization (UWT), a women's association affiliated with Tanzania's ruling party. The eight active women in the village's UWT group run the small hotel. They also carry out other income-generating projects. The cost of constructing the biogas plants was 15,000 Tanzanian shillings per plant.

Prior to the biogas project, the women either spent about 500 Tanzanian shillings each month on the purchase of fuelwood, collected wood themselves or burned cow dung and other agricultural wastes. The introduction of biogas technology in Msanga reduced deforestation in the area. Also, converting the cow dung to fuel through the biodigester rather than directly burning it permits the recycling of cow dung - women use the digested slurry as manure on their vegetable gardens. The enriched gardens are very successful, and generate jobs and income for the group. The women also spend less money on fuel and enjoy a clean, smokeless kitchen environment. However, introduction of biogas technology in Msanga met with several obstacles. Dung is difficult to collect because cattle are kept under a free-roaming system. Also, the Indian type biogas plant proved to be too expensive for the peasants. Hence, although the two biogas plants are still operational, biogas technology has not been well accepted in the area. However, it has been well accepted in Arusha region, where conditions are more favorable and the cattle are kept under the zero-grazing system. One hundred inexpensive Chinese dome-type plants have been introduced in Arusha.

**Postscript:** The over-exploitation of forests due to fuelwood collection has decreased. Women earn additional income from their vegetable gardens. The women enjoy health benefits from having a cleaner, smokeless kitchen environment and spend less money on fuel.

## SUCCESS STORY: Introduction of Kerosene Stoves Saves Time and Energy, and Prevents Fire Hazards

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**Subject:** Energy

**Problem:** Gathering of agricultural residues, such as straw, to fuel traditional ovens proved to be time consuming. Moreover, the villagers stored straw in their homes, and this presented a fire hazard.

**Solution:** The implementors introduced a multi-purpose oven which uses kerosene rather than straw. They did this by spreading information about the oven and by demonstrating its use in villages in Egypt.

Operating traditional ovens was hard, tedious work. These types of ovens are operated by burning large amounts of straw inside the oven for several hours in order to attain the temperature required for baking. Since the stoves require large amounts of straw, collecting and transporting straw from the fields is tedious and expensive. Storing straw in the house or on the roof posed a fire hazard. Farmers stopped baking because with the traditional ovens, it had become a very labor-intensive and time-consuming activity. Moreover, baking with straw makes the cooking area unclean, because the straw does not burn completely and efficiently.

Dr. Kamilia Shoukry and the other implementors of the project addressed the problem by introducing a multi-purpose oven that burns kerosene rather than straw to villages in Egypt. Kerosene-burning ovens are better for the environment because they are completely insulated and have a very safe ignition system. The fuel is very cheap and available, and the ovens have chimneys that take the gases out of the house. Such multi-purpose ovens were introduced by the Baking Technology Department of the Agriculture Research Center, Ministry of Agriculture, Egypt. The Department of Baking and Technology manufactures the stoves. Since November 1989, Dr. Shoukry and the others have been spreading the word about the stoves and have been giving demonstrations in villages. The activity was a pilot project of the Egyptian Ministry of Social Affairs to integrate rural women in development. The Government of the Netherlands was a donor, and the Food and Agriculture Organization (FAO) assisted in the development and execution of the activities. The cost of building a stove is between U.S. $100-200. This cost depends on the availability of needed material at each site and the transportation costs. It costs U.S. $150 to conduct two training sessions for 15 people on the use of the multi-purpose ovens.

The savings and benefits of the activity are large. The design of the stove is better suited to the way the villagers cook. With the same amount of energy required to bake bread in a traditional oven, one can bake bread, and at the same time provide the house with hot water and a warm cabinet suitable for fermenting yogurt and ripening fruit. In addition, by using the new stove, a villager can avoid storing large amounts of straw inside the house, thereby preventing fire hazards. Since the project was initiated, 60 houses have asked for the new multi-purpose ovens or have asked to have their traditional ovens remodeled.

**Postscript:** The new ovens are less of a fire hazard than the traditional ones and cause less pollution. In addition, these ovens save time and are more efficient.

## SUCCESS STORY: Promoting Community Participation to Improve Cairo's Public Housing

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**Subject:** Waste

**Problem:** Public housing neighborhoods in Cairo had deteriorated due to a lack of government facilities for maintaining them. Garbage accumulated in open areas, sewage lines were blocked, sewage mixed with drinking water, etc. This created health hazards.

**Solution:** Wafaa Ahmed Abdalla trained government workers in community participation stimulation methodology. Government, community leaders and community members collaborated to initiate improvement projects based on self-reliance.

In the 1960s, the Egyptian Government established public housing neighborhoods in Cairo, which proceeded to deteriorate due to the lack of government facilities to maintain them. This deterioration reached a peak in the mid-1970s, when blockage of sewage systems, sewage water flooding, and the accumulation of garbage in open areas became widespread problems. In 1978 public housing residents in the Khalafawy neighborhood initiated a self-help project to improve their environment. Their drinking water was contaminated due to dilapidated sewage and water pipe networks. Heaps of garbage with no system of clearance led to insect and rodent infestations. Health problems had begun to spread. Disgusted by these conditions, residents developed a plan for improving the environment of their 60-family housing block, which the community then carried out using self-financing and volunteer labor. They replaced the broken network of water pipes, unblocked sewage lines, removed the accumulated garbage and established a garden. They also arranged for garbage collection and created a children's garden. Their example stimulated other public housing blocks to initiate similar efforts.

Beginning in 1981, Wafaa Ahmed Abdalla, a senior expert in planning with the Institute of National Planning in Cairo, became involved in providing support to the Khalafawy community's efforts and in evaluating the factors underlying their success. With the knowledge gained from this exposure, Ms. Abdalla developed an applied methodology for stimulating community participation for community improvement. From 1985 to 1987, she conducted a training program for 22 government horticulture engineers. They received training on community participation stimulation methods for environment improvement in public housing areas. Five successful environment improvement projects based on community self-reliance were subsequently implemented in five public housing neighborhoods. These projects were the result of cooperation between the trainees representing the government and community leaders representing neighborhood residents. Residents contributed in the planning phase of the projects through their representatives (community leaders), who participated in problem identification, discussions, solution creation and planning for implementation. Many community members of all ages participated in project implementation through such tasks as clearing accumulated waste.

As a result of the project, 5,000 residents belonging to five public housing communities improved their outdoor environment and consequently improved their health status. Trees and flowers replaced sewage water and garbage.

**Postscript:** Five outdoor environment improvement projects were successfully carried out in five public housing neighborhoods in Cairo. The areas became cleaner and more attractive and public health threats were diminished, benefiting the 5,000 residents.

## SUCCESS STORY: The "Clean and Beautiful Swaziland" Campaign

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**Subject:** Waste

**Problem:** Services and facilities were insufficient to handle the rapidly increasing amounts of solid waste, which caused pollution and disease.

**Solution:** Dr. Irma Allen launched a national cleanup and beautification campaign and formed a large group with representatives from various sectors of the community. Sub-groups met regularly and discussed strategies to improve the environment.

Services and facilities in Swaziland were inadequate to cope with the rapidly increasing amounts of solid waste. Residents of two central towns disposed of rubbish in gullies formed by erosion. This resulted in the pollution of water that ran into the main river. Consequently, residents suffered from an alarming rate of gastrointestinal disease. Accidents, too, occurred as a result of the pollution. In some instances, cows died after having swallowed discarded plastic bags.

In 1986 Irma Allen, facilitated by the National Environmental Education Program, launched a national cleanup and beautification campaign to respond to the problem of solid waste disposal. Dr. Allen, in launching her campaign, invited representatives from appropriate government departments, town councils and nongovernmental organizations such as the Boy Scouts, the Environmental Health Association and leading women's organizations. In all, 40 organizations were involved. Interested members formed a large group and divided themselves, according to their interests, into five sub-groups, most of which were led by women. The sub-groups' topics of interest included recycling, education, decision-making, media and business. Each group discussed and planned their activities for the upcoming weeks and scheduled a time when they would reconvene. At the next meeting, each group would report their achievements to all the participants, and then group planning would begin again.

The campaign turned out to be a resounding success. Whole stretches of roadside were "adopted" and kept clean by various schools or groups. One of the most active groups was the recycling group, with mostly women members, which carried out a paper and glass recycling project. The group has found the means to purchase a mobile can baler and will soon be recycling cans as well. Two rivers which run past the towns of Mbabane and Manzini have been the objects of a cleanup program by the Rotary Club. School groups have organized tree-planting days, thereby helping to halt soil erosion. This year the campaign is focusing on human waste disposal and providing adequate pit latrines for residents.

To Dr. Allen's surprise, what started out as a short term campaign has become a continuous and ongoing campaign that is gaining support from more and more individuals and organizations. Dr. Allen received UNEP's 1988 Global 500 Award for her outstanding work for the protection and improvement of the environment.

**Postscript:** The campaign has been effective in mobilizing all sectors of the community to address and to work towards solving the solid waste disposal problem. A baler had been purchased, successful tin can and glass recycling projects launched, and an anti-litter bill formulated.

## SUCCESS STORY: Women, Health and Employment in Mali

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**Subject:** Waste

**Problem:** A large number of Mali's young women graduates are unemployed. In a country like Mali, whose population is rapidly expanding, waste disposal and the lack of sanitation are serious problems, particularly in cities such as Bamako.

**Solution:** The project provided employment to 16 young female degree-holders in the sector of waste disposal and sanitation. During the course of the project, special training on hygiene and family planning was extended to poor women and their families.

Malian graduates find it very hard to find employment after they finish university work, especially after the government stopped hiring graduates for the civil service. In response, the *Union National des Femmes du Mali* had come together to find a solution to this problem. Subsequently, the head of the African division of PROWWESS (Promotion of the Role of Women in Water and Environmental Sanitation) developed an idea for a project in Bamako that simultaneously addresses concerns about the increasing quantities of rubbish, the rapidly expanding population and the high unemployment among graduated women. The project's objectives are to improve the socioeconomic situation and health of women and their families; to integrate women's participation in development; and to promote 16 young female graduates to manage a small sanitation enterprise and educate poor women in sanitation and family health.

The Ministry of Health and Social Affairs executed the project in collaboration with UNFPA, PROWWESS and the Ministry of National Education, Labour and Public Services. UNIFEM funded the implementation of the project, which started in January 1990. UNDP and PROWWESS provided the graduates with training, and UNFPA financed the production of family planning materials.

Project activities included: selection of 16 young female graduates; training of the women in small enterprise management; formation of the garbage collection cooperative; running of the enterprise for garbage collection and sanitation; creation of a fund for enterprise revenues to be used to create their own businesses; elaboration and production of training materials on sanitation and family health; and participatory survey and training by the 16 participants in the area where they would work.

Through the help of the project, 16 graduate women have started their own businesses and are now employed. The environmental and health situation is improving in the Medina-Coure neighborhood, which has about 17,500 inhabitants. There is more awareness on health, sanitation and family planning issues among poor women and their families. Both the local government and other municipalities have responded enthusiastically to the initiative and are considering similar follow-up efforts.

**Postscript:** Sixteen young female graduates have obtained employment and have started their own businesses. The environmental and health situation is improving in the Medina-Coure neighborhood of Bamako. There is more awareness about health, sanitation and family planning issues among poor women and their families.

## SUCCESS STORY: Recycling Household Waste in South Africa

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**Subject:** Waste

**Problem:** Rural people were not using the ground around their huts and homes efficiently. Organic matter that could have been used as compost for home gardens was swept away.

**Solution:** An EarthCare team with Ecolink initiated a program to educate the local population of women about the benefits of home gardens and the ways waste items can be recycled and utilized in the gardens.

The local population of KaNgwane did not use the ground around their huts efficiently and allowed organic matter that could be used as compost in home gardens to go to waste.

Gladys Khangwayini Mashinini, an EarthCare team leader with Ecolink, a nongovernmental organization, initiated a garden/nutrition project in KaNgwane after an assessment of community needs was made. She first attended a training course to observe how a similar project was being conducted in another part of South Africa. Then three team members were chosen. The team began visiting rural communities and meeting with women leaders to discuss what was most needed. From these discussions, the Earthcare team initiated nutrition lessons, food demonstrations and training in the trench garden technique among the local women. The trench garden method uses organic kitchen waste, grass cuttings and crushed glass to produce chemical-free vegetables at low cost.

The team demonstrated the advantages of home gardens and recycling and produced a brochure with illustrations and easy-to-follow instructions that explained how to create a home garden. The key to designing an effective brochure was using simple wording, simple illustrations to complement the words and illustrations that depicted black participants. The team pays daily visits to the community groups participating in the project. Private donors - mainly Nestle South Africa - fund the project, which costs about U.S. $50,000 annually. One obstacle was that local women had very little money with which to buy the seeds needed for the initial planting, although vegetable sales cover the costs of future plantings.

The home gardens produce cheap vegetables that are free of chemicals. This project improved the nutrition of the township and saved cash formerly used to purchase vegetables for consumption. It also reduced household waste. Community women are the sole participants, although the men are supportive of their efforts.

**Postscript:** Community members are able to produce chemical-free vegetables economically. The project contributes to improved nutrition and reduces household waste by recycling. It has also produced cash savings at the household level. Ms. Mashinini received the 1992 Global 500 Award presented each year on World Environment Day.

## SUCCESS STORY: Sanitary Facilities for the Kgalagadi District of Botswana

**Presenter:** Goitsemang Baebele

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**Region:** AFRICA

**Subject:** Water

**Problem:** A severe outbreak of diarrhea occurred in the Kgalagadi district due to water contaminated with human and animal waste.

**Solution:** Six members of the Kgalagadi District Council started sanitation programs in the district's 28 villages. With money from the Ministries of Health and Local Government and Lands, the Health Council built toilets to demonstrate to villagers.

The Kgalagadi District is a desert area located in the southwestern part of Botswana. In early 1989, there was an outbreak of diarrhea among both children and adults in the district due to poor sanitation and contaminated water. Out of every 10 patients who went to the local health facility, eight suffered from diarrhea, vomiting or both. The healthcare workers in the district suspected water contamination. They took samples in the area and delivered them to Gaborone, the capital city of Botswana, for analysis. The results showed that the water was contaminated with fecal matter from animals and humans, thus explaining the diarrhea outbreak. There are 28 villages in Kgalagadi, each with populations of 200 or more people. Some villages had more serious cases than others. The Ministry of Health was informed about the situation. The Ministry of Health and the Ministry of Local Government and Lands granted U.S. $16,625 to the Health Council to address the problem.

Goitsemang Baebele, along with four other members of the Kgalagadi District Council, started sanitation programs in every village. The district's Health Council, with a staff of 250 people, decided to use the limited amount of money to build toilets for demonstration to villagers. Health workers coordinated the project at the village level. They had to teach the community how to use locally available resources, (i.e. mud bricks and grass thatching), since other building materials like corrugated iron sheets are very expensive in the desert. With Council funds, 30 demonstration toilets were built in different villages. The health workers approached the chiefs in each village and *Kgotla* meetings (town meetings) were called to inform villagers what the problems were and what they could do to solve them. Health workers also offered seminars for people in different villages. In the next phase of the project, health workers approached women in churches, clubs, etc., to teach them how to store water in the home and to boil water before use. Hand-washing programs were introduced in the schools.

Three months after the implementation of the project, the incidence of diarrhea decreased. In 1990 more money was solicited, and 60 more toilets were built. By the end of the year, a total of 280 toilets were built. Women's groups in the villages now educate community members about water issues. In 1991 the Council requested additional funding from the Government, and U.S. $192,000 was granted for the continuation of the project. An incentive program will be initiated in which a free toilet substructure will be given to each household. The District Health Team has been supplied with kits to test water from boreholes on a quarterly basis.

**Postscript:** There has been an increased awareness about the links between adequate health care and the environment. Sanitary conditions and overall health of the community have improved.

## SUCCESS STORY: Well Project in Chiredzi District, *Zimbabwe*

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**Region:** AFRICA

**Subject:** Water

**Problem:** There was a lack of clean water in the Chiredzi District in Zimbabwe. People were forced to use contaminated water, and this caused diseases such as cholera, typhoid, diarrhea and bilharzia.

**Solution:** The Lutheran World Federation (LWF) approached the District Administrator (DA) with plans for employing people to maintain boreholes.

The community of the Chiredzi District in southern Zimbabwe, with a population of more than 10,000 people, was adversely affected by the lack of an adequate supply of clean water. Some boreholes existed, but they did not provide enough water for cattle and human beings. Women were getting water from unprotected wells, rivers and dams, which were often located far from the village. Shortages of clean water resulted in many water-borne diseases, such as cholera, diarrhea, typhoid and bilharzia.

To improve this situation, the Lutheran World Federation (LWF) approached the District Administrator (DA) with plans for employing people to maintain boreholes. The District Administrator employed drivers and supervisors. Well sinkers were trained in blasting and handling explosives. The community members started the initial digging of the wells and dug down about two meters. The well sinkers then came to finish the digging of the wells. Women contributed by bringing stones, river-sand and poles with which to erect fences. The sources of funding for the project were the LWF donors. The estimated cost of the project is U.S. $155,520. The LWF funds covered the wages of the well sinkers, supervisors and drivers. LWF also financed the purchase of well pumps and the cost of truck maintenance. Residents do not have to pay for use of the boreholes.

Over the two and one half years since the project was instituted, the water situation in Chiredzi District has improved. There are now 176 boreholes, and 70% of the community has access to clean water. The most beneficial impact of the project is that women have convenient access to clean water for gardening cooperatives and livestock. They no longer have to walk long distances to obtain clean water.

**Postscript:** The project succeeded in supplying clean water to the community. A safe and reliable water source has freed up valuable time for the women in the Chiredzi District. Diseases in the area has diminished and nutrition has improved.

## SUCCESS STORY: Safe Water for Senegal

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**Country:** Senegal
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**Subject:** Water

**Problem:** There was a need for adequate supplies of safe water in rural parts of Senegal. Existing wells were contaminated, poorly located, or in bad condition. Attendant problems include threat of drought to vegetation and livestock and malnutrition.

**Solution:** A project initiated by five Senegalese Soroptimist International clubs was adopted and a joint Soroptimist-UNICEF project was launched. New wells and pumping equipment were installed. Educational programs were implemented.

Drought and desertification created a considerable need for an adequate source of safe water supplies in some rural parts of Senegal. In others, existing wells were worn out, contaminated with salt water or located far from villages. Livestock, crops and natural vegetation were at risk. Disease and malnutrition and were common. The affected areas in Senegal include six sites in five of the country's 10 regions. Women and children were particularly affected as they had to walk miles for water. Good working wells and associated facilities were badly needed.

Soroptimist (SI) clubs consist of women of ages 18 and older . Five SI clubs in Senegal presented their ideas for a water supply project to the UNICEF staff at Dakar, and the presentation became an approved UNICEF "noted" project. SI accepted the project as its quadrennial project (1983-1987). This was a unique situation of an indigenous NGO working with a UNICEF field office to solve serious needs of a country with government consent. Soroptimists in Senegal, with help and guidance from their federation (SI of Europe), finalized the project plans in collaboration with the UNICEF area office in Senegal, all in accordance with the national rural development program of the Senegalese Government. The UNICEF area office supervised execution of the project and recommended the most suitable technology, drillers, technicians, etc. The Senegalese Soroptimists served as liaison with the local communities to ensure that the villagers were taught about the sanitation, nutritional and health benefits of clean water and were trained to maintain the pumps and other equipment. Local Soroptimists informed the people in the rural areas about the proper use of water and encouraged them to participate in the planning, construction and maintenance of the project. The project provided power-driven pumps, elevated storage tanks, a watering place for cattle and market gardening areas for vegetable growers. The cost of the project was U.S. $562,785.

The project faced many obstacles: high inflation changed the cost estimates; Soroptimists needed to negotiate differences among village officials, the Senegalese Government and the UN agency regarding site selection; project implementors had difficulty mobilizing equipment; and some sites failed to produce water. Benefits include health improvements and growth of agriculture. Men began to find sufficient work in their villages rather than having to look elsewhere for work. Women's time was freed up, enabling them to work at gardening and other income-producing activities. The wells provided new social centers for the villagers.

**Postscript:** The health of community members improved. Agricultural production increased. The project created new jobs. The new wells provided a central meeting ground for villagers; thus, the project provided social benefits as well.

## SUCCESS STORY: Maputo, Lesotho Community Development Improves Year-Round Availability of Water and Food

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**Region:** AFRICA

**Subject:** Water

**Problem:** In Maputo village, 2/3 of the 43 households are headed by females due to outmigration of men to South Africa. Rainfall and soil productivity are limited and soil erosion is extensive. Women lack access to health and technical assistance.

**Solution:** An integrated project was started to help women to organize effectively. The project helps provide alternative sources of income, basic facilities, appropriate technology and environmental management for women and families

Lesotho is completely landlocked by the Republic of South Africa. The country consists mainly of foothills and inaccessible mountains. Rainfall and the productive capacity of the soil are limited. Soil erosion is extensive. During the rainy season, the village is often inaccessible. There is excessive outmigration of men to mines and plantations in South Africa. In Maputo village 2/3 of the 43 households are female-headed. Women face the daily burden of household and farming activity. They lack access to technical assistance and credit. Health services are deteriorating.

In December 1986, a UNIFEM programming mission prepared a project proposal for Basotho women. It was approved in March 1987. The objectives of the project were to improve the socioeconomic conditions of women and to promote soil conservation and the use of energy-saving and time-saving technologies. In December 1987 a UN Volunteer project coordinator arrived and the project was be relocated to Maputo in Mafeteng District. An in-depth, participatory survey of the community was then conducted and the project commenced.

Project activities included organization of a women's group and improvement of their organizational skills; training of the women; construction of water catchment areas with small dams; soil conservation activities; fruit tree planting; organization of a mobile clinic; bridge construction; construction of a warehouse and distribution of seeds and fertilizer for vegetable growing; other income-generating activities (sewing, knitting, batik and tie-dye fabric making) and marketing of these products; establishment of a revolving loan fund; and training of 30 Nutrition Assistants and District Nutrition Officers. The executing agency for the project in Maputo is UNV, but since 1990 a Peace Corps Volunteer has been assigned to the project as well. There is close cooperation with the Nutrition Agent at the Nutrition Center in Maputo. Apart from UNIFEM, UNICEF and the Ministries of Health and Agriculture support the project.

As a result of the project, basic services are now available and the health situation is improving. The women have gained skills such as sewing, knitting and improved agricultural production. The introduced technologies save women time so they can pursue production activities. Food production and cash income have both increased. The accessibility of the village as well as the environmental situation have improved. The project had a multiplier effect in surrounding villages.

**Postscript:** Water is now available year-round, and food production and cash income have increased. The health situation is improving now that basic services are available. Women have been empowered with skills such as sewing, knitting and improved agricultural production.

## SUCCESS STORY: *Maji Safi* Women's Group in Kenya Conserves Water

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**Country:** Kenya
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**Subject:** Water

**Problem:** Water supplies were inadequate for household use and for the cultivation of vegetable gardens. Fuelwood was scarce and households lacked adequate latrines.

**Solution:** Women in the Taita/Taveta District of Kenya formed a women's group that helps each member to harvest rainwater, acquire a fuel-efficient *jiko* (stove), and build or improve her family latrine, based on her own priorities.

Shortages of water in the dry Kenyan lowlands created hardships for people in the area. Women carried containers of water on their backs or heads over long distances every day. Lack of water during the dry season created food shortages and lowered hygiene standards, adversely affecting the diet and health of the community. Water problems figured prominently in discussions at the 1985 International Women's Forum held in Nairobi. This prompted women attending the forum from the Taita/Taveta District in Kenya to establish a women's self-help group in 1986 for the purpose of addressing these and other common problems.

The *Maji Safi* Women's Group currently has 210 members. Its objectives include building or buying each member a 1000-gallon water tank for harvesting rainwater; building a ventilated pit latrine for each member or improving their existing latrine; adopting fuel-saving *jikos* (stoves); and generating income for the group through the Posho Mill Project. Members contribute funds to acquire water tanks, latrines, fuel-saving *jikos*, etc., according to their own priorities; they achieve economies of scale by buying or building these items in bulk. In order to harvest rainwater, women build gutters to catch rainwater and place a tank at one corner of the house to collect the water from the roof. Some also build more permanent houses with iron roofs to facilitate rainwater collection and fero-cement water tanks. Members incapable of paying for materials and items immediately are allowed to enjoy the benefits of the facilities before they have entirely paid for them. Colorful public ceremonies are held to recognize members' achievements in acquiring the desired items, and the spirit of competition is high. In order to achieve its goals, the program requires roughly 10,000 Kenyan shillings per member in order to cover the costs of 210 water tanks, 210 fuel-saving *jikos*, digging and building latrines, and financing the group's Posho Mill project. *Harambee* fund-raising drives and donations help finance the efforts.

Most women in the group have achieved one or more of their self-determined objectives. For example, most women are conserving thousands of gallons of water as a result of the project. The harvesting of rainwater saves women time, allowing them to attend to their families and engage in productive activities. It also provides water to use during drought conditions. *Maji Safi's* water conservation activities are being copied by individuals, schools and hospitals.

**Postscript:** Most members are conserving thousands of gallons of water, which creates a large reserve of water for use during the dry season. Women have more time to engage in productive activities. Vegetable gardens thrive, and nutrition and health have improved.

## SUCCESS STORY: Women's Group Supplements Water Supply *in a* Semi-Arid Eastern Province of Kenya

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**Subject:** Water

**Problem:** Water shortages were of concern, especially to women in the semi-arid eastern province of Kenya.

**Solution:** Eight years ago, Margaret Ndoko launched a project involving a women's group to improve the community's water supply. Project participants initiated a water conservation program by planting trees and conserving water in a catchment area.

Water is scarce in the eastern province of Kenya due to poor water sources and a lack of adequate rainfall. Only a few rivers exist in the region. These traditional sources are supplemented by boreholes drilled with funding from the Kenyan Government. Most residents rear livestock or are subsistence farmers. Water (and the lack of it) plays a key role in the daily lives of women, who need water for domestic purposes, tree nurseries and for animals and crops.

Eight years ago, Margaret Ndoko launched a project involving a women's group to improve the community's water supply. She worked in community development and looked with a critical eye at the problems of women in the area. She found that the women needed assistance with water conservation. Ms. Ndoko implemented a water conservation project by organizing the women and educating them as a group. She led them in a program based on a two-pronged approach: 1) educating the public about the important role of water for the community's livelihood and survival and 2) concentrating on methods of collecting water.

A tree-planting activity was initiated with the goal of conserving water and creating a permanent catchment area. As part of the project, Ms. Ndoko arranged to have the women registered with the Social Services Department so they could get tree seedlings from the government. Planting trees helps conserve water in this dry area. It also enhances the scenery and provides windbreaks. Project participants have restricted grazing in this catchment area in order to avoid any interference with the trees. The government has contributed by drilling boreholes to supplement water supply during dry seasons. The Ministry of Environment breeds and provides acacia tree seedlings to the group, who then plant the seedlings in tree nurseries. The nongovernmental organization EMIASAL also provides the group with tree seedlings. The estimated cost of the project is U.S. $4,500. The group currently has no external source of funding; members are the sole contributors to this self-help project.

**Postscript:** The project is doing well. The group has planted numerous trees and started a tree nursery in the continued effort to conserve water. The group is approaching donors to enable them to expand their activities.

## SUCCESS STORY: Fresh Water Supply Infrastructure in Rwanda

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**Region:** AFRICA
**Subject:** Water

**Problem:** Rwanda, a Central African country, faced numerous environmental threats, especially concerning fresh water, due to a lack of environmental awareness and a lack of women involved in development projects.

**Solution:** In 1986, CARE International began setting up water supply infrastructures in the area of Byumba, Rwanda in order to improve the quality of the inhabitants' lives and to alleviate the burdens put upon women.

Water issues are of key environmental concern in Rwanda. The area of Byumba (Murambi-Giti-Muhura), in the northeast part of the country, suffered from a shortage of quality water. This shortage was due to poor water supply infrastructures, which were partly damaged by the inhabitants themselves. Household duties, including tiring walks to water sources, prevented women from playing a significant role in the country's decisions about development and the environment. The lack of information, training and technical knowledge was a factor in the harmful treatment of both nature and ecological systems.

The first task at hand was to build an efficient fresh water network which could be maintained by the inhabitants of the region. Having a reliable fresh water source was a primary need for the population and was the only way to alleviate the women's tiring work of walking to fetch water. This project, started in 1986, was conducted by women with the help of CARE International (an NGO for assistance and development), WASH (technical assistance) and the Government of Rwanda. The support and participation of the community at every technical level was essential; the success of such a project depended on this participation for long-term sustainability. Thus, an intensive training and education program was started to make people more aware of what was at stake. At the same time, several studies were conducted in the area (with the cooperation of border countries) to understand the real needs of the population. The better infrastructure enabled women to participate in organizations which work to preserve the integrity of the environment.

Since 1987 Rwanda has had a national strategy for the environment. Many surveys have been carried out to evaluate the outstanding work. Two years after the project was started, 65 industrial spigots were built, and eight sources of water were brought into use. The project was completed in September 1990, and the total cost of the project is estimated at U.S. $1,323,400.

National and foreign experts have taken part in a mission to evaluate the projects. The results show that health and hygiene in the area have improved greatly. The average quantity of potable water consumed has been increased from 10 to 20 liters per person per day. Water sources are now more accessible, and women no longer have to walk long distances to obtain it. Furthermore, women in the community take into account the environment and are able to manage the new setup in a proper and more efficient manner.

**Postscript:** The information campaign has helped people to take responsibility for the maintenance of the water supply infrastructure. The quantity and quality of fresh water has improved the health of the inhabitants and has alleviated women's burdens. Associations of women and the environment have been established and are working to build a national network.

## SUCCESS STORY: Independent Rural Village Project in *Zimbabwe* Constructs Wells and Provides Health Care Education

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**Region:** AFRICA

**Subject:** Water

**Problem:** Clean water and a proper waste disposal system were unavailable in this rural Zimbabwean village. Many women did not understand the connection between using impure water and the poor health of their families.

**Solution:** A project to build wells and install a pit latrine system was implemented. Women received health education from a primary health care nurse.

The lack of clean water and consequent poor hygiene in this Zimbabwean community prompted collaboration between the primary health care nurse, community members and the local builder to mobilize their resources to find a solution. Diarrhea and bilharzia were persistent. At first, the women in the community had a poor understanding of health care issues. Through intensive efforts of the primary health care nurse, however, they began to see the connection between the lack of clean water, sanitation and disease.

The nurse stressed the provision of acceptable, affordable, accessible and essential health services at the grassroots level. Above all, it was stressed that people should be involved at all levels because primary health care forms an integral part of the country's health system, which is the nucleus of the overall social and economic development of the community. The primary health concepts were explained as preventive, curative, and rehabilitative. Primary health care courses offered to the community by the project included Health Education, Mother/Child Health (including family planning), Water and Sanitation, Nutrition, Provision of Essential Drugs, Treatment of Minor Ailments, and Immunization.

In another phase of the project, two implementors initiated the installation of protected, tapped wells and a pit toilet system. Women collected stones from nearby villages for use as building materials, and with the help of a local builder, established a clean water supply system. Each family contributed a certain amount of money to help finance the project. These funds covered the purchase of bags of cement ($8 each), tap heads ($25 each), iron pipes ($16 each) and slabs of concrete ($30 each). The projects were implemented in turn because it was not possible for the community to fund both of the projects at the same time. In addition, it was not possible to work on both projects simultaneously because the community also provided the labor for the projects.

The project has been in existence for 18 months. Clean water has been provided to the community. The water supply is central to community huts and 25 families have access to the new water source. There was a significant reduction of disease in the community five months after the project was initiated. Community members do not have to pay to use the new system, but help by keeping the area around the project clean and clear.

**Postscript:** The availability of clean water supplies for all families in the area has resulted in a decline in the incidence of disease. Women are better educated regarding health care matters.

## SUCCESS STORY: Jiwruok Women's Group Improves a Fresh Water Fishery in Western Kenya

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**Region:** AFRICA

**Subject:** Water

**Problem:** Unemployment, nutritional deficiencies and low family income plagued a community in western Kenya. Freshwater fisheries in the area could improve nutrition and generate income, but they were not being developed or managed appropriately.

**Solution:** Emily Othieno revived the interest of local women in developing a fish farming project, and helped them to make rational use of inland water bodies and achieve maximum production without over-exploiting the natural resource base.

In Nyalenya, western Kenya, unemployment is high; consequently, family incomes are low. Fish is a major source of food for this community. In addition, fish is the community's cheapest source of animal protein. The Jiwruok Women's Group, an association of local women, started a self-help project in 1979 with the objective of producing fish for consumption in a nearby dam. Between 1980 and 1987, the project collapsed due to lack of commitment and a knowledgeable leader. No one was regulating fishing or maintaining the fish farm; as a result, emergent plants and other aquatic vegetation greatly decreased fish production. No supplemental nourishment was provided to the fish farm apart from the leaves of some food crops in the area and organic manure. Water catchment areas were misused and water was polluted. By 1988, the community was reduced to traveling to Lake Victoria to meet its demand for fish.

In October 1988, Emily Othieno, a lecturer in zoology at Egerton University, approached some of the unemployed women who had been involved in the unsuccessful fish farming project and persuaded them to revive their activities. The women formed a committee to supervise the project. Ms. Othieno made visits to fish pond sites, agricultural offices and related development aid offices, and organized lectures to the farmers. With some technical assistance, but no outside funding, the Jiwruok Women's Group established new fish farms in two earthen ponds and improved management of the one located at the dam. The more able members donated generously toward the project, while others made baskets that were sold to boost the project's budget. At a later date the project may require external assistance: the dam used for the fish farm belongs to a group member, who may ask for payment as the project becomes more stable. To date, the women have farmed mainly tilapia; however, they intend to introduce the black-bass and other varieties in the future. The group harvests the fish once a year and sells them in local markets.

Fish have been harvested and sold twice so far. The income generated by these sales is distributed to group members, who remit half of the proceeds to the project in annual contributions. In addition to raising incomes, the project has enabled maximum production of fish without over-exploitation of the resource base. The availability of fish within the locality has made traveling to Lake Victoria for fish a thing of the past.

**Postscript:** The project produced environmental and economic benefits such as improved nutrition, income generation, employment and environmentally-sound resource utilization.

## SUCCESS STORY: Muguna B Water Project Provides Water for a Variety of Purposes in Rwanyanga Community, Meru District, Kenya

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**Subject:** Water

**Problem:** Residents of Rwanyange Community in the Meru District suffered from health and sanitation problems, primarily due to the lack of clean water and adequate medical facilities.

**Solution:** The women organized themselves into a self-help group and, with the help of the YWCA, designed and implemented the Muguna B Water Project to provide a clean source of water for drinking and irrigation and thus eradicate water-borne diseases.

This project was instigated by the Rwanyange Community in the Meru District during 1985-90 in response to a water shortage problem. Women and children used to spend an average of three hours daily walking four kilometers to fetch water from springs, which were often contaminated. Most families had poorly constructed and maintained pit latrines. As a result, water-borne diseases and other sanitation-related diseases were endemic.

The project was funded by international donor agencies through World YWCA - 60% came from CIDA, 30% from other donors and 10% from community contributions. Beneficiaries also contributed unskilled labor worth U.S. $30,000 for the duration of the project. The YWCA women's group took a leading role, while other leaders, both men and women, were elected from the community. The initial activity involved digging an open channel for the intake of water. However, this channel was soon destroyed by migrating elephant herds and frequent blockages. They identified the need to pipe water from its source. Working with the local YWCA, the group designed the Muguna B Water Project. The entire community provided labor for the project by designating at least one family member to be responsible for providing unskilled labor for the required amount of time. In addition, three members of the group walked 200 kilometers each to raise funds. A total of U.S. $11,500 was raised by the community through walks and other means. The total cost of the project was U.S. $100,000.

The community then obtained a line of credit for the purchase of materials for VIP latrines. With the help of the YWCA project staff, they retained the services of technical staff including a technical inspector, pipe fitter and primary health care coordinator, and were able to incorporate a health and sanitation component into an expanded project. Two VIP latrines were constructed for demonstration purposes at the local primary school, and several members of the community constructed them in their own homes. The latrines are maintained by individuals trained during project implementation.

There are many benefits of the project: women save time and energy because they no longer walk great distances to collect water; the community now has a safe supply of water; water-borne diseases were eradicated; and the water source has increased the catchment area of the forest, thus increasing the rainfall pattern. The general health of the community has improved, women boil their drinking water and the community observes good hygiene through the proper use of toilet facilities provided by the project.

**Postscript:** The community was able to meet local needs for clean water and sanitation. They successfully installed a water pipe network that carries clean water from tanks to residents' homes for drinking and irrigation. Some residents have built VIP latrines in their homes. These efforts helped to eradicate water-borne diseases.

## SUCCESS STORY: Creek Management by the Women of Degema-Abbey, Nigeria

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**Region:** AFRICA

**Subject:** Water

**Problem:** Oil exploration and exploitation in the Degema-Abbey community have caused pollution in local creeks. This has resulted in the depletion of marine life on which the community's livelihood depends.

**Solution:** The women in the community have formed an enforcement group to implement resource management and conservation techniques.

Degema-Abbey is a small riverine community of about 500 people in the Bonny Local Government Area of Rivers State, Nigeria. It is located about 100 kilometers to the east of Port Harcourt, the capital of Rivers State. Fishing is the primary occupation of the people of Degema-Abbey. Degema-Abbey has suffered from oil exploration and exploitation, which have caused pollution in some of the surrounding creeks. Most men have migrated to nearby towns and cities to work, so women have taken the lead in community matters.

For the past 30 years, the women of Degema-Abbey have been making conscious efforts to conserve the marine life in these creeks. The conservation and management of these resources is essential, because these resources sustain the community. The women have formed an enforcement group. Under an elected leadership, the group instituted a number of rules, regulations and sanctions for harvesting and managing the creeks and mangrove forests in the area.

The management practices involved the delineation of the surrounding creeks into different categories based on the level of exhaustion or depletion of resources. For a few months every year, a ban is placed on fishing in depleted creeks in order to give the fish time to recover. Meanwhile, fishing and other activities continue in the other creeks. In order to ensure total compliance with the fishing ban, the women seek the consent of the village chief, who contacts native medicine men or *juju* priests to invoke a curse on anyone who contradicts the ban. A specific date is chosen by the village chief and religious leaders to reopen the closed creeks. Funding for the activity is derived from members and voluntary contributions. The cost of the project is less than U.S. $500. The emphasis is more on non-monetary contributions. Since 1985 when Mrs. Salau was first invited to address the villagers, she has participated in their activities as often as she can and also makes monetary contributions.

The women have succeeded in devising an environmentally sound strategy for coping with the depletion of natural resources and encouraging communal spirit. They have been using natural resource management techniques that are socially acceptable and based on the history and culture of the people. For Mrs. Salau, the most beneficial aspect of the project is that it has united the people in the defense and protection of the environment, and has inculcated in the youth the need to protect the natural resource base on which their community's livelihood depends.

**Postscript:** The women have succeeded in devising an environmentally-sound management strategy for coping with the depletion of natural resources. They have encouraged community participation towards this end.

## SUCCESS STORY: The Tooseng Water Committee *Improves One South* African Community's Access to Clean Water

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**Region:** AFRICA
**Subject:** Water

**Problem:** The 3,000 residents of Tooseng lacked sufficient access to clean water. There were just two taps connected to the only clean source of water. The larger community drew water from an old and unprotected well, which was an unclean source.

**Solution:** A people-centered approach was used to help the village solve their water supply problems. The community was trained to maintain, repair and build their own water supply. They built a system of pipes and taps to increase access to clean water.

Tooseng (Doseng) is a community of 3,000 residents located in Transvaal, South Africa. The majority of the community members are women and children; the men have migrated to the cities due to lack of employment and industry in the area. Women therefore provide the hard labor in this community. With just two taps connected to the only clean water source (a deep borehole) and one contaminated well available, women had to stand in long lines for clean water.

The Tooseng Water Committee was established in February 1989 after the community approached the Rural Advice Centre (RAC) for assistance with their water problem. RAC's mission is to support the development struggle of rural people. Mimie Sesoko, then a fieldworker with RAC, worked with the community on their water program. The committee, consisting of 32 women and 23 men, addressed both the physical need (water) and the abstract needs (self-reliance, self-confidence, self-sufficiency and human dignity) of the community. The committee was subdivided into the street, executive, fund-raising and training subcommittees. They held workshops and group discussions to identify water needs, to set goals and to identify resources both inside and outside of the community. They then held two fund-raising events which raised $2,000. Each household also donated $50 to the water project. 3M Corporation donated $26,250 and Mobil provided $87,500, primarily for construction materials. The committee received training from RAC fieldworkers on leadership, organizational skills, fund raising, conflict resolution, pipe laying, construction and building of tanks. An elected group of 13 committee members managed the water project at the street level. Using all volunteer labor, the community dug trenches, laid cement-protected pipeline and installed standpipes on many of Tooseng's streets to provide convenient access to the clean water supplied by the borehole.

The community has vastly improved its access to clean water as a result of this people-centered project. In addition, the lessons and skills learned in the process are being applied to address other needs in the community such as the development of women's groups and farmers' associations. The project owes its success to the joint grassroots effort that encouraged the participation of the community from the very beginning, not just when physical labor was required.

**Postscript:** The community developed self-reliance and self-confidence. Tooseng has better access to clean water due to the construction of a network of pipelines and standpipes using volunteer labor. Women and children spend less time collecting water. The general health of the village has improved.

# DESCRIPTIONS OF SUCCESS STORIES FROM ASIA AND THE PACIFIC

REGIONAL BREAKDOWN OF
SUCCESS STORIES - ASIA/PACIFIC

| Country | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| Bangladesh | | 1 | 1 | | 2 |
| China | 1 | 1 | | | 2 |
| India | 4 | 1 | 3 | 5 | 13 |
| Indonesia | 2 | 1 | | | 3 |
| Israel | 1 | | | | 1 |
| Japan | | 1 | | 1 | 2 |
| Malaysia | | | 1 | | 1 |
| Myanmar | 1 | | | | 1 |
| Nepal | 1 | 2 | | 2 | 5 |
| New Zealand | | | 2 | | 2 |
| Pakistan | | 2 | | 1 | 3 |
| Philippines | | 2 | 5 | | 7 |
| Soloman Islands | | | 1 | | 1 |
| South Korea | 1 | | | | 1 |
| Sri Lanka | 1 | 2 | | | 3 |
| Taiwan | | 1 | 1 | | 2 |
| Thailand | 2 | 1 | 6 | | 9 |
| Vietnam | 2 | | | | 2 |
| Yemen | | | | 1 | 1 |
| | 16 | 15 | 20 | 10 | 61 |

## SUCCESS STORY: Nature Farming for Agricultural Youth Training Project

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**Region:** ASIA/PACIFIC

**Subject:** EFS

**Problem:** Thai farmers lack appropriate knowledge on proper use of chemical fertilizers and pesticides. The chemical substances accumulate in the soil and pose hazards for both humans and animals.

**Solution:** Joint research experiment projects were implemented in cooperation with the Mokichi Okada Association of Japan and the FINEP of Brazil. Youths aged 15-25 belonging to farm families received training on "nature farming" principles.

Thailand has utilized approximately 100 kinds of poisonous and harmful chemicals in agricultural productivity. This has caused the problem of accumulation of these substances in the soil, water and air as well as in foods consumed by animals and humans. Realizing the problem, the King of Thailand has initiated the Agricultural Youth Training Centre Project aimed at providing the young farmers in the areas surrounding the Yarnasangvararam Voramahavihan Monastery an opportunity to gain knowledge and skills in "nature farming" practices and to have the capability to transfer their acquired knowledge to village counterparts. The project site is located approximately 180 kilometers east of Bangkok in Banglamung, Chonburi Province. The project has been in the care of the Non-Formal Education Department in the Ministry of Education.

The trainees of this project are young farmers from Chonburi and Rayong Provinces. The trainees are male or females between the ages of 14-25. They must already be working as farmers and have a piece of land to work on. The curriculum is tailored to meet local needs. Each class lasts about five months. Two classes are organized each year with 20 trainees in each class. The objective of the curriculum is to introduce "nature farming" to young farmers. This system is focused on improving soil productivity, conserving the natural environment, effectively utilizing land and resources, and reducing cost in agricultural production. It is aimed at developing agriculture which revitalizes farming communities and makes available safe and healthy nutrition. The center started its first training August 4, 1986. At first only females were selected for the training, but now males may enroll as well.

To date, there are already 200 trainees, 120 males and 80 females. A follow-up of the training program shows that the young female farmers had more capability than their male counterparts in applying and using their knowledge of nature farming in their vocations. Nowadays farmers in the area have more of a tendency to stop relying on harmful chemicals and to use instead the principles of nature farming.

**Postscript:** Farmers and general consumers have begun to understand the dangers of using chemical substances and fertilizers in agricultural practices. Farmers have expressed an interest in nature farming and are beginning to change their farming practices.

## SUCCESS STORY: Middle Path in the Hills: Farming with Nature in Thailand

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**Subject:** EFS

**Problem:** Deforestation, destruction of water resources and mismanagement of land resources has occurred due to population pressure, inadequate government policy and lack of land tenure. Slash-and-burn agriculture has led to soil erosion.

**Solution:** The Hill Area Development Foundation (HADF) worked with hill tribes in seven villages to apply integrated farming and alley cropping technologies to recover the degraded environment.

Over the decades, many hill tribe people fleeing ethnic wars and hardships in Burma have settled just across the border in Thailand. The land in this area has been put under stress due to overcrowding, practices of slash-and-burn agriculture and cash cropping. These have caused a drastic loss of topsoil and poor food crop production. In the past, the hill tribe people used to move from place to place leaving barren land to find fertile soil. Over time much of the land has become barren, and there is no place left for them to move. Thailand's forestry department threatened to evict hill tribe people of Lohyo Akra Village from a national forest reserve they inhabited because the department felt the forest land was being degraded. Some villagers recognized the need to farm in a way that would enable them to live on the same piece of land over the years without degrading it.

In 1973 Tuenjai Deetes and her husband began working with hill tribes in northern Thailand. Six years ago, Ms. Deetes, along with a group of fieldworkers, academics and government officials, started the Hill Area Development Foundation (HADF) to promote sustainable development in the village of Lohyo and in other villages. Tuenjai Deetes is now the president of HADF. During its first four-year phase, the project was founded by LDAP through the Canadian International Development Association (CIDA). The second three-year phase has come from Terri Des Hammes (Germany), the MacArthur Foundation (U.S.A.), PDA Thailand and Bread for the World (Germany). HADF gathered information on alley cropping and Sloping Agriculture Land Technology (SALT) from the Mindanao Baptist Rural Life Center in the Philippines. SALT is designed to prevent soil erosion and promote food production by planting crops, bushes and trees along horizontal contours on the slope of a hill. HADF organized an educational field trip especially for women to see sustainable agriculture systems in practice. These field trips have been instrumental in increasing the number of families practicing sustainable agriculture. Tuenjai Deetes says the program's success has hinged on women's participation.

The integrated farming and alley-cropping technologies have been widely adopted in the villages. The techniques restore, protect and enrich the soil, watershed and forest and increase productivity. For example, three years ago, one Lohyo villager, Ajoe Choemoeku, started using the new farming techniques suggested by HADF. The leguminous trees he planted help fix nitrogen into the soil and form a boundary, thereby preventing soil erosion. His harvest was more bountiful than those of his neighbors who used traditional slash-and-burn techniques. He believes the sustainable methods are restoring fertility to the soil.

**Postscript:** The integrated farming and alley cropping technologies have been widely adapted in the villages. The techniques restore, protect and enrich the soil, watershed and forest and increase productivity. This area is used as a model for highland sustainable agriculture and can be used for future government policy. Ms. Deetes won UNEP's 1992 Global 500 Award.

## SUCCESS STORY: Appropriate Technology Association of Thailand's Natural Dye Weaving Development Project

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**Region:** ASIA/Pacific

**Subject:** EFS

**Problem:** There was a lack of income and food in the drought-prone provinces of northeast Thailand. Weaving could generate income, but most women use chemical dyes which harm the skin and poison the soil.

**Solution:** Thailand's Appropriate Technology Association promoted natural dye weaving in 10 area villages. The project built on traditional skills and knowledge and enhanced the villagers income-earning potential.

Appropriate Technology Association of Thailand (ATA), a nonprofit organization founded in 1981, targeted for assistance the five "weeping prairie" provinces of northeast Thailand, where poor soil, drought and low crop yields are typical. Many village women and men migrate outside the region annually to earn income.

In 1985 ATA initiated a natural dye weaving project designed to help women earn additional income in Roi-Et Province (one of the five provinces). Women were not initially interested in the project because it did not appear to solve their problems. ATA offered community development activities such as well digging, training in green manure and compost, and fish farming to village men. The men then introduced their wives to the weaving project. After the project's benefits were demonstrated, women in other villages joined the program. ATA networked with other nongovernmental organizations and by 1991, the project included women in 10 "weeping prairie" villages.

ATA field workers organized the project through existing women's groups and used a comprehensive approach including: 1) women's leadership training; 2) experimentation with and dissemination of natural dye techniques; 3) a revolving fund for women's investments; 4) marketing assistance; 5) silk worm and mulberry tree-raising activities; 6) pattern development; and 7) weaving technique improvement. The project's guiding principles included self-reliance, participation, integration and sustainability.

The women who participated in the project earned income, enabling families to eat better and some husbands to quit their annual migration to Bangkok. Moreover, chemical dyes fell into disuse, and environmentally friendly practices such as tree planting, replacing chemical fertilizer with green manure, raising fish in rice paddies, and recycling dye stuffs for fuel or natural fertilizer became popular. Women gained organizing experience and confidence.

**Postscript:** The project has expanded to 28 villages in 1992. Economic, environmental and social benefits include: a more active role for women in the community; additional income; disuse of chemical dyes harmful to humans and the soil; and increased use of other more environmentally-friendly technologies.

## SUCCESS STORY: Foundation for Children's Environmental Awareness Program at its Children's Village School in Kanchanaburi Province, Thailand

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**Region:** ASIA/PACIFIC

**Subject:** EFS

**Problem:** The ecological balance of Kanchanaburi Province, once blessed by abundant natural resources, has been upset by unsound resource extraction and agricultural practices.

**Solution:** The Foundation for Children initiated programs to increase environmental awareness and teach natural farming methods at its Children's Village School. Participants include teachers, children and housewives.

Fifty years ago, intensive resource extraction began in Thailand's Kanchanaburi Province, where bamboo forest covered 70% of the land. The natural environment of the forest was destroyed within 20 years. Agricultural activities became more economically significant and, in the process, expanded and changed with little concern for the environment; cash crops became dominant and the use of pesticides and chemical fertilizers mushroomed. These human activities have upset the province's ecological balance.

In 1985 *Moo Ban Dek*, the Children's Village School run by the Foundation for Children, moved to Wang-dong, a Kanchanaburi Province village dominated by sugar plantations. They built the school among trees on an abandoned sugar plantation. In its first environmental program there, the school organized children to care for the trees and plant additional ones.

The area's soil lacked nutrients and was so compacted that it could not hold water. Despite (or because of) pesticide usage, insects thrived. Cattle grass menaced crops. Pesticides and chemical fertilizers were a threat to human health. The school decided to promote the principles of protecting the environment, living harmoniously with nature and improving the area's ecology to the villagers. It initiated a food production project for the village in 1985. After a program officer was hospitalized due to pesticide usage, the Food Project stopped using chemicals entirely; from 1986 on, its goal was to grow sufficient vegetables without using tractors, chemical fertilizers or pesticides. (The use of tractors earlier in the project had exacerbated problems by compacting the soil.)

In 1987 interest in natural farming methods deepened; the project began to study and apply ways to restore the balance of nature and grow crops as naturally as possible. For example, they covered the soil with straw to obtain a variety of benefits, grew beans and planted trees for natural fertilizer, and planted seeds only in the right season. Teams of teachers and girls observed the plants and soil and noted changes.

**Postscript:** Interest in organic farming has increased. Program participants are realizing the important contributions they can make toward environmental protection.

## SUCCESS STORY: "Environmental Awareness *Starts at Home*" - *A Program of* the Department of Agricultural Extension in Thailand

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**Subject:** EFS

**Problem:** Women's farm groups at the local level did not have access to information on environmental hazards in the home and in the community.

**Solution:** Department of Agricultural Extension introduced appropriate technology for improving the health and sanitation of the farm house environment to women in 146 pilot villages. Women voluntarily demonstrated the concepts in their farm houses.

Environmental practices in rural areas of Thailand need improvement. Wastewater is frequently thrown out wherever it is convenient. Trash, food and human waste are usually disposed of improperly. Water supplies are often contaminated and inadequate. Chemical fertilizers degrade the soil and can pollute nearby water sources, as can pesticides. The use of pesticides on food grown for consumption may provide an additional health threat. Houses may lack adequate ventilation and enough light to promote cleanliness. Rural women have a key role in improving the farm environment and increasing environmental awareness through their household and child-raising duties.

Thailand's Department of Agricultural Extension (DOAE) initiated a pilot project to improve environmental awareness and practices. They developed recommendations for improving the farm house environment and then used the "farm house model" to promote these practices among rural women. Farm Women's Committees were mobilized to carry out the activities. Each province selected two pilot villages from two districts. There are 146 villages implementing this project in 73 provinces. Home economists and agricultural extension agents discussed environmental problems within and around the farmers' homes with rural women and shared appropriate technology to improve health and sanitation. The Department of Agricultural Extension provided financial and technical support for producing handbooks, slides and posters for technology transfer by home economists at the provincial, district and village levels.

In each village, 30 families or more were expected to volunteer for the farm house model project and apply DOAE's recommendations to their own farms. To become a farm house model and serve as a demonstration farm house for other villagers, a house had to meet criteria in a number of areas. For example, certain standards for latrines and water supplies were to be met. Composting garbage, fallen leaves and animal residues is recommended as is proper disposal of wastewater. Planting fruits and vegetables in a home garden surrounded by a fence, raising ducks and chickens for eggs, and using compost and biological pest control on home gardens are all an integral part of the project.

As a result of this project, many villagers have been able to prevent health problems and to increase the quality and quantity of food available for home consumption. Since the land around the house has been used efficiently for planting food, families save money, time and energy.

**Postscript:** Health and economics have improved because of better utilization of space surrounding the home. Participants use the space to produce better quality food for home consumption. The health of the community has improved.

## SUCCESS STORY: Afforestation in the Himalayas

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**Subject:** EFS

**Problem:** Soil erosion was a significant problem due to over cultivation of steep slopes in this Himalaya region, and erosion rendered the slopes barren.

**Solution:** The project was introduced to solve several interrelated problems the area faced. Plantation areas were fenced in and planted with trees. Fields were leveled and suitable cropping patterns were introduced. Fruit orchards were planted on sloping land.

The area of the catchment of the Ramanga river is comprised of hilly terrain in the middle and outer Himalayan ranges with a portion falling in the Biwallak hills. The catchment has divided into sub-catchments, which in turn have been further divided into 20 watersheds and eventually into 135 sub-watersheds. A sub-watershed is the unit of treatment. At the start of the project, which was begun in 1962, the area presented a very dismal picture. There were several reasons for this. Since agriculture is the mainstay of the population, even steep slopes were cultivated. Forests were subject to heavy denudation due to indiscriminate felling of trees by local people for fuel, timber and fodder. Even the groundcover had almost vanished due to the removal of shrubs and bushes for fuel and unrestricted overgrazing by cattle and goats. As a result, the catchment suffered from severe soil erosion. Other activities like road construction and stone quarrying also contributed to soil erosion. The general population was facing severe shortages of fuel and fodder.

Residents participated wholeheartedly in an afforestation project. Areas were fenced in and planted with trees. Hundreds of such plantation areas are being managed by the village communities, and the project has generated a wave of enthusiasm throughout the communities. The project was an integrated one and other related problems, besides afforestation, were also tackled. Treatment of agricultural lands was accomplished by leveling fields and introducing suitable cropping patterns. Sloped lands were diverted from crop cultivation to fruit trees orchards. Both of these activities helped in arresting soil erosion and improved the economy of the area, the orchards are expected to give an annual return of Rs. 1,000 per hectare. In addition check dams, spurs and embankments, silt detection tanks and other structures were built to check soil erosion. The project is being funded by the Government of India.

The words of Shri Bisht, Block Pramukh of Salt block, convey the general feeling of the people towards the project, "The project came as a Gift of God to us." Today, 30 years since the inception of the project, its success can be seen in the form of luxuriant plantations, which have, in places, taken the shape of natural forests. There has been an increase in the production of agricultural land as a result of improving existing terraces. Crop production has increased at a rate of 1.5 quintals per hectare per year. Afforestation has resulted in increased fodder production. 138,428 quintals of fodder grass is being produced annually which is being utilized by the local people free of cost.

**Postscript:** There has been an increased production in agricultural land as a result of improving existing cultivated terraces. Thousands of hectares of land were afforested, and consequently, grass production increased. The fruit orchards have attained the fruit bearing stage and are expected to give an annual return of Rs. 1,000 per hectare.

## SUCCESS STORY: Defending Our Forest - A *Nonviolent Approach in* the Philippines

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**Subject:** EFS

**Problem:** The community of San Fernando experienced general ecological imbalance due to deforestation with its attendant environmental problems such as soil erosion, floods and droughts. Crop production fell as a result.

**Solution:** In 1987 a mass demonstration was organized by a group from the community to protest the presence of logging companies in the area. Since then, the group has worked non-stop to preserve the remaining forests in their municipality.

San Fernando is located in Bukidnon Province, northern Mindanao in the Philippines. It occupies a total land area of 77,500 hectares with a population of 34,000 people. Rice and corn are the major crops raised in this municipality. In 1972 five logging companies started operations in San Fernando. Due to their logging activity, there are few trees left in San Fernando to keep the soil in place. Rains frequently wash away crops and soil. The decrease in the number of trees has also caused a reduction in the amount of rainfall needed to grow crops. Malnourishment has become common in the community. With the depletion of the forest, a problem with rats attacking crops has arisen, since the forest had provided a habitat for snakes, the natural predators of rats.

In 1987 a group of concerned people affiliated with the community parish recognized the interconnectedness of the problems associated with logging and sent a petition to the Department of Environment and Natural Resources (DENR) to stop logging in the area. The group received no reply, and in July of that year, organized a picket of the CCA Logging Company. Many women joined this group of protesters. The group's demands were met, and the company lost their rights to log in the area. In 1988 another logging company started to cut trees in the immediate watershed of the municipality. After more protests, the DENR stepped in and forbade the company to log in the area. The DENR entrusted the group with the responsibility to protect the remaining forest. Facing stiff resistance from illegal loggers, the group chose representatives to go to Manila to gain support for their cause. The representatives, seven women and six men, went to Manila in September, 1989, and in a display of nonviolent protest fasted and prayed in front of the DENR building to awaken people's consciousness about the problem.

As a result, a logging moratorium was declared by the Secretary of the DENR. The DENR has also chosen 20 "volunteer forest guards" from the original group of protesters. These guards are authorized to close illegal lumber yards operating in the area. The Government has given funds (6.8 million pesos) to other members of the parish to establish a reforestation project. Presently the group is busy assisting the DENR to implement the San Fernando Forestation Project within a three-year period. The goals of the project are to promote assisted natural regeneration, reforestation and integrated social forestry. The group has received two national awards for their active but nonviolent crusade to curb forest destruction: the Ozanam Award from Xavier University and the *Likas Yaman* Award from the DENR.

**Postscript:** A logging moratorium inspired by the group's actions was implemented by the Department of Environment and Natural Resources (DENR) throughout the province of Bukidnon, Philippines. Twenty "voluntary forest guard" positions were created and filled by members of the protest group.

## SUCCESS STORY: Protecting Taman Negara National Park in Malaysia

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**Subject:** EFS

**Problem:** Agricultural and other local activities threatened to encroach upon Taman Negara National Park, the largest national park in Malaysia.

**Solution:** The Kelantan State government invited Kanta Kumari and other staff from World Wildlife Fund Malaysia to comment on a buffer zone plan for the national park. The team formulated a plan that suggested modifying and extending the buffer zone.

Taman Negara National Park was created in 1938-39. With a total of 4,343 square kilometers, it is the largest park in Malaysia and one of the largest parks in all of Southeast Asia. It encompasses the largest area of pristine lowland dipterocarp forest left in Malaysia. The single forest region that includes Taman Negara contains more elephants than any other region of Peninsular Malaysia. Without a buffer zone, silt and chemicals used in agriculture penetrate the park, altering it from its natural state. Also, the potential for illegal hunting, trapping and collection of forest products is high without a buffer zone. The park lies astride three Malaysian states: Terengganu, Kelantan and Pahang.

In 1989 the state government of Kelantan sought to develop an entry located in their state to Taman Negara Park. Their proposal focused on development of tourist infrastructure and transport facilities. It also included development of a buffer zone along one of the rivers bordering the park. A three-person team from World Wildlife Fund Malaysia (WWF Malaysia), including one woman - Kanta Kumari, was in the process of preparing a State Conservation Strategy for Kelantan at that government's request. Consequently, the State of Kelantan invited Kanta Kumari and her two team members to review the government's initial proposal for development of the park for tourism. This plan included establishing a buffer zone adjacent to the park's current boundaries. The WWF Malaysia team reviewed the government's proposal, conducted an investigation and met with the Agricultural Development Agency, the Department of Wildlife and National Parks and the State's Economic Planning Unit to establish the interests of the different sectoral groups. They then formulated a revised plan that looked at the broader context of the park's security and sanctity. This plan stressed the importance of modifying the buffer zone to take certain physical and ecological features into account. It also emphasized the need to extend the buffer zone along the rest of the state's park boundary.

After submitting its proposal to the Kelantan government, the team was invited in April 1990 to present their recommendations to the State Executive Committee, chaired by the Chief of Kelantan. The State subsequently endorsed the plan for the altered and extended buffer zone. Ms. Kumari notes that it was a great challenge, as a woman in a predominantly Muslim state, to convince the government of the importance of the issues at hand.

**Postscript:** The Kelantan State government endorsed the WWF-recommended plan to establish an extended buffer zone for the park. That buffer zone allows timber production in line with the concept of sustainable development and protects the park from undesirable influences like poaching and pollution from agricultural activities.

## SUCCESS STORY: Environmental Education for Youth

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**Subject:** EFS

**Problem:** After years of rapid economic growth, Taiwan has suffered severe environmental degradation.

**Solution:** The YWCA of Taiwan set up environmental education camps for children aged 10 to 12 and seminars for teachers to promote a heightened environmental awareness.

Forty years of rapid and stable economic growth have left the island of Taiwan in a state of environmental instability. Ninety percent of the rivers in Taiwan are seriously polluted. Lead levels in Taiwanese children are twice the level of U.S. children. Groundwater supplies have been so exhausted by industry that land has sunk (sometimes as much as 30 feet) in some parts of the island.

Since July 1989, 174 children and teachers have participated in environmental camps sponsored by the YWCA of Taiwan. Each camp costs approximately U.S. $4,018. The Taichung county government, the YWCA of Taichung and the campers' registration fees finance the camps. Throughout each three-day, two-night camp, an intensive program of activities keep the children occupied. The children, aged 10-12 years, are taught about environmental issues through stories, songs, classroom activities, outdoor walks and visits to national parks, forests etc. "Hands-on" activities such as separating garbage into different kinds (burnable, non-burnable, recyclable, biodegradable) are practiced. Project implementors think of the camp as a catalyst allowing participants to start thinking of environmental problems and to ask the question, "What can I do?" During the camp a variety of environmental issues such as water pollution, garbage and waste disposal, air and noise pollution, energy and natural ecosystems are discussed. Garbage cleanup events are also organized. Participants are asked to imagine new ways for waste disposal. A primary focus of these activities is to teach the children to love and respect the land, not by rules and regulations, but by showing the children that they are a part of the land and that their well-being is intrinsically linked to the environment. They are taught that taking care of the environment is a number one priority for survival.

A similar, two-day comprehensive seminar for primary and secondary school teachers has also been initiated. This workshop, held once every two months, has attracted people from all walks of life, not just teachers. Stemming from their participation in the YWCA-sponsored seminars, a small group of teachers has begun to work on incorporating environmental education into the school curriculum. The children who participate in the YWCA environmental camps are beginning to gain a renewed interest in and recognition of the environment. They learn basic environmental knowledge like how to separate garbage and to treasure natural resources. Influenced by the children participating in the camps, their families learn environmentally friendly behaviors as well. When the children return home, they instruct their grandmothers and mothers in garbage classification and teach their siblings to utilize used paper for note taking. Two other local YWCAs have begun to implement similar environmental education programs.

**Postscript:** The project is beginning to cultivate an environmental ethic among young people. Participants gain a better understanding of environmental problems and some practical leadership experience. Parents and teachers are also becoming more involved in environmental issues.

## SUCCESS STORY: Appropriate Technologies Alleviate Poverty in Cavite Province, Philippines

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**Region:** ASIA/PACIFIC

**Subject:** EFS

**Problem:** Population pressures and unequal access to resources have led to poverty and environmental degradation. There is a lack of livelihood opportunities for rural women.

**Solution:** Philippine Women's University's extension program trained rural women in several appropriate technologies: an Integrated Food Processing System which reduces waste and a cold-process soap-making system which uses indigenous materials.

In the early 1970s, the Philippine Women's University (PWU) in Manila began assisting Metro Manila squatters who had been relocated by the government to Cavite Province. The Francisca Tirona Benitez Rurban Center (FTBRDC) evolved from these early efforts; it is now responsible for all of PWU's community outreach projects. Its Barangay Technology Center (BATEK) and Noveleta Livelihood Center have conducted a number of livelihood and entrepreneurial training programs for underprivileged women from the resettlement area and other towns in Cavite Province. Among their programs are several which train women to generate income by using appropriate technologies. These technologies include the Integrated Food Processing System (IFPS) and making soap from coconut oil using a cold process.

Training women in IFPS provides income-generating opportunities and ameliorates waste disposal problems by maximizing the use of raw materials and converting wastes into useful products such as fertilizers or animal feed. IFPS modules were developed for coconut, fruit, fish, meat and poultry. These modules are designed to produce a diversity of products from the processing of a raw material and to ensure that as little as possible goes to waste. For example, in the coconut processing module, charcoal is produced as well as vinegar, oil used for soap or cooking and a residue used in hog feed or in various other recipes. The same principle applies to the other modules. The other appropriate technology promoted by the group is cold-process soap-making from coconut oil. Training rural women in this technology provides income-generating opportunities. Moreover, this soap-making process is a sustainable technology because it uses indigenous materials and increases local demand for coconut oil at a time when foreign demand has fallen. In addition, the process does not require a lot of energy. The soap-making program was one of the livelihood programs initiated with funds from the Australian Government to assist marginal salt-makers in income-generating activities. The National Commission on the Role of Women, the Ministry of Social Services and Welfare, Manila Community Services and Philippine Business for Social Progress have also provided assistance for the programs.

Both IFPS and soap-making are labor intensive and have provided employment to a large number of women. Since the first IFPS training in 1984, more than 2,000 women in Cavite Province have been trained to generate income using these appropriate technologies and have received funds for initial capital investments. Acquisition of these livelihood skills linked with financial assistance greatly improved the women's economic situation.

**Postscript:** Acquisition of these livelihood skills linked with financial assistance greatly improved the economic situation of 2,000+ rural women in Cavite Province. The Noveleta Livelihood Center has diversified its activities and has become a national training facility. The Women's University has conducted seven regional seminars on "Women for Safe Environment" in seven cities and have started to organize a network among the participants.

## SUCCESS STORY: Integrated Development of Women in Sericulture, Udaipur District, Rajasthan, India

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**Problem:** The tribal community in Udaipur can not meet its own subsistence level needs anymore due to a variety of environmental factors. As a result many people from the community migrate to urban areas.

**Solution:** The project was started with the aim to establish a solid agro-industrial base for women and their families. It offered the tribal community health, social and educational facilities, in addition to promoting sericulture and agriculture.

The tribal community in Udaipur could not meet its own subsistence level needs anymore due to environmental constraints, land scarcity, low agricultural productivity and inadequate health facilities. For these reasons, many people from the community migrate to urban areas.

From 1982 to 1986, a sub-project called "Sericulture in Udaipur District" was implemented as part of the project "Increasing Employment Opportunities for Tribal Women." A 1987 evaluation revealed that physical targets had been fulfilled and income generation improved, but the focus on women, their organization and their quality of life needed to be strengthened.

In response, a three-year project was started in late 1989. UNIFEM funds the on-going project, the local nongovernmental organization *Astha* (which means "faith in the people") carries out training and awareness-raising activities, and the Tribal Area Development Department in Udaipur District implements the project. There is close cooperation with the Department of Women, Children and Nutrition and the Forest Department to establish linkages with World Food Program projects, as well as with UNFPA.

Activities have included promotion of sericulture through training, mulberry cultivation, silk worm rearing and cocoon marketing; promotion of vegetable growing, kitchen gardening and intercropping; establishment of health facilities; establishment of women's groups and centers; training and empowerment of women; awareness training for staff and officials of involved agencies; establishment of preschooling facilities; and organization of study tours. Also planned: improvement of water supply, mushroom growing, tree planting (bamboo and acacia) and soil conservation, and street theater puppetry to increase community awareness of environmental issues.

The project has increased the family income and improved the nutrition and health situation of the people involved. It has raised gender awareness and has empowered women. The project has stimulated the ecological regeneration of the environment through the planting of trees and the use of intercropping, which regenerates the soil. The trees used meet multiple needs and are ecologically suited to the environment. The pressure on scarce land is decreasing. The women have started protesting the felling of trees by contractors. The project has an innovative character and serves as an example for other agencies.

**Postscript:** Tree cover is expanding and women are protesting the felling of trees by loggers. Family income is increasing, nutrition and health are improving, gender awareness is increasing, and women are more organized and empowered.

## SUCCESS STORY: The Saenaua Tribe Combines Reforestation With Income Generation Activities, Solomon Islands

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**Subject:** EFS

**Problem:** The slash-and-burn farming methods practiced by a tribal community left their lands either denuded or covered by regrowth species with little value or use. This trend threatened future availability of agriculturally productive land.

**Solution:** A project was initiated in which tribal landowners combined their plots of land and were paid a small wage to clear and plant the land with teak and mahogany trees. Women planted communal vegetable gardens between the stands of trees.

In the Malaita Province of the Solomon Islands, the slash-and-burn farming methods practiced for generations by the Saenaua Tribe had deforested the area. Fauna species and numbers were declining. Land was either completely denuded or covered with regrowth species unsuitable for building needs or commercial logging ventures. Given land limitations, the use of slash-and-burn agriculture also endangered the tribe's future agricultural production and hence, its ability to sustain itself. In 1982 a United Nations study recommended a reforestation pilot project be established on customary land owned by tribal members.

New Zealand funded the reforestation project under a plan negotiated among the Solomon Islands Government, the New Zealand Government and Saenaua landowners. Sited on a 250-hectare area, the project combined plots of land owned by individual men. Tribal men then cleared strips of land and planted teak and mahogany trees, with the cash incentive of minimal wages for their labor. Women became involved in the project in 1988 through the encouragement of the New Zealand Government. They were employed to maintain and weed the stands of trees. The women formed an association to fill their needs for a social club and to better manage their affairs, and were successful in negotiating desired adjustments to the project. For example, when the women became concerned that reforestation activities would squeeze out their traditional garden plots, they negotiated a project modification which allowed them to intercrop communal vegetable gardens with the mahogany stands. They also developed a flex-work schedule to enable maintenance of the gardens. In addition, the women succeeded in implementing their preference to work under the supervision of other women chosen by themselves.

The project reduced slash-and-burn farming methods and resulted in the reforestation of tribal lands. The community benefited economically by receiving cash income for their labor; when the hardwood species mature and are harvested, additional cash income will be realized. Proceeds from the sale of vegetables raised in the communal gardens support women's club activities. The women also purchase these vegetables themselves to improve their families' nutrition. Male landowners, forestry officials and the women themselves agree that the project is stronger due to women's participation. The status of women has risen: men started helping with traditional women's work and treating their wives as equals.

**Postscript:** Deforested lands are being replanted and produce vegetables to supplement the nutritional needs of the people. Tribal members earned wage income for their reforestation efforts. In addition, harvesting of mature teak and mahogany trees will provide income.

## SUCCESS STORY: Promoting the Role of Women as Natural Conservationists in Bangladesh

**Presenter:** Hasna J. Moudud

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**Subject:** EFS

**Problem:** Coastal ecology and biodiversity are under threat. Women and children suffer the most from the environmental degradation. Women are natural and traditional conservationists, but their potential to contribute in this capacity has not been well recognized or supported.

**Solution:** Hasna Moudud, through her work with CARDMA and NARI, promoted environmental protection of Bangladesh's coastal areas, especially through the participation of women.

One quarter of Bangladesh's population live in the country's coastal areas, where the ecology and biodiversity are under threat. This poverty-stricken region is subject to almost annual hurricanes that destroy lives and damage the fragile and complex environment. Coastal areas have the highest malnutrition rate in the country, as well as the greatest number of landless peasants and female-headed households. Hasna Moudud has worked to protect the coastal environment and to promote the role of conservationists through her involvement in two organizations: the Coastal Area Resource Development and Management Association (CARDMA) and the National Association for Resource Improvement (NARI).

In 1986 Hasna Moudud was elected to the Bangladeshi Parliament by a coastal constituency. She founded the Coastal Area Resource Development and Management Association (CARDMA), which brought together members of Parliament from coastal areas, experts and scientists. Led by Ms. Moudud, the Parliamentary members of CARDMA lobbied the Parliament to raise the general level of consciousness about conservation and the value of involving women in environmental management. Parliament subsequently formed a Special Committee on Environment and Coastal Development. The role of women as natural and traditional conservationists was highlighted and women were included in the coastal afforestation program. In addition, Hasna Moudud initiated a proposal to give land jointly to husband and wife and to female heads of households under the program of distribution of government land to landless peasants. When the Government adopted this proposal, women's status improved and land "grabbing" declined because of the women's fierce attachment to the land, as demonstrated by their immediately planting trees and growing vegetables. Hasna Moudud is no longer a Member of Parliament, but remains the chairperson of CARDMA and NARI.

NARI, under the leadership of Ms. Moudud, encouraged coastal area women in Noakhali to plant trees by the roadside and embankment and urged local authorities to integrate women in the coastal afforestation program. NARI also helped coastal area women earn income from grass mat sales. Coastal area women weave and sell grass mats, but competition from plastic mats was limiting their sales; the women were not making any money. NARI helped the women by designing the mats, marketing them in Dhaka and exporting them to Japan. The middle-aged women and their daughters who participated in the project earned additional income. Hasna Moudud's activities have created awareness of the critical links between women and the environment.

**Postscript:** Ms. Moudud believes that to bring about any significant change in the environment, women must play leadership roles on the national and international level. She is now striving to involve more women in the highest decision and policy making levels, and to help gain the global exposure, training and access to information needed for women to be effective managers of natural resources locally and globally. Ms. Moudud received UNEP's 1992 Global 500 Award.

## SUCCESS STORY: Women Participate in a Study on Hydroelectric Development

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**Subject:** EFS

**Problem:** Hydroelectric development of the Lower Clutha Valley could have profound effects on adjacent communities. Community participation was crucial in pre-project studies to assess the effects of alternative schemes and to find ways to minimize negative impacts.

**Solution:** The study commissioned by the Government of New Zealand incorporated novel techniques which maximized community awareness and participation, especially by women.

In the early 1980s, the New Zealand Government was examining options for generating additional electricity. They investigated adding hydroelectric dams to the lower Clutha River and commissioned a study team to compare four alternative schemes. To minimize problems associated with hydroelectric development, the study team's tasks were to: 1) conduct intensive technical, environmental, social and economic investigations into the various options and 2) involve the local community in the investigation and decision-making process. This approach required: 1) community involvement in study design; 2) periodical informing of the community on study progress and altering activities based on feedback; and 3) presenting the results and getting community input on their preferred option.

The study team encouraged participation by individuals and families and encouraged communities to be proactive in seeking and giving advice on the project. Women had a high profile in the investigations. (Ten study team members were women.) Several women who were elected local government officials served on the local advisory committee. Project information was made accessible to women through the distribution of pamphlets to every household and by locating posters, displays and meetings at shopping areas. Home visits and meetings were emphasized. School-aged children's assignments were used as a catalyst to involve the parents. The study culminated in a comprehensive report intended to assist decision makers. It contained recommendations for further work on key issues identified in the investigation.

As a result of this process, community women took a more active and public role than was typical in earlier development project investigations. Local women convened meetings in their homes and controlled the proceedings. They influenced the process and played a key role in disseminating information and made submissions which covered the whole range of hydroelectric development issues. Elements of this study's approach have been adopted for other proposed projects in New Zealand.

**Postscript:** The level of local community participation was high, particularly for women. Different development alternatives are being considered by the agency. The needs, expectations and aspirations of the communities affected have been taken into consideration in the decision-making process. The methodology of community involvement can be replicated elsewhere to the benefit of both policymakers and the public.

## SUCCESS STORY: Permaculture Education in New Zealand

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**Subject:** EFS

**Problem:** Uncontrolled use of agricultural pesticides and fertilizers contributed to denudation, ecological impoverishment and health problems in the Wairau Valley of South Island, New Zealand.

**Solution:** Evening classes were held on organic gardening and permaculture - sustainable, ecologically-sound land use. The classes made use of Margaret Peace's 10 years of personal experience in developing a small mixed farm using permaculture principles.

The Wairau region in the north of South Island, New Zealand is highly productive for livestock, grains, fruit, vegetables and wine grapes. The majority of farmers have relied heavily on chemical pesticides for the past 40 years, with much aerial spraying. This has adversely affected the environment. Some rare endemic plant species are threatened with extinction, and the safety of groundwater for drinking is at risk. Most large farmers still resist change, however.

Upon retiring as a secondary school biology teacher in 1975, Margaret Peace took it upon herself to help solve this problem in her local Wairau Valley. Margaret Peace first became aware of the dangerous effects of pesticides with the release of Rachel Carson's book *Silent Spring* in 1964. Since then she has actively campaigned against the use of hazardous pesticides and chemicals through the media and has lobbied government authorities, making the general public aware of problems related to chemical pesticide and fertilizer use. Through the Rural Education Action Programme, she instituted and taught evening classes in organic gardening and permaculture - sustainable, ecologically-sound land use - from 1986 to the present. Field demonstrations were also arranged to accompany the twelve-hour courses each year.

In addition to these activities, for the past six years Ms. Peace has represented the Minister for the Environment on the Pesticide Board, which regulates the use of pesticides in New Zealand. She has been interviewed on television and radio about her views on pesticides. Her ultimate goal is for New Zealand to become a nuclear-free and pesticide-free country.

Most participants of Ms. Peace's evening classes acquired the knowledge and enthusiasm to grow their own fruit and vegetables without using chemical fertilizers or pesticides. They felt inspired by the example set by Ms. Peace on her own property, which she uses as a demonstration unit for permaculture on field days. Over 100 local people (75% women) learned to grow their own food without using chemical pesticides or fertilizers and to make the most productive use of their land, thereby saving money, improving health and restoring environmental values. Over the last six years, a number of her former students have started up commercial operations producing organically grown fruit and vegetables. When Ms. Peace attended the Fourth International Permaculture Conference in Katmandu, Nepal in February 1991, she was nominated as one of the founding members of a proposed International Guild of Permaculture Practitioners. Recently, the local Zonta Club (Women's counterpart of the Rotary Club) presented her with an award as a "Woman of Achievement" in recognition of her work on environmental issues.

**Postscript:** Ms. Peace's educational courses in Permaculture Design are ongoing. She gives illustrated talks to community organizations and continues to contribute regular feature articles about environmentally-sound land-use to metropolitan and provincial newspapers and magazines. There are plans for a National Assembly of Women and the Environment in the next two years.

## SUCCESS STORY: A Chemical Emergency Response Plan is Launched in Kalookan, Metro Manila

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**Subject:** EFS

**Problem:** There is a risk of environmental damage due to a high concentration of industry in Metro Manila, home to about seven million people. There were no effective emergency response plans to deal with the possibility of an industrial accident.

**Solution:** The "Awareness and Preparedness for Emergencies at Local Level" (APELL) project was launched in the city of Kalookan. A risk assessment project which focused on estimating the accident risks posed by 1,000 small-scale industries was undertaken.

There is a risk of environmental damage due to a high concentration of industry in Metro Manila. About 50% of the 2,699 industrial firms are located in Manila, home to about 7 million people. In mid-1988, hundreds of residents living within a three-kilometer radius of a chemical factory in Bulacan, located about 15 kilometers north of Metro Manila, had to be evacuated following an accidental release of chlorine gas from the factory. In this case and in similar ones, the underlying problem was a lack of emergency response planning.

In response to an increase in such minor, but potentially devastating accidents in the Metro Manila Area, the National Engineering Center (NEC), a branch of the University of the Philippines, and the City of Kalookan joined forces in implementing a project that advocated the "Awareness and Preparedness for Emergencies at Local Level" or APELL process. In 1988 NEC decided to initiate action to lay the groundwork for a National Program on Chemical Safety.

The NEC technical team decided to work initially with authorities at a local government level. In this way a small-scale pilot project could be worked out before advancing to a national program on chemical safety. They chose Kalookan, which has 50 firms and a population density of 15,000 per square kilometer, for the pilot project. August 1989 marked the formal launching of the "Chemical Hazard Control and Emergency Response Project." The NEC offered in-kind support in the form of its expertise on chemical emergency planning, and the city government provided logistics and funding for operations within city limits.

A four-step strategy was outlined. It involved the identification of potential sources of chemical hazards and "at risk" community resources, and the final formulation of recommendations to include in a Community Emergency Response Plan. Two working groups were formed and were delegated tasks from the original outline. Their duty is to write a final report about their findings. In February a risk assessment project was launched. It estimated risks from more than 1,000 small-scale industries in order to identify high risk or vulnerable areas in order to help propose realistic control and emergency response measures.

The project is off to a good start. Through the established emergency response plans, the project is expected to prevent leakages or spills of potentially toxic chemicals to the environment. The project also offers chemical safety guidelines including proper storage and handling.

**Postscript:** A Chemical Emergency Response Plan for Kalookan has been drafted. This plan will prevent the loss of million of pesos in property damage. More importantly, it provides a system that could help save human lives and avert environmental pollution.

## SUCCESS STORY: Community Institutes Social Forestry *Program and* Walks to Raise Awareness in Andhra Pradesh, India

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**Subject:** EFS

**Problem:** The area in the foothills of Eastern ghats in Andhra Pradesh, India was rapidly being deforested due to exploitation of timber resources for sale and for firewood. Over the past 15 years, the area has become denuded, and water resources have been depleted.

**Solution:** CDC initiated a social forestry program in 20 villages. Satapathy Annapurna organized a women's group which adopted a hillock as the site for a tree plantation. A marathon walk was organized to publicize the area's environmental problems.

The Community Development Center (CDC), registered in 1980 in Ramabhadrapuram, is an organization working with the rural poor for social justice. It has been working with tribal villages in the foothills in Andhra Pradesh. The phenomenon of poverty has entered into their culture in the process of "development". The growing need for firewood, coal and timber over the past 15 years has led to deforestation and denudation in the area. The climate has changed as a result, and summers have become hotter.

Initial funding came from Brot fur Die Welt, F.R. Germany, Catholic Relief Services and REHASWISS (Switzerland) among others. During 1988-89 the CDC spent 20,000 rupees towards its social forestry program. The three-year program involved the tribal people in developing sustainable agricultural practices and discouraging shifting cultivation and deforestation. Among other accomplishments of the program, participants planted a contiguous area covering more than 20 villages (about 130 hectares of land) with various trees such as cashew, guava, papaya, subabal, neem and agave (a plant which provides fiber women can use to make ropes for income generation).

Satapathy Annapurna started an environmental forum within CDC involving women from 30 villages. In June 1990, the group adopted a hillock as the site for an experimental plantation. Nearly 11,000 species were collected from various sources and planted in a five-acre area. Ten women from CDC organized this project and 300 women participate in the general care of the plantation. The whole hillock has been regenerated with new plant life. The project recently received funding from the Catholic Women's Organization of Austria.

The CDC and Ms. Annapurna took an active interest in a *padayatra* (marathon walk) involving 70 organizations in seven districts. The walk covered a distance of 1,300 kilometers through the hill tribe region from February 14 - April 5, 1991. The walk was organized for participants to experience environmental degradation first-hand, to publicize these issues to the outside world and to mobilize the tribal people to articulate their viewpoint on the issues. The CDC initiated a parallel mini *padayatra* from February 17 - 19 with a group of 100 (more than half women) covering a distance of 50 kilometers. This mini *padayatra* fed into the main *padayatra.* During the three-night stops, people voiced their concern about the fast vanishing forest.

**Postscript:** Through the social forestry program, an area of 130 hectares was reforested. The tree plantation initiated by Satapathy Annapurna was a success as well, involving 300 women in planting and caring for the trees. Satapathy Annapurna has worked with the I.T.D.A. (Integrated Tribal Development Agency) to address the needs of the indigenous populations. Alternative income-generation programs are being developed that are environmentally-friendly.

## SUCCESS STORY: Swine, Toys and Trees and the Greening of San Miguel, Philippines

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**Subject:** EFS

**Problem:** San Miguel's agriculturally-based population lives near or below subsistence level. Farm size is small and income low. The once verdant eastern mountain range is bare. Outmigration became necessary to meet basic needs.

**Solution:** The project developed women's entrepreneurial capabilities so they could generate sources of income. It established a savings system maintained by the women for entrepreneurial needs. Women developed sustainable livelihoods.

The residents of San Miguel, an agricultural community, live near or under subsistence level. The farm size is small, and the income is low. Outmigration often becomes necessary to meet basic family needs. Ecologically, the area's eastern mountain range was once thick with vegetation. Now the slopes are bare.

In 1979, with a U.S. $50,000 UNIFEM grant, the Foundation for the Advancement of Filipino Women and the Kababaihang Barangay (KBB), an association of village women, started a cooperative pilot project for swine production. After a hog industry crisis, KBB diversified its activities. In 1985 KBB became the sub-contractor for a knitted garment manufacturer. (Knitters organized themselves into the San Miguel Knitters Association.) In 1986 the women began manufacturing and exporting stuffed toys. In 1987 another major project was launched: "the Greening of San Miguel." Under this five-year project funded by USAID and the Department of Agriculture, 50,000 fruit trees will be planted in 20 highland villages.

Project goals included increasing incomes and subsistence levels of women and their families, expanding the livelihood base, increasing women's financial independence, mainstreaming women into the economy and establishing orchards for fruit-processing ventures. The Technology and Livelihood Resource Center and the Department of Agriculture assisted the project. UNIFEM, ESCAP and USAID provided funding.

Activities included the organization and training of the women in KBB in such areas as swine production/pig fattening, knitting garments and manufacturing stuffed toys for export, fish farming (tilapia raising), soap making, Azolla (green fertilizer) and vegetable production, savings activities and fruit tree planting.

The project has not only increased the livelihood base of the families concerned but has also had an important impact on the whole city. The women, individually and as a cooperative, are empowered. The spin-off of the first project into a diverse set of economic activities has also opened options for environmental regeneration activities such as the "Greening of San Miguel" project.

**Postscript:** The project increased the livelihood base of the participants. The women, individually and as a cooperative, are empowered. The spin-off of the swine project into a diverse set of economic activities created opportunities for environmental regeneration activities such as tree planting.

## SUCCESS STORY: Philippine Women's Campaign *Against the Bataan* Nuclear Power Plant

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**Subject:** EFS

**Problem:** A nuclear power plant was planned in Bataan, a volcanic region with a history of earthquakes. Community members felt that risks to their health and environment were too high to warrant their acceptance of this project, despite the benefits.

**Solution:** A 10-year campaign was waged at the local, national and international levels to oppose the Bataan Nuclear Power Plant (BNPP).

In 1976 the people of Morong, Bataan, learned that a nuclear power plant would be built in their town. They became apprehensive when preparations for plant construction began and someone painted a sign on the school wall which said, "Fight the Nuclear Poison!" A group of Morong citizens read magazine articles and books and held study sessions in order to learn more about nuclear power. They decided that the risks of the Bataan Nuclear Power Plant (BNPP) outweighed any benefits, given the dangers of thermal pollution to their fishing grounds (a major source of income and subsistence), radiation from the plant and radioactive waste.

They informed all of Morong about the dangers of the planned BNPP. Then the Philippine Movement for Environmental Protection (PMEP) began informing other towns in Bataan. From 1977 to 1981, the Philippine Movement for Environmental Protection forged links with groups in other countries, gathered and disseminated information about the BNPP, and eventually built a nationwide network of groups concerned about the BNPP's safety. In 1981 PMEP helped form the Nuclear Free Philippines Coalition (NFPC).

With the Philippine Federation for Environmental Concern, the Nuclear Free Philippines Coalition coordinated most of the 10-year campaign's big events. The anti-BNPP campaign, in which women played key roles, included letter writing to heads of state; representation at public hearings; organization of fora, symposia, and environmental congresses; organization of rallies and marches; implementation of a media campaign; international protests at Westinghouse, which had been contracted by the Philippine Government to provide the nuclear reactor and technology for the Bataan plant; and a campaign among U.S. congressmen through support groups in the U.S. to regulate the export of this technology. (Under U.S. law, Westinghouse could export the nuclear reactor to the Philippines without undergoing the safety, health and environmental review process required of nuclear plants in the U.S.)

Opposition to the Bataan Nuclear Power Plant swelled, especially in 1984 when the Philippines Atomic Energy Commission (PAEC) prepared to conduct start-up testing. Despite this, plans to begin plant operation accelerated following public hearings on BNPP safety. (BNPP-opposed lawyers walked out, protesting bias.) In 1986 the Aquino Government came into power and, after the Chernobyl nuclear accident in the U.S.S.R., mothballed the Bataan Nuclear Power Plant project.

**Postscript:** In March 1992, President Aquino approved an out-of-court settlement with Westinghouse Electric Corp. calling for the upgrading and operation of the BNPP. This is subject to the approval of Congress. Opposition to this from different sectors, including media, was spontaneous. The administration of President Fidel Ramos is tackling the issue and recognizes the great opposition to the BNPP.

## SUCCESS STORY: *Thai Payap* Project in Nan Province, Thailand

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**Subject:** EFS

**Problem:** Dwindling natural resources and increasing material needs jeopardized the self-sufficiency of Nan Province's communities. Adjacent forested slopes were encroached by farmers, leading to soil erosion and a decline in water to lowlands.

**Solution:** The *Thai Payap* Project promoted the use of indigenous weaving skills to create a new home-based industry for women which would provide a sustained source of income. Farmers were introduced to new crops and sustainable farming techniques.

Dwindling natural resources and increasing material needs jeopardized the self-sufficiency of Nan Provinces' remote communities of ethnic minorities. Population pressures were leading to the cultivation of slopes and thus environmental degradation in the form of deforestation and soil erosion.

In April 1984 the Ockenden Venture began the *Thai Payap* Project, an export-oriented craft marketing project designed to generate income in Nan Province's remote communities of ethnic minorities. The British Government and the European Community initially helped fund the project, but now handicraft sales cover all marketing program operating costs and generate a surplus for other development activities. Most marketing team staff, members of the autonomous craft production groups and their elected leaders are women. The *Thai Payap* Project covered a number of villages, including Ban Don Chai, where the project was implemented to market traditional woven cotton cloth. At the time, this type of weaving was a skill known only to a few older women. As large orders began to flow in through the Ockenden Venture's group's worldwide contacts, increasing numbers of women began to pick up the weaving skills.

In response to village requests for additional assistance, in 1988 the Ockenden Venture (with Canada Fund support) began a two-year program to improve the villagers' main occupation, subsistence farming. The two-year agricultural program focused on maintaining the fertility of the land and producing food for subsistence by developing goat raising; introducing wheat; planting contour rows of nitrogen-fixing bushes on sloped land; creating paddy fields and fish ponds in small upland valleys; planting fruit trees; and creating model farms which integrate activities into an ecosystem. Women farmers often led the way in adopting the environmentally-sound farming techniques. The *Thai Payap* Project now uses an integrated approach to help the farmers subsist on their land while conserving and preserving their natural resources.

This integrated approach is creating substantial social, economic and environmental benefits. For example, in Ban Don Chai weaving provides sufficient income to enable the village to respond to natural resource preservation needs. Former encroachment of neighboring hills has ended because pressure on land use has been eased by the new income source. Villagers planted fruit and forest trees in the low slope areas. As a result, the village's lowland areas benefit from increased natural water supply, especially during the dry season. This enables farmers to develop new crops in their paddies during the dry season for consumption and local sale. Added income decreases migration pressures, helping to preserve families.

**Postscript:** The Thai Payap Project recently began operating independently of it's former UK based sponsoring organization, The Ockenden Venture. Thai Payap is now entirely owned, managed and operate by Thai and ethnic hill tribe residents of Nan Province. Thai Payap has expanded its work into ten additional villages since November, 1991.

## SUCCESS STORY: ABC/Nepal - Agroforestry, Basic Health and Cooperatives Assist in Dacchi Village

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**Country:** Nepal

**Region:** ASIA/PACIFIC

**Subject:** Energy

**Problem:** Dacchi Village, Nepal suffered from deforestation and inadequate opportunities to generate income.

**Solution:** Agroforestry Basic Health and Cooperatives/Nepal (ABC) initiated efforts to help the village. They focused their efforts on building village awareness and including village women in development activities.

In 1987 a group of Nepalese women launched ABC/Nepal. Its mission is to carry out activities in the areas of agroforestry, basic health and co-operatives (hence its name) in order to raise the status of underprivileged rural people, especially women. ABC seeks to maximize the involvement of women in all its activities and to engender respect for women's potential to uplift the society. Since ABC's inception, it has worked in Dacchi Village. This village has a plethora of problems, including deforestation, illiteracy, poor sanitation, lack of health facilities and few economic opportunities.

The basic goal of ABC's intervention in Dacchi is to raise the level of understanding concerning village problems and the options for solving these problems with available resources. Thus, ABC immediately initiated a non-formal literacy class which not only taught reading and writing, but created awareness about village problems in such areas as sanitation, health and deforestation. Women's participation in discussions was sought, and when families pressured women to drop out because the instructor was male, ABC organized a females-only class taught by a woman.

Activities to ameliorate deforestation have included training villagers to establish tree nurseries and to construct smokeless ovens which are more fuel efficient than traditional ovens. In cooperation with ABC, villagers have planted over 7,000 high-yielding fodder and fruit trees. With the support of World Neighbors, ABC appointed two community workers, one for health and one for reforestation. To improve health and sanitation, ABC established a health clinic served by a female doctor and initiated a village cleanup campaign. To reach the illiterate population, ABC produced songs and used the media to educate and popularize the message. ABC linked sanitation with income generation by providing spinning wheels on easy terms to 100 women. To qualify for the spinning wheels, women had to keep their home surroundings clean and well-maintained. These women have significantly increased their incomes by supplying the many household carpet industries in the valley.

**Postscript:** The village is more conscious of its problems and is more motivated to improve its situation. Seven thousand trees have been planted. Villagers have learned to construct fuel-efficient smokeless ovens. One hundred women earn additional income by spinning yarn. A clinic serves the health needs of the people.

## SUCCESS STORY: Solar Box Cookers Help Indian Women Save Time and Reduce Consumption of Scarce Fuelwood

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**Subject:** Energy

**Problem:** Deforestation has made it difficult for people to obtain fuelwood. The Indian Government's solar cookers and alternative fuels, such as kerosene, are too expensive for the rural population to purchase.

**Solution:** An affordable solar cooker was designed that supplements traditional cooking facilities and reduces the demand for kerosene and firewood. The cooker can be built using local materials and skills.

Residents in Kangra, India have trouble finding fuelwood for cooking due to forest depletion. Residents can not afford to buy kerosene to use as an alternative. The Indian Government produces solar cookers, but they are small and expensive. Other technology is not often available.

Using local materials and skills, Didi Contractor developed a solar cooker that has a cooking capacity more than twice that of government cookers, at half the price. Materials used in construction include glass, matt black paint and oil or ghee tins. Local materials used include sun dried mud bricks, bamboo poles, rice husk and home spun woolen fabric. The cooker supplements traditional cooking facilities, as its use depends on the seasons and the time of day. Her work has been funded by the German Agency for Technical Cooperation (GTZ). From 1985 to 1988, Didi Contractor helped to install solar cookers for the Indo-German Dhauladhar Project (IGDP), aimed at devising means to regenerate mountain region ecologies. She trained women in the maintenance and use of the solar cookers. Installation and training costs for 150 cookers was roughly U.S. $5,000. The cost of one cooker is about U.S. $20. One third of this amount can be produced by the owners directly if local materials are used.

Solar cookers, unless they are extremely sophisticated, can never completely replace stoves using conventional fuels. However, with solar cookers, women can save up to one third of their fuel use and up to four hours a day, which used to be spent gathering wood and tending the cooking process and the fires. Women with skills and economic opportunities are able to increase their earnings by 5 to 20 rupees daily during the time saved. Results from a survey done in 1988 showed a savings of 1.20 rupees per day on the purchase of fuel. The cookers are effective for Indian cooking and match the local diet. The midday meal consisting of rice and dahl can be entirely prepared in the cooker. The cookers are effective for baking, a new skill women learned, thereby extending the family diet. Villagers dependent on diminishing resources had begun to avoid nutritious foods like whole beans that require long, slow and fuel-consuming cooking. Now with the solar cookers they have added these to their diets. Use of the solar cooker is spreading. In addition to the activities already described, Didi Contractor has advised the Ecology and Energy group, an nongovernmental organization that is making the cookers in the Una District, with funding from the Indian Government. She has also recently worked with an anthropologist on developing a light-weight portable cooker to be used by migrating shepherds in the highlands.

**Postscript:** Dissemination of this rural adaptation of a solar collection oven has reached a multiplication phase with a number of NGO's promoting it and giving training camps in its making and use. Didi Contractor remains available to guide and encourage this expanding network. Current experimentation includes solar cooker use for natural vegetable dyes for an Oxfam funded project training women in spinning and weaving.

## SUCCESS STORY: Gujarat Energy Development Agency Develops an Energy and Education Package for Tribal Children in India

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**Region:** ASIA/PACIFIC

**Subject:** Energy

**Problem:** Severe deforestation is occurring in the state of Gujarat, seriously degrading agricultural productivity and causing critical fodder and fuelwood shortages. The inefficiency of traditional wood-burning stoves compounds the energy crisis.

**Solution:** The Gujarat Energy Development Agency designed and field tested a 15-module energy and environment education package for tribal children which used scientific folklore tales adapted from tribal folklore.

The Indian state of Gujarat has only 3% of its land under productive forest cover. In addition, traditional wood-burning cookstoves are inefficient. Consequently, there is an acute energy crisis; annually, 1,000,000 tons of precious cow dung are burned for water heating and cooking purposes and thus diverted from use as manure on fields. The loss of tree cover which prevented erosion and enhanced soil structure has resulted in the degradation of agricultural lands. There is a desperate need to alleviate the energy crisis and protect agricultural productivity through afforestation and energy conservation. Tribal people have been particularly affected by deforestation.

Nandini Gandhi is Manager of Mass Communication for the Gujarat Energy Development Agency (GEDA). With her instigation and active leadership, GEDA carried out a project which developed a unique 15-module energy and environment education package for tribal children. She adapted tribal folklore, fables and nature myths and created scientific folk tales that teach environmental concepts. Five women implemented the project. They initially developed and field tested the education package with 40 teachers and extension workers and 10 activists from voluntary agencies. The package was easy to use, enabling the use of semi-skilled extension workers and tribal women to deliver it to the children. By February 1991, 500 tribal children had participated in programs using GEDA's environmental education package.

The format was successful in breaking the tribal children's resistance to science and technology education and in bridging dialect and sociocultural barriers that inhibited learning. As teachers and particularly local non-formal education workers adapted the tales in the local dialect, they were able to give the stories the immediacy of a local problem. Children listened to the stories with enthusiasm and gained a better understanding of the role forests play in sustaining natural cycles. Concepts not easily grasped in tribal schools were understood even by primary schoolchildren. Children, teachers and extension workers became "tree literate" and gained a keen desire to participate in tree plantation and fuelwood conservation programs; tree-planting activities were started in schools after exposure to the energy and environment education package. The next phase of the project, package extension, plans to reach a total of 50,000 tribal children; it is estimated that this may result in the planting of 250,000 trees and the adoption of improved cookstoves by 20,000 homes.

**Postscript:** The GEDA has been successful in reaching rural populations with essential information about environment and energy. Additional module packages have been designed, including a package geared towards women. The GEDA is now coordinating with a women's activist group in tribal villages to train over 200 women in December 1992.

## SUCCESS STORY: Deccan Development Society of India

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**Subject:** Energy

**Problem:** Degradation of productive land led to erosion of topsoil, loss of food crops, increased unemployment in the villages, and choked drainage systems which increased soil salinity.

**Solution:** Forty women came together to cultivate degraded lands through collective farming and sharing of resources, altering the nature of farming in the process.

Agricultural policy, support, infrastructure and research in India have been mostly based and oriented on the model of the "green revolution." Select, endowment-rich areas receive all the water almost free of cost as well as cash subsidies, hybrid seeds, low interest bank loans, remunerative prices, etc. This has lead to a situation where only modern, irrigated mono-cropping of market-oriented crops becomes profitable to farmers. Arid areas, relying on rainfed agriculture and traditional farming face neglect. This leads to increasing unemployment, loss of seed stocks, poverty and disruption of the agricultural cycle. This in turn leads to neglect of land, erosion of topsoil, and water logging, which make land management increasingly difficult. The women describe this as the silent process of desertification.

The village-level women's organizations extensively discussed the impact of these problems on their present conditions and the implications of these problems for the future. They came up with the idea of collectively leasing degraded land and reviving them through traditional farming. The Deccan Development Society (DDS) gave the initial funds on a loan basis since no bank came forward to assist the women.

Hundreds of women now ensure that there is no loss of crop diversity, no loss of topsoil and no wastage of rainwater. The project involved 400 women in 20 villages. In three years over 700 acres of land has been brought back to productive use, and every year more land is improved. The economic and ecological soundness of this program, which holds validity for all arid areas, is a good example of survival strategies and sustainable development. The Government of India has accepted this program for the whole state under the Development of Women and Children in Rural Areas (DWACRA). International agencies have identified it as a good example of sustainable development and a way to halt the rapid degradation of the land and water.

**Postscript:** Over 700 acres of land has been brought back to productive use. The Government has accepted this program for the whole state under the Development of Women and Children in Rural Areas. International agencies have identified it as a good example of sustainable development and a way to halt the degradation of land and water.

## SUCCESS STORY: Greenhouse Gas Policy in Japan - *One Woman's Approach*

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**Subject:** Energy

**Problem:** The Japanese Government was not addressing the problem of greenhouse gas emissions in the country. The Government resisted dialogue with environmental nongovernmental organizations (NGOs).

**Solution:** Ms. Matsumoto lobbied persistently for a reduction in greenhouse gas emissions in Japan. She established a dialogue with the MITI, Ministry of Foreign Affairs and the former minister of the Environment Agency.

Japan is the fifth largest emitter of greenhouse gases like carbon dioxide. Many scientists believe that increases in the emissions of these gases present an alarming threat to the global environment, because they will lead to radically higher average temperatures. However, in early 1990 Japan's Ministry of International Trade and Industry (MITI) was talking about increasing carbon dioxide emissions by 16% over the next 10 years. The Japanese Government did not recognize the problem of global climate change and had a very negative attitude toward a dialogue with environmental nongovernmental organizations, especially Greenpeace.

Since early 1990, Yasuko Matsumoto has persistently lobbied the Japanese Government in an effort to promote policies to decrease greenhouse gas emissions. The small Greenpeace office in Japan supported her efforts. She presented material on global warming to officials and invited experts to Japan. She attended international conferences on climate change, where she promoted to the Japanese Government the benefits of interacting with environmental NGOs and the necessity of taking the initiative in calling for carbon dioxide reductions. She established a dialogue between the Japanese Government and environmental NGOs. For example, connections made with senior officials of MITI at the conferences allowed her to set up a meeting between Greenpeace climate change experts and the Agency for Resources and Energy.

Japan is a male-oriented society. Therefore, Ms. Matsumoto found it difficult as a female lobbyist to engage senior government officials in a dialogue. However, her persistence has paid off. Japan has agreed to freeze greenhouse gas emissions and to keep emissions policy under constant review. Dialogue between the Environment Agency, MITI and the Ministry of Foreign Affairs and environmental NGOs has improved. For example, in two recent international meetings on climate change, Japan was the first country to hold a press briefing open to NGOs and to attempt to have a dialogue with NGOs. Ms. Matsumoto has been lauded by journalists who acknowledge that her style and persistence helped to bring about the reversal of attitudes about greenhouse gas emissions.

**Postscript:** The Japanese Government has agreed to freeze emissions at a steady level, and the Environmental Agency is more receptive to working with nongovernmental organizations (NGOs) knowledgeable in the field of greenhouse gas emissions.

## SUCCESS STORY: Biogas Technology in Al-Habeel Village, Yemen Reduces Women's Workload

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**Subject:** Energy

**Problem:** Women bear a heavy work burden that includes fetching water and collecting fuel. This workload and unhealthy working environment (harmful smoke and contaminated water) threaten women's health.

**Solution:** Biogas units were installed as alternative energy sources. Women manage and maintain these systems. This project incorporated training in diverse areas - literacy, health, vegetable growing - and the organization of women.

Women in Yemen are responsible for many farming activities including all aspects of animal husbandry. Apart from the household tasks, they also bear the burden of fetching water and collecting wood or other fuel. This workload, in addition to working in an unhealthy environment - harmful smoke, contaminated water, working with dung, etc. - affects their health adversely. The people in Al-Habeel in particular are poor and lack access to adequate health services.

Since 1986, the Economic and Social Commission for Western Asia (ESCWA) has implemented several projects exploring biogas technology (BGT) in Yemen. Their success moved the Government to ask ESCWA to adopt Al-Habeel village for a biogas technology pilot project. The project's objectives are to improve the quality of life of women and their families through the introduction of biogas technology and income generation activities; to assess the health, social and environmental impacts of BGT; and to minimize air and water pollution and other health hazards. UNIFEM funded the two-year pilot project, which started in 1989. Other collaborating agencies are ESCWA, the Ministry of Energy and Minerals and the General Union of Yemeni Women.

Project activities included surveys of the village before and at the end of the project; construction of 22 family and community biogas units, including latrines, animal sheds and gas stoves; training of local people in biogas system construction and maintenance; training of women on plant operation; training of women leaders to help implement programs in health, literacy and home-based economic activities; installation of water treatment units; and planting of vegetable gardens. Village women are directly involved in the village committee and in maintaining and managing the BGT systems.

As a result of the project, the women have been relieved from tasks such as the collection of wood and agricultural residues and the handling of animal manure. Their exposure to the by-products of burning organic matter has been diminished, thus greatly reducing health hazards. The sanitary and health conditions of the households as well as the environmental conditions of the village have improved. The village was provided an inexpensive energy source which meets 70-80% of the household energy requirements. Air and water pollution have decreased. This project has been so successful that the Government intends to adopt a national program in biogas technology based on the model developed by the project.

**Postscript:** Reduced pressure on land and vegetation encouraged environmental regeneration. Air and water pollution declined. Women were relieved of fuel-gathering tasks and exposure to the by-products of burning organic materials, reducing health hazards.

## SUCCESS STORY: Women's Groups Play a *Main Role in an Integrated* Environment Project in Nepal

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**Region:** ASIA/PACIFIC

**Subject:** Energy

**Problem:** Environmental degradation and deforestation were severe problems in rural areas of Nepal. Residents of rural areas also suffered from abject poverty coupled with an insanitary environment.

**Solution:** Using existing service delivery structures, a broad range of activities was launched to mobilize women for conservation of the local environment, improvement of their environment at the household level and reduction of women's workload.

Nepal is among the poorest countries in the world. It has high infant mortality rates (165 per 1000 live births), high maternal mortality rates (830 per 100,000 live births), low literacy rates, particularly for females (18%), and inadequate access to safe water (38%) and sanitation (8%). Furthermore, deforestation is a serious problem, since forests are the major source of domestic energy supply. The rapid deterioration of the environment affects the poorest families most severely, particularly their women and children.

The Production Credit for Rural Women (PCRW) and the Small Farmers' Development Programme (SFDP) are strongly committed to alleviating the problems of poor families in Nepal, particularly low-income and deprived women. These two organizations are now playing a very crucial role in the mobilization of communities for development and environmental protection activities, with support from the Nepalese Government and UNICEF. The credit as well as non-credit groups formed by the two local organizations have functioned as important entry points for this project, which uses a decentralized, community-based, needs-assessment approach. In 1990, eight PCRW and eight SFDP sites were selected to initiate the project. They were selected based on the following criteria: visible/prominent environmental degradation (deforestation, soil erosion, fuelwood scarcity, lack of environmental sanitation); the activeness of group members; and potential for community development programs. Initiatives were carried out at the household and community levels with the active participation of women and small farmers.

To date, the project has been highly effective in addressing the environmental problems identified by the women's groups and small farmers at the community level. As a result of the project, 3,002 participants, of which 40% were women, were trained and oriented on issues which have a direct bearing on the living environment of women and children. In addition, six community-based nurseries were established, and a total of 2,848 households participated in agroforestry activities (such as the planting of 147,000 fuelwood, fodder and fruit tree saplings). Sources of drinking water were protected through fencing and tree planting. The project also enabled the installation of 547 improved household cooking stoves, 350 low-cost latrines and 100 compost pits. The project has led to a change in the thinking of the local community, increasing the self-confidence of women and creating a realization of the importance of improving/protecting the environment, especially at a household level.

**Postscript:** The importance of women's participation has been recognized. Sanitary conditions have improved and clean water is available. Local organizations have been strengthened and are playing a more active role. The project also resulted in the formation of local environment committees. Plans are underway to expand the project to 14 new sites across the country this year.

## SUCCESS STORY: KSSP Develops Fuel-Efficient Wood Stoves for Indian Villages

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**Subject:** Energy

**Problem:** There was a lack of fuelwood available and inefficient cooking stoves compounded the problem. The stoves also generated a lot of smoke and put women's' health at risk.

**Solution:** A team of technicians of the *Kerala Sastra Sahitya Parishad* (KSSP) developed a fuel-efficient stove. Festivals were held in various towns to demonstrate and distribute the stoves to prospective buyers.

Women had to travel, often by foot, to gather the fuelwood needed to cook family meals. They had to travel further and further from home in order to gather enough wood to cook, using valuable time that could be spent on other endeavors. The inefficient cooking stoves used large quantities of wood and were also very smoky. Women working in smoky kitchens inhaled carbon monoxide and other toxic gases and therefore suffered from respiratory diseases such as bronchitis.

In spite of the cynicism engendered by the failure of earlier campaigns to effect a change, the *Kerala Sastra Sahitya Parishad* (KSSP), of which Ms. Radhamani is a member, sought a solution to this problem. A team of technicians with the KSSP developed ceramic-lined two pot and three pot stoves. The stove is designed with an asbestos cement chimney with grating in the firebox and an auxiliary air supply. The project was funded through a program of the Government of India's Department of Science and Technology. To spread the word about the new stove, the KSSP organized stove installations and festivals in the villages. They demonstrated how the stove works and gave classes about the need to conserve fuel, the necessity of the forests and the economic value of the stoves. They also took orders for stoves from interested persons and installed the stoves in their homes. More than 2,000 people are trained to install the stoves, and of these, about 600 are women. It took one year to develop the project and five years to implement it.

The Agency for Non-conventional Energy and Rural Technology, an institution of the government of Kerala, provides a subsidy of 65 rupees per stove. (In select areas and for select groups, this subsidy is higher.) The buyer must then pay 80-90 rupees more in order to purchase the stoves. In all, it cost about 200,000 rupees to develop the project and 34 million rupees to implement it.

Out of five million people in the state of Kerala, 200,000 households use the new stoves. One quantifiable benefit of the project is a 40% reduction in fuelwood consumption from previous levels, amounting to a savings of 600,000 tons of fuelwood at a cost of 300 million rupees. Another important benefit: kitchens equipped with the new stoves have become much healthier places in which to work.

**Postscript:** The stoves use 40% less fuelwood than traditional stoves, thereby reducing the impact on forests surrounding the villages. The women who use the stoves now have a clean and healthier cooking environment.

## SUCCESS STORY: Paasban Women Introduce *the Smokeless Stove, Pakistan*

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**Region:** ASIA/PACIFIC

**Subject:** Energy

**Problem:** Traditional mud stoves or *chulhas* used by 72% of the rural population consume a lot of firewood. Indiscriminate wood collection put pressure on dwindling forests. Smoke inhaled by the women from the stoves causes respiratory problems.

**Solution:** The Paasban's Women Association introduced smokeless *chulhas* in five rural locations and taught women how to build, repair and maintain the *chulhas*.

Traditional mud stoves or *chulhas*, used by 72% of the rural population in Pakistan, consume a lot of firewood, which is not readily available since only 3% of the country is forested. The stoves produce much smoke which the women inhale while preparing meals. It has been estimated that the amount of smoke inhaled by a housewife is equivalent to her smoking 200 cigarettes a day. Smoke inhalation causes respiratory problems and lung cancer and affects the women's eyesight.

For the past 12 years, the Paasban's Women's Development Program has been working on a national strategy to bring women into the mainstream of development in order to improve their economic and social status. To accomplish their goal the group provides social education, training to upgrade skills, social centers and other assistance to women. Paasban has created awareness of contemporary issues such as environmental degradation. In October 1986, a group of three women from Paasban's Women's Development Program introduced smokeless *chulhas* designed in India by Madhu Sarin in five rural locations. Initial funding for the project came from CIDA, Oxfam, Population Concern and Pak Canada Small Projects. The project team organized a series of *chulha* workshops in which women from the communities were trained to build, repair and maintain *chulhas*. In addition, a national *chulha* training workshop is conducted in which women learn to be master trainers. The program has been particularly successful in the rural areas around the industrial city of Faisalbad. The women there were particularly eager to adopt methods to improve their environment as well as their working conditions. Moreover, the *chulhas* at U.S. $5.00 each were very affordable. A workshop held in March 1990 trained 15 women. Within a period of eight months, 193 smokeless *chulhas* had been built.

As the project gained momentum it gathered sufficient funds to make it self-sustaining. The smokeless *chulha* lowers fuel consumption by 30%, and housewives save time and energy by using them. Less fuelwood is collected and used in the communities that have adopted the new *chulhas*. A housewife can cook two meals simultaneously using the same amount of wood previously used to cook one meal. Women's health conditions have improved, since they no longer inhale as much smoke. Kitchen walls and utensils no longer become smoke blackened, and women spend less time and water cleaning them.

**Postscript:** Women expend less energy gathering wood, and health conditions have improved as women do not inhale as much smoke. The time savings of up to four hours a day for women are significant.

## SUCCESS STORY: Rehabilitation of Degraded and Eroded Land in India with Community Participation

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**Subject:** Energy

**Problem:** The village of Jamla suffered from excessive land degradation, severe soil erosion and shortages of fuelwood, fodder and water.

**Solution:** A Project Area Development Committee consisting of both forest department field staff and villagers was created and registered as a cooperative after in-depth analysis of the problem and creation of environmental awareness among the villagers.

The village of Jamla in Mandi District of Himachal Pradesh suffered from excessive land degradation, severe soil erosion and the shortage of fuelwood and fodder. Uncontrolled grazing of cattle had led to the degradation of the pasture. Thus, the productivity of pasture lands was very low. In addition, the area had hilly terrain with sparse plant cover. This caused the washing away of excessive amounts of soil during the rainy season. Severe seasonal erosion of banks threatened to wipe out two settlements. Water was scarce during the dry months. Villagers lacked awareness about the necessity and importance of trees and forests.

Archana Sharma is a divisional forest officer with the Siket Forest Division in India. She and her staff visited Jamla and held discussions with the local people, especially the women, regarding the problems faced by them and the probable solutions. Ms. Sharma then formulated a project and requested funding from the National Waste Land Development Board, which provided 350,000 rupees to be spent over a five-year period. A Project Area Development Committee consisting of both the villagers and forest field staff framed the by-laws for the execution of the project, seeking the participation of village women in particular. Villagers carried out afforestation activities, planting fuel and fodder species on degraded lands. In addition, they constructed check dams, check walls, spurs, retaining walls, etc., in order to reduce the intensity of soil erosion. To address degradation of pasture lands, they closed off some areas, developed pastures and advertised the benefits of stall feeding and having fewer but more productive cattle. The people constructed water retention structures like farm ponds and water storage tanks to mitigate their water shortage problem. The villagers through their committee made collective decisions regarding the area to be afforested, the pasture land to be closed and the choice of fuel and fodder species for afforestation.

The ongoing project has many benefits. It employs local people exclusively and thus provides them with additional income. With the passage of time, fuelwood, fodder and timber will be available to the villagers free of cost and in the vicinity of their dwellings. The general micro-climate will improve once the plantations mature and degraded land will be rehabilitated. The project has reduced soil loss and consequently protected agricultural productivity. The provision of farm ponds and water storage tanks provides the villagers with better access to water during the dry season. The project has created awareness among the villagers about the need for a healthy environment and helped them to realize that forests and trees are essential for the survival of human beings.

**Postscript:** The project has created environmental and economic benefits, such as a reduction in soil loss, increased productivity of pastures and forests, improved access to water, increased availability of fuelwood and fodder and, above all, the positive response of the people towards their role in preserving and conserving the environment.

## SUCCESS STORY: A Sanitation Project in Kurana Village, Sri Lanka

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**Region:** ASIA/PACIFIC
**Subject:** Waste

**Problem:** Kurana Village lacked sanitary facilities for human waste disposal. This led to environmental pollution and frequent outbreaks of diarrhea.

**Solution:** With the support of UNICEF, the District Planning Unit implemented a participatory sanitation project which focused on women and developed the skills of the village's Rural Development Society.

Inadequate water and sanitation facilities in Kalutara District's outlying areas led to regular rainy season outbreaks of diarrheal disease, a major killer in Sri Lanka. In response, UNICEF supported a water and sanitation project for 25 villages in Kalutara District. The project used a process designed to strengthen the government extension system, community participation and institution building, especially women's participation in development projects and activities.

Kurana was selected as one of the project villages. Ninety-five percent of its 460 families were members of a socially-depressed group which had migrated to the village when they were offered Crown land. Kurana lacked both a sanitary waste disposal system and a potable water supply system, and suffered from its remote location and a caste-based social ostracism. It had been bypassed by other development efforts. A core group of young people (mainly women) had joined the dormant Rural Development Society to try to improve their conditions.

The objective of the waste disposal project in Kurana was to construct 25 water-sealed latrines within a year. Early achievement of this goal secured UNICEF funds for another 25 latrines. UNICEF funds of 750 rupees per latrine and community self-help enabled latrine construction, which was accompanied by sanitation, health and nutrition education. The education emphasizes the ability of the community to effectively control the situation by using sanitary toilets and adopting related health habits. Orientation/training sessions for the Rural Development Society and government extension workers and officials prepared everyone for their roles in the participatory project. The Rural Development Society, especially its Village Development Team (8 of the 12 were women), had major responsibilities. Working closely with government extension workers and officials, they conducted a community survey to assess village needs and resources, and analyzed the data; mobilized village participation; managed the UNICEF funds; and planned, supervised and monitored the construction program.

Twenty-five water-sealed latrines were constructed. Heightened awareness and the adoption of better water and sanitation practices reduced roadside pollution and the incidence of sanitation-related infections. The community established connections with the government. This ended its isolation and led to the implementation of other development projects in Kurana.

**Postscript:** As a result of the project, 25 water-sealed latrines and 205 wells were constructed. Increased awareness and adoption of improved water and sanitation practices reduced roadside pollution and the incidence of sanitation-related infections. Village isolation ended as the community established connections with the government.

## SUCCESS STORY: The Compost Improvement Program of Nepal's National Agricultural Research Centre

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** Deforestation has degraded soil fertility in Nepal. The use of compost can improve soil quality and increase crop production, but the scarcity of fodder and fuel has led to a decline in materials available for composting.

**Solution:** The Division of Soil Science at Nepal's National Agricultural Research Centre implemented a "Compost Improvement Program" targeted at rural women in all of Nepal's 75 districts.

Until recently, agriculture in Nepal was self-sustaining. Massive deforestation in rural Nepal has impoverished the country's soils and has depleted the availability of biodegradable material from the forest. Consequently, soil erosion has increased and women are forced to divert dung and agricultural wastes from compost to fuel uses. As a result, Nepal's crop yields have declined in recent years. To complicate matters, Nepal's rugged topography inhibits transportation of chemical fertilizers, which in addition are very expensive.

In response to these problems, in 1974 the Division of Soil Science at Nepal's National Agricultural Research Centre began a "Compost Improvement Program." Through its research, the Division of Soil Science developed an improved method of making compost. The Division's extension program, which has been implemented in all of Nepal's 75 districts, trains mid-level technicians, progressive farmers and village motivators to use these improved compost-making techniques. The system stresses the use of on-farm materials. It also reduces the volume of compost needed by improving compost quality. Permanent platforms are built for compost making in order to limit nutrient loss through leaching and evaporation. Farmers are encouraged to plant additional trees on their farms in order to increase the materials available for composting and to meet their fuel and fodder needs as well.

This participatory project includes committees of farmers and other village groups in its training sessions; it is hoped that those trained will train other rural people in a later phase of the project. The extension program targets women farmers, since they generally have more responsibility than men for collecting farm wastes and distributing compost. Environmental education using audiovisuals has proved most effective so far in encouraging women's participation.

The project has had beneficial impacts. The nitrogen content of the compost improved when prepared by the methods suggested by the Division of Soil Science. Favorable effects were observed when compost was used on various vegetable crops. A study showed that organic matter supplied by different sources such as farms, cities and biogas slurry, if supplied in adequate quantities, could sustain yields of wheat at higher levels as compared to yields that had chemical fertilizers alone applied to them. Plots treated with organic fertilizer were found to have a higher phosphorus content than those treated with chemical fertilizers.

**Postscript:** The project, by reducing women's burden, freeing up their time and generating income, has had a favorable impact on the lives of women and their families. The nitrogen content of the compost improved and favorable results have been achieved when the compost was used on various vegetable crops.

## SUCCESS STORY: "Eco-Aides" Help Recycle Wastes for 18,000 Households in Manila

**Presenter:** Leonarda Camacho

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** There was a lack of adequate waste disposal, landfill space and an effective garbage recycling program.

**Solution:** Households were urged to separate wet and dry wastes. Existing junk shop traders were organized to collect and pay for dry wastes to sell to factories as secondary materials.

Many of the residents in the Metro Manila area did not have adequate waste disposal systems. Landfill space was scarce, and few residents had thought of recycling household wastes. Land, air and water pollution was a major problem in the city, and many canals were clogged with plastics.

In February 1983, the Metro Manila Council of Women Balikatan Movement, Inc. planned a garbage recycling program in order to improve waste disposal for the town's 18,468 households. The San Juan Chapter of the Council organized 10 existing junk shop traders to collect and pay for dry waste. A system was set up whereby "eco-aides" collect the community's dry household waste once a week. This waste is then sold to junk shop traders who in turn sell it to the factories as secondary material. The factories then convert the dry waste into new products.

The women also continuously wrote to the households urging them to separate their wet and dry garbage and sell it to the "eco-aides." Seminars, meetings and general assemblies in the villages explained the problem and the proposed solution. The Metro Manila Council of Women provides an annual subsidy of U.S. $400 which is used for collection equipment, uniforms and "eco-aide" identification cards. The village councils cooperate by supporting the program.

The project has resulted in many environmental, health and economic benefits. Streets and canals are cleaner. Most community members are becoming more cooperative in separating wastes. There is less air, water and land pollution. Street litter has been reduced. Participating households, "eco-aides" and junk shop traders earn money from the program, and the general health of the community has improved. Factories consume less fuel when they use recycled materials and spend less on imports of raw material, thereby decreasing overall production cost. Fewer government dump trucks are needed to collect the wastes, thereby saving government funds. Less government money is spent on unclogging canals which were previously clogged with plastic. The project has been so successful that both the Metro Manila Council and the Government of the Philippines are considering replicating it. Ms. Camacho was asked by the Metro Manila Authority to advise them on how to word an ordinance that would compel residents to recycle.

The environmental and economic benefits include waste recycling, creation of income-generating opportunities, reduction in raw material consumption by factories, and improvements in general health.

**Postscript:** Ms. Leonardo Camacho and the Metro Manila Council of Women are working with other subdivisions of the city and with universities to develop their recycling programs. Ms. Camacho attended a World Bank workshop in February 1992 and has been asked to submit a study of waste recycling to the Bank by the end of the year.

## SUCCESS STORY: Taiwan Homemaker's Union and Foundation Promotes "The Four R's" to Reduce Municipal Solid Waste

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**Country:** Taiwan

**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** The increasing use of disposable goods (as a result of rising affluence and use of convenience products) resulted in a dramatic increase in municipal solid waste. The increase placed a heavy strain on disposal and management operations.

**Solution:** The Environment Protection Committee of the Homemakers Union and Foundation (HUF) carried out activities to educate and motivate citizens to "Reduce, Reuse, Recycle and Regenerate."

In 1990 Taiwan had a population of more than 20 million people, giving the island a population density of about 560 people per square kilometer. Municipal solid waste reached more than 7 million metric tons, an increase of 37% from 1987 figures. Wai-Jane Ho, a member of HUF has identified what she calls the three "highs" and three "lows" that explain why Taiwan is experiencing this problem: High Density - high economic and social indices affecting environmental loading; High Growth - increased pollution following economic growth; High Expectations - people expect a clean environment; Low Funds - low public investment in environmental protection; Low Manpower - few people working in environmental protection; Low Technology - technology often lags behind that of developed countries.

The Homemaker's Union and Foundation (HUF) established in 1987, was renamed as The Homemaker's Union Environmental Protection Foundation (HUEPF) It is one of the most outstanding women's organizations in Taiwan. HUEPF has over 1,000 members who want to unite to improve the quality of life and is funded by private firms and enterprises. The Environmental Protection Committee (EPC) is one of HUEPF's seven committees. The EPC planned 11 environmental protection projects during 1988-89. The HUEPF declared 1989 "The Year of Waste Reduction."

HUEPF's members have promoted many environmental projects, such as the "Hsi-Fu" Recycling Project, started by the Government's Environmental Protection Administration (EPA). HUEPF printed thousands of pamphlets to teach people how to sort their garbage and where to send recyclables. Each year the group targets communities and sends teams to work with community members to encourage recycling. Other HUEPF members have worked through department stores to encourage shoppers to bring their own bags rather than using plastic bags. " The Little Magic Scouts of Environmental Protection" project involved educating a group of 30 teenagers about environmental issues. It included a field trip to teach children about waste regeneration and disposal. "The Environmental Protection Mothers' Camp" is designed as an eight-week training course for mothers to learn about environmental protection. HUEPF initiated a workshop for grandmothers to recruit skilled senior homemakers to participate in environmental activities. The HUEPF also holds "Green Consumer Workshops" to raise awareness among consumers.

The HUEPF have helped to educate the public about the "Four R's and reduce the total weight of solid waste by 20-40%. There was a monetary savings of NT $.25-.51 on refuse disposal cost per person per day, and each family recovered NT $70 per month from recyclable material.

**Postscript:** The HUEPF continues to promote the "Four R's"- Reduce, Reuse, Recycle and Regenerate. The Committee has advocated "Green Consumption Action" to promote a more simple and ecologically-sound lifestyle. In addition, their most recent activities include promoting breastfeeding and developing nature trails in urban areas.

## SUCCESS STORY: "Women in Environment" Implement a Squatter Settlement Improvement Project

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** The squatter settlement at Balaju was neglected environmentally. Piles of solid waste created health risks. Many people drank unsanitary river water due to a lack of a potable water supply. The river bank was unstable.

**Solution:** "Women in the Environment" undertook an improvement program in the squatter community. They promoted sanitary waste disposal, facilitated the connection of the community to the main water line, assisted in efforts to stabilize the river bank, etc.

On the west bank of Nepal's Bishnumati River at Balaju lies a squatter settlement of 70 households. The community there suffered from poverty, poor sanitation, lack of potable water and the insecurity of living next to a river which threatened their homes whenever water levels were high. "Women in Environment" (WE), a Kathmandu-based NGO, consists of professional women committed to creating environmental awareness among Nepalese people, especially women and children, through education and village-based action programs. In 1990 WE initiated a squatter settlement program at Balaju in an effort to provide education, health, sanitation, waste disposal and drinking water facilities to the members of the squatter community. Prior to initiating the project, WE visited Balaju a number of times and spoke with local people to identify problems and issues. WE also arranged a "Training of Trainers Workshop" to equip WE members with knowledge and skills prior to implementing the project.

An action committee of 12 local people was formed to act as a catalyst for the development activities in the settlement. Piles of solid waste had gathered around the settlement, and WE considered poor management of solid wastes a major health threat to women and children; however, the community did not identify this as a problem. WE organized lectures on the health risks posed by improper solid waste disposal. When the people remained unmotivated to change their habits, WE provided a bucket to each household and offered a cash prize of 500 rupees to the household which disposed of their solid waste most effectively and kept their house clean. Within two months, every household was disposing of their waste at a WE-recommended site, and no one wanted the cash reward. After living in a clean environment, families wanted to keep their homes that way.

WE also facilitated the connection of the community to the main water line. They helped the people liaise with government agencies and provided building materials for the water connection and two taps. Local people contributed their labor; they then added a third tap themselves. The squatter community also planted saplings and established a gabon wall to stabilize the river bank. Kitchen gardens have been established, and more than 20 women participate regularly in the non-formal education program.

**Postscript:** Households dispose of their solid waste in a sanitary fashion. A water pipe with three taps connects the community to the main water line. A gabon wall and a greenery line stabilizes the Bishnumati River bank. Kitchen gardens have been established and 20 women participate.

## SUCCESS STORY: Women Spearhead Promotion of Environmental Health, Sri Lanka

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**Region:** ASIA/PACIFIC
**Subject:** Waste

**Problem:** There was a need to promote awareness of environmental health at the household and community level.

**Solution:** Members of a women's organization, Lanka Mahila Samiti (LMS), organized training courses. They then organized a mass campaign to educate rural women in promotion of a healthy environment.

The importance of environmental health to human well-being is now universally recognized. The *Lanka Mahila Samiti* (LMS) is a well-established nongovernmental women's organization which has been working to improve the status of rural women for the past 60 years. In 1990 LMS initiated a one-year program, with the assistance of the Central Environmental Authority and UNICEF, to promote awareness and activities related to environmental health in Sri Lankan villages. Efforts were channeled through rural women's committees already established in the villages.

Ms. Fernando (Vice-President of the Child Protection Society) initiated the Environmental Health Program in Sri Lanka in 1989, and was elected president of LMS in June 1991. The Environmental Health Programme had four components: safe domestic water, food safety, solid waste disposal and vector control. It promoted a variety of good practices, including (among many others) sanitary toilets, compost making, fuel-efficient stoves, home gardening, tree planting and the proper disposal of human waste, garbage and wastewater. As a preliminary activity, officers of the Health Department, the National Water Supply and Drainage Board, the Municipality and the Central Environmental Authority conducted a two-day training program for 25 *Parikshana Sevikas* (Senior Field Coordinators of LMS) on the above issues. From August to October 1990, these *Sevikas*, with the assistance of local authorities and health staff, held 28 training courses for 547 members from 274 rural women's committees (*samitis*) in 14 districts. These 547 women then divided into groups and visited 30 households per *samiti* in the first month to provide environmental health awareness and education on two of the four subjects. In the second month, they revisited the same 30 households and educated these families, especially the women, on the remaining two subjects. In the third month, they obtained the cooperation of whole villages and the officials responsible for their welfare to organize a mass *shramadana* (group free services) campaign to meet their most pressing needs. The program was repeated over the next three months, covering a total of 60 households per *samiti.*

The program shows that high standards of environmental hygiene and education can be implemented in areas of rural poverty, given the right motivation and organization. The Environmental Health Program evoked unusual interest and support among rural women. As a result of this successful education, mobilization and sensitization campaign, the same type of program will be implemented in 15 more districts this year through the Sri Lanka Girl Guides' Association and *Vanitha Karya Samajas* (Rural Women's Societies) by the Women's Bureau.

**Postscript:** The Program educated over 25,000 households in the 14 Districts in which it was implemented, during its first year, with considerable impact. It is being continued until up to the end of 1993, aiming to include a total of 400 villages in 16 districts. The Programme was nominated in 1992 for the valuable King Baudouin International Development Prize.

## SUCCESS STORY: Women Members of *Naripokkho* Mobilize To Resist Toxic Waste Importation and Dumping in the Bay of Bengal

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** A ship originating in the U.S. was attempting to dump toxic and nuclear wastes into the Bay of Bengal. In addition, a proposed manufacturing plant based on imported toxic waste jeopardized public health and the environment in Bangladesh.

**Solution:** Women between the ages of 18 and 65 united to resist these environmental hazards. They conducted a public awareness campaign and protested through letters to the Bangladeshi Government.

In February 1989, two news reports appeared almost simultaneously in the Bangladeshi press. One pertained to a proposed manufacturing plant in Bangladesh based on imported industrial waste; the other referred to the clandestine movement in the Indian Ocean of a U.S. ship attempting to dump its 15,000 tons of toxic incinerator ash into the Bay of Bengal. The ship *Felicia* had originated in Philadelphia, changing its name several times in two years to avoid detection. Dumping this toxic waste off the coast of Bangladesh would threaten the fishing industry, the area's main source of livelihood. It would also undermine the health of humans, plants and animals living on the coast.

Starting in March 1989, *Naripokkho* (a Bangladesh women's activist group) mobilized like-minded individuals and organizations - women's organizations, human rights and legal aid groups, scientists, students, researchers and social activists - and undertook a series of actions as the organization "Foreign Waste Resistance Committee." Its prime objective was to build up public opinion to put pressure on the Bangladeshi Government to take steps against these toxic waste threats. They conducted a nationwide signature campaign, distributed information leaflets, demonstrated, wrote newspaper articles, and held seminars and press conferences to create public awareness about industrial waste and its possible effects. Sayyada Ghuznavi and Parvin Hasan jointly coordinated these activities, which cost Bangladesh Taka 20,000. *Naripokkho* provided most of the necessary funding, although member organizations also contributed financing. There was also a strong element of volunteerism in the campaign. Several hundred women participated in the activities.

As a result of the group's campaign, the two toxic waste issues were resolved by October 1989. The proposed industrial waste-based plant was canceled. The Bangladeshi Government used its resources, including the Navy, to protect its territorial waters. The Indian Navy also joined in the search for the ship, although given the enormity of the problem, neither navy could confirm or deny whether any waste had in fact been dumped in the Indian Ocean. The most dramatic effect of the actions, however, has been the awareness created about the hazards of industrial waste. The group, renamed the "Environment Protection Committee," continues to operate with a wider mandate on environmental matters.

**Postscript:** The attempt to pollute Bangladeshi coastal waters with toxic and nuclear wastes was thwarted, and the proposed manufacturing plant based on imported industrial waste was shelved. The Naripokkho's Women's action has created enormous public support for the findings of the Committee and continues to mobilize the community on environmental issues.

## SUCCESS STORY: Tsinghua Environmental Engineering Corporation - Linking Universities and Industry for Better Pollution Control in China

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**Country:** China

**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** Industrial wastes caused pollution. There was a lack of communication between the university research community and the industrial sector on how such wastes should be treated.

**Solution:** Shaozhen Jiang started Tsinghua Environmental Engineering Company (TEEC) to facilitate the transfer of university research findings and technological development to industries for effective management of pollution discharge.

The Beijing region suffers from heavy pollution that is caused by wastes from the industrial sector such as steel, electric power generation, metallurgy and paper making industries. The existence of new enterprises has created an urgent need for technological research and implementation of pollution control measures. Typically, industries have not been interested in investing in pollution control. Shaozhen Jiang, who was a faculty member in the Environmental Engineering Department of Tsinghua University, decided to initiate this project to increase collaboration between the scientific research community and industry.

In 1988 Shaozhen Jiang started an independent company, Tsinghua Environmental Engineering Corporation (TEEC), to act as a mediator between the university researchers and industries for more effective management of industrial wastes. The company links the university research groups to a mill or factory which needs new pollution technology. Facilities consult university research groups about how to improve their internal management; they then equip external treatment facilities according to the research group's recommendations. Young environmental studies graduates are involved in the project and several government agencies have facilitated linking industries with universities.

Since the TEEC was established, it has worked with more than 20 factories and mills, including Beijing Ferment Plant, Beijing Brewery and Beijing Dyeing Mill. The university research groups have provided them with such new technologies as coal dust treatment processes and AD bio-treatment technology. The technology provides low-cost and efficient pollution abatement for facilities and their surrounding areas. Since TEEC was founded, accumulated funding has reached 21.44 million yen, of which 15 million came from the national financial allocation and the back-payment of levied pollutant discharge fees; 8.44 million was raised by factories and mills. With the funds, TEEC pays the university research groups for their transfer of technology.

TEEC has helped companies save money while improving the environment. For example, Harbin Airplane Manufacture Co. only spent 3.89 million yen for wastewater treatment using the coal dust treatment process provided by TEEC, as opposed to 5 million yen the company would have paid for traditional biological wastewater treatment. In addition, the pollution discharge fees of 2.5 million yen are waived for factories which have controlled their industrial waste by using the new technology provided by the university research groups. By adopting the new technology, factories also benefit from reused and recycled resources, in the amount of 1.8 million yen in all.

**Postscript:** TEEC, in conjunction with university research groups, has helped industrial facilities to implement cost-effective, up-to-date and efficient pollution control technology. TEEC has also introduced the idea of resource recovery and reuse to several facilities.

## SUCCESS STORY: *Wanita Utama* Women's Farmers' Organization Initiates Waste Management System in Gombong Village, Indonesia

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**Subject:** Waste

**Problem:** Gombong Village was economically and environmentally impoverished. Most land was barren and infertile. There were frequent outbreaks of contagious diseases due to poor sanitation. Poverty was widespread, and most men had abandoned the village.

**Solution:** Seventeen women formed a farmers' organization and embarked on a house-to-house campaign encouraging their neighbors to build simple latrines and to use processed human waste to fertilize crops and improve soil conditions.

In the 1970s, Gombong Village in Indonesia suffered from multiple problems. Eighty percent of the people relied on the land for a living, but that land was so infertile that many men had left the village to seek employment elsewhere. Only 3% of the villagers had attended school beyond the primary grades. Improper human waste disposal and water shortages led to frequent outbreaks of contagious diseases.

PKK is an Indonesian social movement devoted to enhancing the role of women in grassroots development activities. In 1981 the PKK team in Gombong conducted several education programs and meetings for women. In the wake of these meetings, 17 village women formed an organization of women farmers called *Wanita Utama* or the "Honorable Ladies." The 17 "village motivators" then went house to house and encouraged each family to: 1) build two pit latrines; 2) use a simple system to convert the human waste into manure; and 3) use that manure to improve the land's agricultural productivity.

Using this simple, low-cost, environmentally friendly strategy, Gombong's women have raised village living standards without using outside resources. Agricultural yields are higher, especially for horticultural products such as fruits, vegetables, herbs and spices. Poultry and livestock raising has expanded. Increased incomes have transformed the village: the men have returned to these improved conditions; families can afford educational expenses through the high school level; housing has been built using a rotating credit scheme; and more and more villagers can afford radios, televisions and motorbikes. Moreover, sanitation and health conditions have improved. In 1986 the President of Indonesia gave *Wanita Utama* the KALPATARU Award for their continuous and impressive efforts to preserve and improve the environment.

**Postscript:** Soil conditions have improved. As a result, agricultural production, family income and the standard of living have risen dramatically. Sanitation and health conditions are improving.

## SUCCESS STORY: Woman Develops an Improved Sewer System for Municipalities in Japan

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** The sewer system that the Japanese Government had implemented was costly and inefficient. The system treated industrial wastewater simultaneously with domestic sewage.

**Solution:** Dr. Nakanishi organized citizen action and presented an alternative sewage system comparing its cost and performance analysis with that the Government system. She publishes a monthly newsletter *Mizu Joho* (Water Report).

In the 1970s, the Japanese Government initiated a policy of constructing a sewage system on a large scale and treating large amounts of industrial wastewater simultaneously with domestic sewage. Rural governments were forced to incur considerable expense, and delays were common. Low-quality treated water and heavily polluted sludge were produced. Water quality was impaired. The system was poorly planned and often too large for small communities. Moreover, the construction and maintenance of this system was costly.

For the past 15 years, Dr. Nakanishi has been working to develop an alternative sewer system. She lectured in most of the Japanese cities where a sewage system was being planned, organized citizens, and proposed an alternative to the government plan. The Japanese Government ignored Dr. Nakanishi and citizen opinion. Most scientists stopped studying the issue and supported the Government. Dr. Nakanishi conducted many experiments in her laboratory in which alternatives to the Government's plan were developed. In 1981 Dr. Nakanishi began producing a monthly journal *Mizu Joho* (Water Report) to inform people about the latest scientific facts and citizen's movements. *Mizu Joho* is now being published in English. Local people were involved in the collection and analysis of data for environmental impact assessments and cost-performance analysis. A large percentage (40%) of those involved in these activities were women. Initially, the cost for all of her activities including research at the university was paid for from her personal salary, income from her book's royalties and lecture fees. In 1984 a citizen's group was organized to support her financially. The group provided her with 1-2 million yen for six years. The subscribers' fees have covered the cost for publishing her monthly newsletter, which costs about six million yen per year to publish. Her annual research costs total about three million yen.

National and local governments gradually followed Dr. Nakanishi's advice as she was able to establish a basis for constructing a sewage system that improves water quality. Municipalities pay her to investigate and design sewer systems, although when the municipalities want to adopt her proposals, the central government frequently intervenes in their decision claiming that her ideas are against the Sewerage Law. Dr. Nakanishi's activities have prevented industries from discharging the toxic wastewater in the environment through the sewer system. In addition, they have promoted an economical sewerage system and therefore enhanced the extent of sewage treatment coverage. There is cleaner water in the river system, better performance of sewage treatment with less cost, and more rational use of fresh water in the area.

**Postscript:** By identifying the problem and proposing a working alternative, Dr. Nakanishi convinced national and local governments to adopt her approach. Communities now have cleaner water and a better performing sewage system. Many citizens are taking part in activities to reform sewer planning.

## SUCCESS STORY: Management of Community Waste Disposal *System*

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** Inefficient waste collection led to the pile-up of domestic wastes in the San Antonio Valley II Subdivision outside Metro Manila. Residents resorted to dumping and burning the garbage themselves. The waste attracted disease-carrying pests.

**Solution:** Through the Catholic Women's League, the community held meetings to discuss the problems. They sought their own solutions by using local resources to dispose of and to recycle garbage rather than depending on the Metro Manila Authority.

The project was initiated in a small community called San Antonio Valley II Subdivision (SAV) located outside Metro Manila where 1,000 people (about 200 families) reside. The community could not depend on the Environmental Sanitation Center, which is part of the Metro Manila Authority, to pick up their domestic waste on a consistent basis because of the center's limited resources. As a result, garbage piled up, and residents resorted to burning their garbage themselves or to dumping it in a nearby creek.

Through the Ladies Auxiliary Committee of the Catholic Women's League (CWL), the community decided to remedy the problems themselves rather than to reform the Environmental Sanitation Center. They transformed wide vacant lots in the area into sanitary landfills where organic waste could be converted into fertilizer. Dry wastes such as plastic containers, tin cans, newspapers, old tires, etc., were either recycled or sold through junk dealers. Proceeds from the sales are given to maids and "househelps" working in private residences to provide an incentive for them to participate in recycling. Wet wastes such as fish intestines and gills, spoiled rice, fruit peelings and the like were either buried to produce plant fertilizer or put in disposable plastic bags for the garbage collectors. The CWL sent representatives to the local government to ensure garbage collection proceeded two times a week on a regular basis.

As a result of the new waste disposal system, residents burn and dump less garbage, although this activity still goes on. The CWL continues to hold meetings and circulates memoranda regarding the household waste disposal. Heads of families are encouraged to educate all family members, especially the househelps, regarding proper waste disposal methods. Officers and committee members conduct inspections of house surroundings, and inform residents if disposal activities have not been performed properly. Concepcion Ocampo believes the work of her group, the CWL, has increased the role of women in the community. Moreover, CDL's efforts have saved money for the local government and for the Metropolitan Manila Authority since the project reduced collection activity by the local government by as much as 80%.

**Postscript:** Dumping of wastes into the local creek and the burning of domestic wastes by residents have decreased. Diseases carried by flies, cockroaches and mosquitoes have been greatly minimized.

## SUCCESS STORY: *Sulabh Sauchalaya* Toilet Systems in India

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**Region:** ASIA/PACIFIC
**Subject:** Waste

**Problem:** Inadequate sanitation facilities led to widespread diseases and high infant mortality rates. Scavengers of the human waste were particularly affected by disease. Flies and mosquitoes infested unsanitary areas.

**Solution:** Community and individual *Sulabh Sauchalaya* toilets were constructed. Biogas conversion mechanisms were implemented to convert the waste to usable energy.

One of the most important priorities for excreta disposal programs in developing countries is reducing the transmission of diseases by introducing inexpensive sanitation facilities. High infant mortality rates, widespread disease and malnutrition due to diarrheal disease are characteristic of unsanitary environments. In India, the cost in terms of medical treatment and lost production is about U.S. $348 million annually. A survey revealed that only 20% of the households had flush arrangements connected to the sewer system, 33% had bucket or dry latrines, 33% had no facilities and 14% had water-borne toilets connected to septic tanks. This means a widespread use of open drains and open spaces, resulting in the spread of disease and a heavy reliance on scavengers for disposal of human waste. The scavengers, most of whom are women, are exposed to serious health hazards and are socially segregated in marginal or low land-value areas.

Sulabh International, a voluntary social organization, succeeded in demonstrating that pour-flush latrines with on-site sanitation can be constructed in heavily congested areas, and this technology is well suited to different socio-cultural contexts in India. The objectives of Sulabh International are: 1) to liberate scavengers by converting bucket latrines to hand flush water-seal compost latrines; 2) to utilize biogas generated from human excreta and to use the sludge for fertilizer; 3) to maintain community toilets, baths and urinals on a pay-and-use basis; 4) to impart training to sanitary inspectors, engineers, and social workers to open *Sulabh Sauchalaya* toilets in urban and rural areas; 5) to rehabilitate the individuals forced to scavenge and their children by making provisions for them in various vocations; 6) to engage doctors to distribute free medical treatment to scavengers and to check them for diseases.

Two hundred community facilities have been provided all over the state of Bihar. The success of the project is due to its design and operation. A fee is charged for use of the facilities, but for women, children and invalids it is free. The facilities function around-the-clock and are maintained by 5-8 caretakers. Where there is a sufficiently large use of community toilets, biogas is being converted into energy. Fifty-four *Sulabh Sauchalaya* feed an underground digester, and the plant produces 55 cubic meters of biogas per day. This gas was used to generate electrical power for a 10 K.V.A. generator.

**Postscript:** A cleaner environment resulted from the project. In some locations the human waste was converted into biogas used to fuel generators.

## SUCCESS STORY: All Pakistan Women's Association (APWA) - *Sanitation* Project

**Presenter:** Begum Tajwar Shaukat

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**Country:** Pakistan

**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** An absence of sanitation and sewage facilities led to constant health problems for families occupying areas of Karachi. Poor water drainage attracted flies and mosquitoes and caused diarrhea, malaria, etc., in the population.

**Solution:** The All Pakistan Women's Association helped to introduce sanitation facilities where they were needed in the community. They first introduced simple bucket latrines and then helped community members to build more permanent facilities themselves.

During the last ten to fifteen years, thousands of families in search of food and employment have moved to certain areas of Karachi from rural areas of Pakistan and from other countries. They occupied unauthorized land in unplanned settlements. These people suffered from constant health problems due to the absence of sewage systems and sanitation. Poor drainage attracted flies and mosquitoes, causing diarrhea, typhoid, malaria and dysentery among the population. The focus of the project by the APWA was to improve health through better sanitation practices and facilities in the communities.

Money posed a constraint, therefore the first step was to introduce simple improvements such as bucket latrines and soakpits for human sewage. Open pits were dug for the disposal of wastewater. In order to raise money to build more permanent sanitation structures, APWA introduced income-generating activities. Women were trained in such skills as pickling and preserving vegetables, embroidery and carpet and rug making to help raise money. APWA and other organizations helped communities to save money by helping them build facilities themselves rather than having it done by commercial companies.

Small social welfare organizations developed, and community members approached the Karachi Development Authority and the Karachi Municipal Corporation for further assistance when needed. In some communities, latrines have been constructed inside the houses.

Aside from improved sanitation and health, another social benefit arose from the implementation of the project: the project instilled confidence in the women of the community. Improvements in the health of women and children has freed up women's time to pursue activities that interest them. Previously, women had spent much of their time caring for sick children. Women participate in income-generating activities as well as contribute physical labor to construction projects. More and more women take out loans from cooperatives and women's banks newly operating in Pakistan.

**Postscript:** Health in the communities improved, and women, who formerly spent much of their time caring for sick children, had more time to pursue other activities. They received training in skills such as preserving vegetables and local handicrafts.

## SUCCESS STORY: KAWWAS Women's Group in Pakistan Uses Collective Action and Self-Help to Transform Their Urban Community

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**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** A cooperative housing community of 65,000 residents lacked basic facilities such as regular garbage collection and an adequate sewerage system. The lack of service provision by the local authorities created health and safety threats.

**Solution:** A group of local housewives organized a door-to-door campaign and mobilized women to work collectively to solve these problems. The women pressured local agencies to respond to their needs and organized to improve their environment.

A cooperative housing community in Karachi, Pakistan lacked many basic services, including adequate garbage collection and sewerage systems. Consequently, gutters became choked and sewage from broken pipelines mixed with drinking water. In addition, there was sewage overflow into homes from the open drains flowing through the locality. These drains also created a breeding ground for disease-bearing mosquitoes.

Safina Siddiqi and other community women had individually approached civic agencies to try to obtain improved services for their area. These efforts were always unsuccessful. In August 1988, the women decided to address these problems collectively and formed the Karachi Administrative Women Welfare Society (KAWWAS). They launched a campaign to encourage women in this socially conservative, middle-class community to take action outside of their homes. After much effort, they were able to motivate the women to take part in the collective effort to improve their environment. Men did not participate, as they had long ago given up on the system and thought that the women's approach was not practical. KAWWAS has 35 members who regularly support its activities, which include pleading their case before municipal agencies, facilitating and coordinating the agencies' activities in the community, and improving their environment through self-help efforts. The project's expenses included transportation, the purchase and installation of garbage bins, salaries for refuse collectors and street sweepers, and the purchase of tree guards, plants and manure. These expenses are covered by monthly dues of 100 rupees and fund-raising events. KAWWAS estimates its recurring costs at U.S. $2,300 annually. One-time costs for replacing sewage lines (U.S. $19,690) and construction of embankment walls (U.S. $86,956) were covered by civic agencies, who carried out the work after being pressured by the women.

Within two years, KAWWAS had achieved the following by exerting persistent pressure on local government agencies and by solving immediate problems on the basis of self-help: broken sewerage lines were replaced; a regular system of garbage collection was instituted; banks of open drains were constructed to avoid overflow of sewage into homes; and there was a reduction in mosquitoes. Activities to establish parks and tree plantations were embarked upon. As a result of the women's efforts, residents now enjoy a cleaner, healthier and more attractive environment.

**Postscript:** KAWWAS is the first women's group in the country to approach the Supreme Court with a public interest petition concerning the health and environment of their housing society. Initial success has been achieved when on the Court's order, the management relayed a formerly contaminated water supply line that was serving at least 30 homes and fixed another dilapidated sewage line for 16 homes.

## SUCCESS STORY: Training Housewives and Women Leaders on the Safe Uses and Handling of Toxic Substances, Thailand

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**Country:** Thailand

**Region:** ASIA/PACIFIC

**Subject:** Waste

**Problem:** The dangers of toxic substances in agriculture, food and the household are widespread and increasing, especially in rapidly developing countries such as Thailand.

**Solution:** The Foundation for Life-long Education and UNEP initiated a training program for women on toxic substances in the home and in agriculture. The Department of Non-formal Education organized workshops attended by 166 women.

Due to concerns over the growing dangers from toxic substances in agriculture, foods and the household, the United Nations Environment Programme (UNEP) earmarked funds to train women leaders on the proper use of hazardous substances. Thailand was one of the countries to utilize these funds.

The Thai training program was headed by one of UNEP's Senior Women Advisors, who was also the president of the Foundation for Life-long Education. The Foundation and UNEP provided policy guidelines; the Ministry of Education's Department of Non-formal Education implemented the project. The training program was known as the "Project to Train Housewives and Community Leaders in Safe Uses and Handling of Harmful Substances in Homes and Agriculture," and it ran for two months in 1989. One hundred and sixty-six women (local housewife group leaders, village health workers, volunteer teachers of the Department of Non-formal Education and local leaders) attended one of the five three-day workshops on toxic substances held throughout Thailand (one per region).

The workshops provided information on the proper use of toxic substances through lectures, videotapes, exhibits, models, etc. Equally important, the workshops offered the women skills training and practice which instilled self-confidence in their ability to share knowledge acquired in the workshop with neighbors and friends. The women researched topics individually and in teams and reported back to the group. They also prepared and performed short plays on training themes. On the last day, the women went into the community and practiced the strategies they had learned for providing information on the use of toxic substances.

Within three months, the program's participants had shared their knowledge with over 10,000 people, more than six times the expected number of people. In addition, the people who were reached directly and indirectly through the program had made improvements in practices related to harmful substances. The Thai Government has earmarked its budget for a similar workshop to be undertaken in 25 more provinces for 1992.

**Postscript:** The 166 women were asked to share the information with at least 10 people, and a follow-up study showed that the program reached 10,267 people with information on toxic substances. In addition, the people who were reached through the program had made improvements in practices related to harmful substances.

## SUCCESS STORY: Radio Show Spreads the Word about Water, Health and Sanitation to Thousands in Indonesia

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**Region:** ASIA/PACIFIC
**Subject:** Water

**Problem:** Lack of adequate garbage disposal systems caused water pollution in rural areas. Villagers were not in the habit of using latrines, and water-borne diseases were widespread.

**Solution:** A community awareness project was initiated through radio, television, and group demonstrations. The broadcasts disseminated information widely throughout rural areas. An additional project was set up by the Department of Public Works through key women

Inadequate garbage disposal systems contributed to water pollution in parts of rural Indonesia. Water-borne diseases increased as residents dumped garbage into rivers. Through weekly radio and television programs, a community awareness campaign was launched by women of all ages. The program is an ongoing program broadcast to rural people, especially to women, in the form of dialogue between two women on the air. These dialogues between *ibu* Siti and *ibu* Minah (mother Siti and mother Minah) attracted a large listening audience among farm women in South Sumatra. The two broadcasters used simple language, which everyone in these areas could understand, to communicate ideas about sanitation and health.

To find out about the impact of the broadcast, the organizers conducted a competition for the program's listeners, who sent in responses to questions which were broadcast over the air. Some of the questions were: From where do you get your drinking water?; Do you boil your drinking water?; Do you have a latrine?; How do you get rid of your rubbish? After reading through the answers, the program organizers visited the places from where they had received responses. They saw improvements in the villages, mostly accomplished by women. Fitri Aini manages the project and writes scripts for the program. She also acted as secretary for the competition. In all a total of about U.S. $270 has been spent implementing this ongoing project.

The radio program delivered helpful information to women, who used what they learned to improve their environment. The program's organizers believe the project is really changing people's behavior. Women began to insist that their families install and use latrines. Less garbage was disposed of in their rivers. The organizers believe the most beneficial impact has been a decrease in the incidence of water-borne diseases. Plans are underway to extend the program in other areas. For example, along Musi river in Palembang, South Sumatra, there are lumber mills. The sawdust is piled and burned or goes to the river. The sawdust could be used for fuel for cooking in a sawdust stove. Fitri Aini plans to introduce this idea to people and to local stove makers.

**Postscript:** Women used the information to better improve their living conditions. More latrines were installed, and villagers were more conscious of keeping their drinking water clean. As a result, there has been a reduction in the incidence of water-borne diseases.

## SUCCESS STORY: UTTHAN-MAHITI Water Pond Project in Gujarat State, India

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**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** There was a lack of appropriate and alternative systems for providing drinking water in drought-prone saline coastal areas of Gujarat, India.

**Solution:** Rainwater runoff is harvested in earthen tanks lined with low-density polyethylene to prevent seepage of rainwater as well as the salinity which contaminates stored water. This water is then filtered in a slow sand filter and taken out by a hand pump.

Gujarat state in India is situated in the west and has a very long sea coast. The state as a whole suffers from water shortages. The village in the region of Dhanduka Block of Gujarat has been suffering from regular scarcity of drinking water. The groundwater is extremely saline, and about 25-30 years ago, the government had installed a pipeline 100 kilometers long supposedly to provide drinking water to the people in the coastal villages. This alternative failed to provide water for several reasons: poor quality construction of the pipeline; numerous leaks along the pipeline leading to less output and lots of pressure; its operational dependency on electricity, which is unreliable; and the social problems such as powerful people taking away more water by breaking the pipeline.

In 1981, the NGO UTTHAN-MAHITI started to work with people in this region to identify appropriate and viable alternative water supplies. The community then conceived the idea to collect rainwater in village ponds (tanks) and to line the ponds to prevent contamination. This was tried out in a village called Rahatalav in 1985. Though crudely demonstrated, it proved its viability as this was the only source of water in that village during the drought in the summer of 1986. Thereafter, surrounding villages applied to the government for the implementation of this solution. The approach and acceptance at the government level was not easy, as this was a non-conventional alternative which was not on their program. It was at this point that women members in two villages out of the most troubled seven villages organized themselves to persuade and convince the Board to sanction this scheme. Women discussed with engineers the viability of this system, the maintenance responsibility of the community and the problems they faced due to the pipeline water supply system. The local officials operating the pipeline expressed their anger as the women had openly complained to the higher authorities about the poor state of the water supply pipeline.

Women's groups were under tremendous pressure, but they clung together until finally the sanction came from the state government, through which the funds for excavating ponds came. In the summer of 1987, eight ponds were completed in seven villages. A semi-government body called Council for the Advancement of People's Action and Rural Technology (CAPART) gave funds for lining the ponds. In five of the seven villages, excellent maintenance systems are evolving where the community as a whole protects these ponds. Since 1987-88, these villages have not faced any of the water shortages which were previously prevalent. Water is now available all year round for people as well as cattle. The period of seasonal migration of people has been reduced by 30 to 40%. Women no longer have to walk long distances to collect water in summer, and the incidence of diarrhea and skin disease has been reduced, especially among children.

**Postscript:** Due to the success of the Utthan Water Pond Project, other villages have become interested in implementing similar designs. A World Bank project to construct plastic-lined ponds in fourteen villages has been improved. Lessons have been learned regarding the importance of including the community, and especially women in the decision-making process.

## SUCCESS STORY: Lakaki Lake Preservation Project, India

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**Country:** India

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Lakaki Lake in Pune, India was threatened by the planned construction of a school and a five-star hotel on the site. The lake was to be filled in and developers had started draining the lake on April 9, 1985.

**Solution:** Dr. Bondre used her research findings on the hydrobiology of the lake to defend its preservation. She organized an open-air "laboratory" on the shores of the lake for the general public. Concerned residents started a campaign to halt development.

Dr. Meera Bondre's field of study is fresh water ecology. Since 1969, she had observed Lakaki Lake in Pune, India with keen interest. She approached the Pune Municipal Corporation to discuss the possibility of making the lake a bio-reserve only to find out that the lake had been leased out and construction of a school and a five-star hotel was planned at the site.

Dr. Bondre launched a campaign to save Lakaki Lake from development. She stressed the importance of preserving the lake in a paper she presented at the All India Symposium on Biology and Algae, where her ideas met with enthusiastic approval. However, the town planning department was determined to implement its plans for the lake. With her research, she met with those involved in developing the lake. They were not convinced of the importance of preserving the lake, so Dr. Bondre sought help from environmentally aware friends and social workers. Time appeared to be running out for the environmentalists: on April 9, 1985 the developers started pumping hundreds of liters of water out of the lake. Those opposed to the project quickly organized themselves in a critical campaign to save the lake. They approached the press, gave interviews and wrote articles. Lakaki Lake became the burning issue in the city. Pumping stopped on April 11. The preservationists organized an open-air "laboratory" on the banks of the lake for children and adults. Their efforts achieved results. The Urban Development Minister visited the site and announced that Lakaki Lake should be preserved. On July 9, 1985, the Pune Municipal Corporation passed a resolution that a status quo would be maintained at the site of the lake.

Dr. Bondre and others have been organizing activities on the banks of Lakaki Lake (tree planting, lectures, discussions, exhibitions, puppet shows, etc.) to make citizens more environmentally aware. These activities bring people to the lake, which helps continue the interest in the issue of the lake's preservation. As a result of the successful campaign to preserve the lake, the general public of Pune has become environmentally aware and 50 poor families can still harvest fish from the lake. All future development activity in the area will require the approval of the Muhalla Committee, which was formed in January 1989 and includes environmentally conscious citizens and some civic authorities. Dr. Bondre's other environmental activities include the establishment in 1983 of the Arbutus Cultural Centre for children ages 4-16. This center's aim is to help in the all-around development of children, with an emphasis on environmental education, through its program of activities.

**Postscript:** Lakaki Lake was spared from development through the joint efforts of Dr. Bondre, other environmentalists and concerned citizens. Future development activities in Pune City will have to be approved by a committee including environmentalists and civic authorities. The public is more environmentally aware.

## SUCCESS STORY: Water Projects Help Dangsa-ri Island *Residents* Obtain A Clean Water Supply

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**Country:** South Korea

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** The shortage of clean drinking water and the absence of proper washing and bathing facilities created a burden for women on the South Korean Island of Dangsa-ri. They were forced to travel to another island to obtain clean water for their families.

**Solution:** The community was educated about the relationship between health, sanitation and environment. A water supply project was carried out with collaboration among the community, the ACWW and the government and local councils.

Dangsa-ri is a small South Korean island accessible only by boat from Cheju Island. Its population of over 7,800 suffered from the island's lack of clean water and facilities for bathing and washing clothes. Consequently, women were burdened with the need to travel to another island to obtain clean water for their families' needs. Also, families had the expense of conveying the whole family to another island once a week for bathing purposes, particularly during drought season.

Some of the women on Dangsa-ri are members of the Social Welfare Association of Korea (SWAK). In line with SWAK's mission to help its members meet their basic needs, the association sought ways to aid its members on Dangsa-ri in obtaining a clean water supply. SWAK initially held several meetings with community leaders on the island. The community was educated on the relationship between health, sanitation and environment. In particular, the basic knowledge about the importance of clean water for drinking, proper sanitation, etc., was conveyed. Various sectors of the community responded very positively to the proposed water supply project and pledged their cooperation. SWAK conducted a feasibility study with technical advice from various relevant government agencies in order to identify the best way to increase the availability of clean water to the community. After the study was successfully completed, SWAK began to plan the project in more detail, including estimation of costs and the need for external assistance. The Associated Country Women of the World (ACWW) provided the initial funds for the project, while various inputs such as technical and material advice were provided by the government and local councils. About 1,500 men and women contributed their labor throughout the implementation of the project in 1985. The project provided the community with additional sources of clean water. In addition, areas for the women to wash their clothes and bathrooms containing showers were built nearby.

The project provided many environmental, health and economic benefits. The community has improved its access to clean water supplies. This saves money for the residents, who no longer need to travel to another island to obtain water. It also saves women's time, which they can now devote to other productive activities. In addition, the community has become more environmentally responsible and health-conscious; hence, the environment is kept cleaner and residents no longer throw garbage and human waste directly into the sea. Through its experience implementing the project, the community learned how to solve other problems and became more united.

**Postscript:** The water supply project has freed women from the burden of traveling to another island to obtain clean water, saving time and money. In addition, the raising of the community's awareness on environmental issues has led to changes in behavior.

## SUCCESS STORY: Towards Environmental Transformation: A Baha'i Experience

**Presenter:** Janak Palta McGilligan

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**Country:** India

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Contaminated water caused Guinea worm disease in 302 villages in a tribal district of central India. Seven hundred and fifty-two (752) people were infected and 211,813 people were at risk.

**Solution:** Awareness was generated among the affected communities. Tribal women were given health and environmental education and empowered with simple techniques such as sieving drinking water and using hand-pumped water.

Guinea worm disease, a bacterial infection, is a major health issue in the districts and is related to contaminated water. Areas particularly susceptible are dry areas with low-water ponds and open tanks. In the problem districts, families experienced multiple cases of the disease with both men and women of all ages being affected; 752 cases of the disease were recorded. The initial symptoms include nausea, diarrhea and vomiting. Age-old remedies are used to treat the disease but are not very effective. Eradication of Guinea worms is possible by preventive measures which are simple and highly effective if organized properly. The measures include sieving drinking water through a cloth, keeping infected persons away from water sources, treating contaminated water with chemicals every week, and ensuring that safe water supplies are available.

Janak McGilligan is the director of the Baha'i Vocational Institute for Women. Due to her strong interest in water-related health issues, she was invited take part in a health education and motivation program in Jhabua District. The program was to implement the Indian Government's "technology mission" on drinking water management and related management issues to ensure adequate drinking water to 51 problem districts in India.

In 1987 the Baha'i Vocational Institute for Rural Women adopted and implemented the following three different methods to educate villagers for prevention and eradication of Guinea worms: 1) Education and Training Programs - with special focus on women through regular training programs and involvement of village volunteers in the field; 2) Awareness Programs - Ms. McGilligan joined the technology mission and went from village to village to generate awareness and training of women through awareness camps with the help of folk drama; 3) Mobilizing and Motivating Health Functionaries - she also went with the health department staff to all of the primary health centers in the district and interacted with doctors to mobilize and motivate health workers. The mission of the Baha'i Vocational Institute for Women was health education to communities through women.

According to government authorities, today the district is completely free from Guinea worms. The complete eradication of Guinea worms from over 300 villages was accomplished. The lives of the 752 infected people were saved, and the 211,813 people at risk were protected. The Institute has witnessed an overall improvement in personal hygiene in the villages under the program. Villagers are taking more pride in the care of their environment and are planting trees and gardens. More than 2,500 trees were planted in five villages.

**Postscript:** The Baha'i Vocational Institute for Rural Women received the Global 500 Award on World Environment Day June 6, 1992 in Rio de Janeiro. Since their return, the group has set up awareness and training camps to eradicate Guinea worms in another six villages in the tribal district Dhar.

## SUCCESS STORY: Research Project on Controlling Organic Water Pollution Caused by Industries in China

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**Country:** China

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** China has a serious water pollution problem. Organic pollution discharged by industry is a major water quality issue.

**Solution:** Yi Qian proposed and then managed a four-year research project on anaerobic treatment of high strength organic industrial wastewater. It involved 16 institutions and 110 researchers, including Yi Qian, in different parts of China.

China produces 36.8 billion tons of wastewater annually; more than 70% of that is produced by industry. About 74% of China's wastewater is untreated and directly discharged into rivers, lakes and seas, causing severe pollution of surface and groundwater. Organic pollution is characterized by the growth of bacteria, the reduction of dissolved oxygen and an unpleasant odor. This can harm the higher forms of aquatic life and can limit the use of water bodies by human beings. Many Chinese industries produce wastewater with very high strength organic matter. One way of limiting organic pollution by these industries is to subject their wastewater to an anaerobic biological treatment process. Unlike traditional aerobic processes, anaerobic treatment of wastewater does not require additional oxygen, uses less energy and produces methane gas, a potential energy source.

Yi Qian is a professor in the Environmental Engineering Department at Beijing's Tsinghua University. Since 1982 Professor Qian has conducted research on anaerobic treatment of brewery wastewater. With colleagues, she developed a pilot plant which is the model for a soon-to-be-completed full scale wastewater treatment plant. In 1986 Professor Qian submitted a proposal to the national Environmental Protection Agency and the Science and Technology Commission of China to carry out a 1.1 million yen project to study and apply anaerobic treatment processes for treating high strength wastewaters from various industries. The authorities approved the project and appointed Professor Qian to head the project.

One hundred and ten (110) scientists, engineers and analysts from 16 institutions have been working on this project for more than five years. A series of new processes and reactors have been studied for treating nine different wastewaters. Professor Qian's contribution includes uniting and motivating 16 widely-dispersed institutions. She has held many discussions on academic and administrative issues and overcome technical, economic and other obstacles to the project's success.

By 1990 the researchers' efforts had culminated in 23 research reports, three full-scale wastewater treatment plants, five pilot plants and eight sets of experimental apparatuses. An evaluation committee deemed the project academically strong and of significant practical value for protecting the environment, and it was accepted as one of the key projects of China's 7th Five-Year Plan in the field of the environment. The research results of this project are now being implemented in China.

**Postscript:** The ability to successfully apply anaerobic treatment technology to ameliorate organic pollution by industries has advanced tremendously. The project was accepted and defined as one of the key projects of the 7th Five-Year Plan in China. Three wastewater treatment plants and five pilot plants were set up.

## SUCCESS STORY: Mitigation of Ground Water Crisis and Land Subsidence in Bangkok

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**Country:** Thailand

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Over-development of groundwater in Bangkok and contamination of fresh water. Land subsidence oblems for the low-lying city.

**Solution:** The Department of Mineral Resources launched th. ..e groundwater crisis. Project participants conducted ..g of groundwater levels and quality, and predicted the effects of alter.. ..s.

As a result of the unlimited urban growth, Bangkok City's basic water supply sources had been stretched to the limit. Extensive groundwater pumping designed to meet the needs of the burgeoning population had led to land subsidence rates as high as 10 centimeters annually. This resulted in the cracking of city pavements, the breakage of water piping systems and the intrusion of sea water into aquifers, which caused a dramatic decrease in the quality of groundwater. In addition, flooding in low-lying areas during high tides in the monsoon season had become a major problem.

Vachi Ramnarong has been actively involved with the study of hydrological profiles of Bangkok since 1967. Her research indicated a rapid decline of groundwater levels and deterioration of water quality in the three major aquifers in Bangkok. In acknowledgement of her findings, and in an effort to slow down the rates of land subsidence and ease the groundwater crisis, the Government of Thailand launched a major project in 1983. Mrs. Ramnarong heads this project, which is known as the "Mitigation of Ground Water Crisis and Land Subsidence in Bangkok Metropolitan Area" (MGL) project. Its objectives are to stop the decline of groundwater levels, to achieve recovery to or near the original levels and to slow the rate of land subsidence. The project, scheduled to continue through the year 2000, has cost over U.S. $1 million to date. Mrs. Ramnarong's contributions include extensive monitoring of groundwater levels and quality. She also uses mathematical modeling techniques to simulate and predict the response of the aquifer system to various pumping schemes for ground water management. Six of the 18 researchers assisting Mrs. Ramnarong are women.

Using the findings of Mrs. Ramnarong's team of researchers, the master plan of the Metropolitan Waterworks Authority and the "Remedial Measures of the Ground Water Crisis and Land Subsidence in Bangkok" recommended phasing out groundwater usage and increasing water supply production by relying on surface water sources. As a result, the water supply produced from surface water in central Bangkok has increased, and many wells have been abandoned. This has allowed recovery of groundwater levels: recoveries of 8-18 meters during 1983-1987 were observed in central Bangkok. Bangkok is still experiencing sea water intrusion and land subsidence, but the problem has declined due to the project.

**Postscript:** Information from the evaluation of data obtained from the monitoring of groundwater levels and quality has been used for management of groundwater pumping. Land subsidence rates decreased in Bangkok between 1985 and 1990. The Monitoring Network has been enlarged to cover provinces adjacent to Bangkok.

## SUCCESS STORY: Research and Monitoring Program Preserves Lake Kinneret in Israel

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**Country:** Israel
**Region:** ASIA/PACIFIC
**Subject:** Water

**Problem:** Israel's only fresh water reservoir, Lake Kinneret, which supplies 30% of the country's fresh water, was endangered by pollution. Economic development along the coast threatened to further pollute the water source.

**Solution:** Dr. Serruya spearheaded a 10-year research and monitoring program of Lake Kinneret.

In 1965 Lake Kinneret (LK) became the main reservoir of the National Water Carrier (NWC), a large North-South waterline which supplies 30% of the fresh water requirements of Israel. It then appeared that a thick waterbloom was endangering the quality of the lake water. Moreover, there was a definite possibility that the economic development of the lake watershed would contribute additional pollution and trigger an irreversible process of eutrophication. The limited water availability in Israel and the investments which have already been made in the NWC compounded the environmental problem.

In 1970 Colette Serruya became the director of the Kinneret Limnological Laboratory within the Israel Oceanographic and Limnological Research, an institution aimed, among other purposes, at protecting the water quality of lakes and seas in Israel. Colette Serruya, with a few other scientists, instituted a 10-year master plan for the investigation of Lake Kinneret. The purpose was twofold: to understand and quantify the main limnological processes of this unusual lake; and to supply the database required for elaborating an ecologically sound plan of economic development of the watershed area. The 10-year project was funded by the Water Commission. In later years, the scientists obtained personal grants from international agencies to support the project.

The first three years of the program were devoted to quantitative nutrient balances which indicated the pattern of nutrient cycles in the lake and pointed to the forms of phosphorus and nitrogen of watershed origin which should be diminished. Simultaneously a monitoring program of lake water quality was designed and implemented. As a result of this initiative, the sources of damaging nutrients in the watershed were identified, stored and treated in large reservoirs instead of flowing down into the lake. This action caused a significant decrease of the polluting load. In addition, the information collected in the research and in the monitoring programs was used by the Water Planning Company to develop an economic development plan for the Lake Kinneret watershed area. This plan stipulates which kind of activities are allowed and under which conditions and forbids other activities estimated too polluting to implement in the drainage area of the lake.

This combined activity of a small group of scientists together with the Water Authorities (and in several instances the pressure of the scientists on the Water Authorities) has prevented uncontrolled economic development in a sensitive area. This initiative of the early 1970s has preserved the quality of Lake Kinneret water, which still is a major source of water for the country. Ms. Serruya has been recognized by UNEP for her environmental work.

**Postscript:** The program gathered critical data necessary for the preservation of Lake Kinneret. The program results provided support for controlled economic development of the watershed. More than 20 years after the project started, no deterioration of water quality has been observed in spite of significant demographic and economic development.

## SUCCESS STORY: Mark II Pump Repair Training Program for Women in Tharu Tribal Community, India

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**Country:** India
**Region:** ASIA/PACIFIC
**Subject:** Water

**Problem:** The Tharu Tribal community suffered from sanitation and health problems due to polluted water.

**Solution:** TRYSEM (Training to Rural Youth for Self-Employment) offered a training program on the operation and maintenance of "India Mark II" hand pumps for the women and rural youth of the Tharu Tribal community.

The training program was begun in May 1989 in the Tharu Tribal Community, India, in response to the polluted water and its accompanying health hazards such as water-borne diseases. The aim of the project was to transfer the maintenance of "Mark II" hand pumps from the government to the users in order to inculcate the feeling of ownership in the community and to provide an opportunity for users to earn an income by repairing defective hand pumps. The pump is widely used as a low-cost community water supply facility throughout developing countries and requires an expert mechanic for repairs.

The project was organized through a government-sponsored program in which 15 tribal women were selected to be trained as hand pump mechanics. They were given one month of extensive training on installation and maintenance techniques. The women also received training on the health aspects of potable water and personal hygiene in order to give them a complete picture of the importance of clean water so they could relay this information to their communities. During training the women worked under the supervision of expert mechanics.

The cost of training 15 participants was 15,000 rupees, including a stipend of 250 rupees for each participant at the conclusion of training. The training project was financed by the state government under TRYSEM and was subsidized by the department responsible for implementation and maintenance of the water supply system in rural areas. UNICEF supplied training materials and audio-visual aids. Following training, TRYSEM provided subsidized loans to participants to purchase necessary tools.

The trained women now have contracts for the maintenance and repair of "Mark II" hand pumps installed in their area. TRYSEM supplies free spare parts and pays for the women's labor. This arrangement has reduced the annual maintenance cost of the hand pumps from 300 rupees to 195 rupees per hand pump. Since the initiation of the project, there have been fewer breakdowns in the system, and a regular supply of clean water is supplied to the community. The project has provided part-time employment for women to supplement their family income. In terms of health benefits, the community has realized the importance of potable water and its connection to better health and hygiene. Statistical data on the incidence of water-borne diseases is in the process of being collected.

**Postscript:** As a result of TRYSEM's training of rural women to provide information on the health hazards of polluted water and to operate and repair water hand pumps, the community understands the importance of potable water and now better maintains its source of clean drinking water.

## SUCCESS STORY: Women in Bumiredjo Village, Indonesia Obtain a Safe Water Supply

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**Subject:** Water

**Problem:** Bumiredjo Village lacked a safe water supply system. The only accessible water resource was a polluted river located 1.5 kilometers from the village. Diarrhea epidemics killed many children and adults.

**Solution:** With women as the driving force, the village obtained permission from another village to share their spring. The women then motivated the entire village to develop a communal water supply plan through community self-help and self-reliance.

In 1972 a group of women leaders in Indonesia launched the Family Welfare Movement (PKK). The next year, PKK began working in Bumiredjo, a mountain village in Central Java. The sole water source for the village was a small, polluted river 1.5 kilometers away which dwindled during the dry season. Water-transmitted diarrhea epidemics and water-borne skin diseases were common. The PKK gradually mobilized the village to participate in development activities. Leadership training of women was intensified. Then in 1978 a diarrhea epidemic broke out which killed many children and adults.

Moved by the will to free their village from the recurring diarrhea epidemic, the women leaders of the poor mountain village, supported by the village head, took the initiative to bring clean water from a mountain spring in another village 500 meters higher up the mountain, to their own village and closer to their homes. The women and Bumiredjo's head met with the head of this mountain village, and eventually obtained official permission to share the village's clean spring water. At a village-wide meeting supported by the formal leaders, the women then secured the commitment of the entire village to build and manage a safe water supply system based on collective responsibility. For three years, village men worked in shifts to build a water supply structure of tanks and bamboo pipes. Most materials were available locally, but cement had to be bought using money donated by the Subdistrict and laboriously raised by the women. Later, CIDA funds allowed the replacement of leaky bamboo pipes with iron pipes.

Village women designed and now manage a water distribution system based on group responsibility and open management. Women take turns cleaning the communal water facilities. They also collect monthly user fees of 200 rupees per household to cover maintenance costs. Each of the village's hamlets now has at least two communal water facilities which connect it to the mountain spring. Dramatic improvements in village health have resulted. Village records show a dramatic drop in infant mortality rate from 125 per 1,000 live births per year in 1980 to 80 per year in 1990. There has been a 10% annual increase in per capita income during the last decade thanks to the improved water supply, which supports agricultural production, fish farming and goat raising.

**Postscript:** Women are organized and have received training in legal matters and other skills. The project increased community cooperation and team building. Women now have more time to devote to income-generating activities, etc. Diarrhea epidemics and serious skin diseases are no longer a problem.

## SUCCESS STORY: Woman Instigates a Series of Environmental Projects in Nepal

**Presenter:** Chitra Kumari Thapa

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**Country:** Nepal

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** The community faced problems such as polluted water, scarcity of drinking water, water-borne diseases, poor health and a general lack of basic facilities.

**Solution:** Chitra Thapa talked to villagers about their problems and initiated a series of projects to ameliorate the situation. She promoted the building of toilets, a drinking water project, an irrigation project and the planting of a variety of plants and fruit trees.

In many villages in Nepal, deforestation and polluted drinking water are problems. People are poorly educated about the problems, and there are limited funds to solve them.

Chitra Thapa, along with other collaborators, has implemented a series of projects to improve the situation. In 1987 under her chairmanship, the Makaibari Village Development Committee implemented a project which resulted in the planting of 10,000 plants in Awal Chaur. The project was completed through the participation of the people. In 1981 a drinking water project was initiated under Ms. Thapa's leadership and completed in the same year. This project cost 23,355 rupees of which 11,000 was financed by the government and the local people. Seven hundred people benefited from this project. In 1986 an irrigation project, two kilometers in length, known as the *Makaibari Kupri* irrigation project, was completed. The district panchayat contributed a small amount, 1,000 rupees, to purchase some construction materials. Other costs were met by the local people. Ms. Thapa also worked as chairman of Kuti Danda Primary School, where she mobilized people to construct toilets in the school. She received training and worked under this project for a long time. During this time she motivated people to construct 110 toilets in rural areas.

Due to the deforestation problem, the group is currently emphasizing tree planting to help counteract disasters such as floods and landslides. Ms. Thapa has become well-known for planting different types of fruit trees in her area. The Makaibari Village Development Committee distributes fruit seedlings free of charge to the local villagers. They also make available different types of recommended agricultural seeds and plants in local areas.

Ms. Thapa feels her group has been successful in motivating people to help solve environmental problems. People have taken the initiative themselves to grow varieties of plants on their own land. Most of the farmers have planted fruit trees, and the produce is being seen at the markets. In addition, through their efforts, the community now has better access to clean water and toilet facilities.

**Postscript:** Villagers have participated wholeheartedly in the activities and have begun to implement environmental measures on their own.

## SUCCESS STORY: Provision of Safe Drinking Water *in a Rural* Vietnamese District

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**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Water pollution is serious in Quynh Phu District, and it causes widespread health problems. More than 70% of the district's people suffer from water-borne diseases, especially intestinal parasites.

**Solution:** In conjunction with local health service authorities, the Water Resources Development Institute for Hydraulic Research conducted a well construction pilot project in one village and then expanded the program to cover three other villages.

Quynh Phu District in Vietnam's Thai Binh Province has serious surface water pollution; the rural district is far from the sea and major rivers, lacks a drainage system and has uneven land elevation. Wastewater, carcasses, fertilizer and pesticides (such as DDT, 666) pollute water sources. Rainwater only provides enough drinking water for 30-50 days a year. At other times, most people rely on very polluted ponds, wells and lakes. Health problems related to water pollution are endemic; more than 70% of the people have ascarid or helminthiasis (worms). In response to this situation, a group of female engineers from the Water Resources Development Institute for Hydraulic Research initiated a clean water supply project in Quynh Phu District in coordination with the local public health system.

The project was introduced in one village. After constructing some wells for families, the project coordinators invited other families to see the new wells. The families in turn volunteered to implement the project themselves, because they understood the objective of the project was to benefit them. After the project was successfully implemented in this village, three other villages implemented the project. In addition to these well construction activities, the local health service encouraged each family to build a 100-150 liter tank to treat well water used for drinking. Local people contributed the labor, funds and construction materials needed to build the wells; the engineers provided technical advice.

The four villages had relatively good economic conditions which enabled many families to meet the costs of well construction. Project success also depended upon the leadership and participation of women. The mostly female project implementors collected data on topography and geology, conducted laboratory tests on soil and water samples, and managed the planning, design and construction of wells. Village women collected construction materials and brought them to well sites. They also constructed precast concrete for well walls.

**Postscript:** Eight hundred and fifty-three wells with filter systems were constructed in four villages. As a result, 70-80% of the families in these four villages have access to cleaner drinking water.

## SUCCESS STORY: Water Supply and Treatment in Daiang Commune, Vietnam

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**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Demand for fresh water far outstrips supply in Red River delta lowland villages; epidemic and infectious diseases were widespread.

**Solution:** The Rural Development Center studied conditions in the area; designed simple, effective and low-cost water supply and treatment schemes; and pilot-tested some schemes in Daiang Commune with the help of women volunteers.

People in the lowland of the Red River delta usually get their water from hand-dug wells, ponds, small lakes, drainage canals and, to a lesser extent, rain and flood water. These sources of water tend to contain high quantities of bacteria and solid residues and are, in general, below hygienic standards. About 50% of the households use pond water in high quantities. Hand-dug wells are numerous, and about 54% of the household use well water, which often contains high levels of iron and residue, smells bad and is yellow. Sometimes it is bacterially polluted by latrines. The quality of rainwater is very good, but its use is limited due to the lack of a large capacity tank to collect the water. In the last two decades, the population has grown rapidly, increasing demand for fresh water.

In response to these problems, the Rural Development Center (RDC) initiated a study in 1986 to develop water supply and treatment schemes for the lowland area. RDC chose Daiang Commune as representative of the region. About 6,000 residents live in Daiang Commune, and the main occupation in the Commune is farming. During the rainy season most of the land area is submerged. RDC researched the village and designed several simple, low-cost schemes. They then tested their ideas in Daiang, hoping to develop a useful model for lowland area water supply and treatment. They focused on treating bad pond and well water and installing hand-pumps. Obstacles the project faced included apathy toward water quality issues and the inability of some people, especially young couples, to afford even a low-cost filter tank and pump.

Ms. Luong Thi Truong, the RDC engineer in charge of implementing the program in Daiang, embarked on a campaign to utilize women and women's associations. Domestic water supply is traditionally women's work, and women usually respond to innovations which benefit their families. Young girls and housewives whose husbands worked in the city became partners in the project. Under Luong Thi Truong's guidance, these 16- to 40-year-old women volunteers implemented the water supply and treatment project. A simple filter tank was designed to treat well water and pond water, and the first filter system pump provided a supply of water to 30 households and a 15-bed clinic. Afterward, many households built their own pumps and filter tanks, simulating the experimental models. As a result of the project implemented by the Rural Development Center, the residents of Daing Commune have better access to clean water.

**Postscript:** Water filtration systems and pumps were provided for two ponds, one serving 30 families and the other a 15-bed clinic. In addition, a number of hand-dug wells now have filter tanks and pumps. Residents now have access to clean water as a result.

## SUCCESS STORY: The *Samanalagama* United Women's Association, *Sri Lanka*

**Presenter:** Kamini Meedeniya Vitarana

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**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Due to a hydropower project, the 40 families in Kinchigune were resettled on a distant tea and coconut plantation, where they suffered from a poor quality of life and scarcities of water, fuelwood and medicinal plants.

**Solution:** With Kamini Vitarana's help, the women formed a society in the resettled village to solve their economic and environmental problems (the need for water, fuelwood and medicinal plants).

The village of Kinchigune was situated in the hill country in Sri Lanka and was famous for its rice farming. With fertile soil and plenty of water from clear mountain streams, the village was surrounded by forests that provided medicinal herbs and other forest products to the 40 or so families residing there. The village was virtually self-sustaining. In 1987 the residents were given short notice to leave Kinchigune village because a hydropower project was to be developed there. The 40 families were resettled on a tea plantation. Each family was given 1.5 acres of land planted with tea interspersed with coconut to compensate for the loss of their land. The people did not know how to grow or market tea, and there were no forests for fuelwood, game animals or medicinal plants. They were reduced to subsisting on purchased rice and dried fish. The new village had only one drinking water well; they had to go to another village for washing and bathing facilities. The resettled people successfully agitated for additional wells, but these were in poor condition, unhygienic or claimed by other people. The other villagers acted hostile towards them; the farm animals they had brought with them were stolen and slaughtered by thieves in neighboring villages.

Kamini Meedeniya Vitarana is the president of *Ruk Rakaganno* (The Tree Society) and a senior environment scientist with the Environmental Foundation. As part of a study, she interviewed the resettled women, who were in a state of cultural shock. With her guidance and encouragement, they formed the *Samanalagama* United Women's Association. In one of their first joint efforts, the women cleaned up one of the neglected wells and secured the right to common use of the wells.

Applying in the name of *Ruk Rakaganno*, the society then obtained a plot of land from the government to grow fuelwood and medicinal plants. With advice from the forestry department and the Ayurvedic Research Institute, the women are planting trees and plants for fuelwood and medicinal purposes. *Ruk Rakaganno* provided liaison with government departments; Environmental Foundation contacts smoothed the project's way. The families also formed a society to jointly market their tea and obtained help from the Regional Tea Small Holdings Authority. Women are mostly responsible for the tea crop, so they are key players here as well. The women now receive higher prices for their tea, are less despondent and have better access to clean water. Efforts are being made to organize a nursery school so young mothers will be free for part of the day to take part in community activities. Girls from adjoining villages have also joined the society.

**Postscript:** The women have become organized and are adapting to and improving their economic situation and environment. There is a safe and clean source of water and the nutrition of the villagers has improved. The tea crops are becoming more profitable.

## SUCCESS STORY: Girl Guide Association of Thailand's Water and Sanitation Program in Ban Bok Village

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**Country:** Thailand

**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** The village of Ban Bok had widespread water shortages and very few latrines. Diarrhea and other health problems relating to sanitary conditions were common, as were poverty and high levels of indebtedness.

**Solution:** With support from UNDP's "Promotion of the Role of Women in Water and Environmental Sanitation Service" program, the Girl Guide Association of Thailand implemented a participatory women-focused water and sanitation project.

Between 1985 and 1987, the Girl Guide Association of Thailand (GGAT) implemented the "Promotion of the Role of Women in Water and Environmental Sanitation Service" or PROWWESS program in a number of villages, including Ban Bok. Ban Bok is located in rural northeastern Thailand and has a population of 315 people in 41 households. Rice farming sustains the local economy. There was only one public cement case well used for domestic use and drinking water. The village also has 45 200-liter cement jars used for storing rainwater. During the dry season, 70-80% of the villagers experienced drinking and domestic water shortages. Latrines were virtually unknown; only 7.3% of the households had them. Common diseases were diarrhea, common colds and conjunctivitis.

GGAT promoted women's participation, education and leadership in relation to village-based water supply, sanitation and sustainable development projects. Fieldworkers, many of whom were women, lived in Ban Bok gathering information, helping villagers identify needs and problems, and working with them to find solutions, mainly through informal visits and discussions. The project was designed by and focused on women. At training sessions, which were broadcast for the benefit of women unable to attend, women were seated in front rows and encouraged to present their ideas. These factors increased village women's participation in the project's formal decisionmaking structures.

A latrine-building campaign commenced after housewives received training in health and sanitation. GGAT provided construction materials on installment and households provided labor and the superstructure. Fieldworkers trained people in fish farming and mushroom cultivation, GGAT established a community fund to meet villagers' credit needs, and successful health campaigns were launched. In addition, villagers dug a shallow well, providing 500 baht (local currency) and their labor. Persistent obstacles include illiteracy among women, the use of Ban Bok's improved water supply by outsiders and the tenacity of negative attitudes toward women's participation at the leadership and construction levels.

One hundred percent of households now have latrines, compared to fewer than 10% before the project. Water supplies have been expanded and/or upgraded, low interest credit is available, diets and incomes have improved, and there is generally a more positive attitude toward women's participation in development activities. Trust between villagers and project staff was the key to success in what is now the district's most developed village.

**Postscript:** There is now a more general acceptance and recognition of the need to include women in development projects for them to be successful and sustainable. The health and environment of the village has improved tremendously.

## SUCCESS STORY: A Gravity-flow Water Supply Project in the Northern Hilly Regions of Myanmar

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**Region:** ASIA/PACIFIC

**Subject:** Water

**Problem:** Women and children in the northern hilly regions of Myanmar suffer in particular from the lack of adequate supplies of clean water and proper medical facilities. Water-related diseases are common.

**Solution:** A gravity-flow water supply project was implemented incorporating low operation and maintenance costs, and community participation in planning, implementation and maintenance. Women played a major role in project management.

Many villages in the remote hilly regions in the south and north of Myanmar are usually inaccessible by vehicles, particularly during the rainy season when there are frequent torrential floods and landslides across the dirt roads. The inaccessibility of proper medical facilities makes it particularly important that communities in hilly areas have safe and reliable water supplies. Many villages, however, are situated far from traditional water sources such as springs, streams and small ponds. Thus, women and children spend much time collecting and carrying water along steep slopes - a time-consuming, wearying daily chore. Because of the scarcity of clean and adequate water, diarrheal diseases, worm infestations, skin diseases and other water-related diseases are common problems.

Gravity flow water supply projects were started in 1983 with the support of the Government of Myanmar and UNICEF. Daw Nyo Nyo Win, as the staff officer of AMD, was involved in the design and logistical support of the project, as well as the monitoring of project implementation. The project at Zokua, started in December 1988 and completed in May 1989, was one of 40 projects completed in 18 townships to supply clean water to a population of 103,000. The water supply system was powered only by the force of gravity, and neither pumps nor machinery were required. Proper intake, storage systems and pipelines of high density polyethylene were constructed in order to protect the water from contamination, using locally available materials whenever possible. The cost for operation and maintenance was therefore negligible. At the village level, the implementing teams consisted of water supply technicians from the Rural Water Supply Division (RWSD) and members of the village communities. Community leaders were involved in the planning and implementation of the system. The local people were responsible for collection of all local construction materials, organization and mobilization of all labor, and for maintenance of the system and water quality, with training given by RWSD technicians where necessary. Women played a major role in managing the project, and locating the tapstands.

As a result of this project, there have been considerable savings in time required to fetch water. Moreover, the average water consumption per person per day has risen 2 1/2 times, and the morbidity rate of diseases related to water supply has fallen from an average of 50 per 1,000 population to an average of 14. The health of the community has visibly improved. These improvements mean that women can focus more on other activities such as income generation and food preparation. Replications of such projects are being currently planned in several other areas of the country. One of the recommendations made by a 1989 UNICEF-sponsored evaluation study was the increased participation of women.

**Postscript:** The villagers are satisfied with the system, and prefer the water that comes from it. There have been considerable benefits to the health of the community and savings in the time of women. Daily per capita water consumption has risen. The Zokua villagers have agreed not to cut trees on the hill above and around the water source.

# DESCRIPTIONS OF SUCCESS STORIES FROM EUROPE

REGIONAL BREAKDOWN OF
SUCCESS STORIES - EUROPE

| Country | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| Austria | 1 | | | | 1 |
| France | | 1 | 3 | | 4 |
| Greece | | | 1 | | 1 |
| Ireland | | 2 | 1 | | 3 |
| Netherlands | 1 | | 1 | | 2 |
| Norway | | | 2 | | 2 |
| Spain | | | 1 | | 1 |
| United Kingdom | | 1 | | | 1 |
| USSR | 2 | | 1 | | 3 |
| | 4 | 4 | 10 | 0 | 18 |

## SUCCESS STORY: Organic Farming Practices *in Barcelona, Spain*

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**Country:** Spain

**Region:** EUROPE

**Subject:** EFS

**Problem:** The Cottas acquired a four-hectare parcel of land that had been farmed using conventional fertilizing and insect-control chemicals for over 12 years. These practices resulted in soil nutrient depletion and exhaustion and wildlife decreases.

**Solution:** Rose Cotta, founding member of the Soroptimist Club of Barcelona, decided to convert from chemical insect protection and other non-organic farming techniques to organic methods.

A four-hectare area of agricultural land located in the northeast section of Catalunva Province, Spain had been farmed for 12 years using conventional non-organic techniques, including the use of chemical pesticides and fertilizers. This resulted in soil erosion and exhaustion and loss of indigenous habitat for several species of birds and plants. Grape vines suffered from oidium and mildew; the olive grove and vegetable garden were infested with insects.

After the tenant farmer of this land quit, the landowners (the Cottas) took over soil management. Rose Cotta, by then environment coordinator of the Soroptimist Club of Barcelona, had helped to organize the 2nd International Congress of Alternative Technologies in Madrid for *Vida Sana* (The Technical Institute for Organic Agriculture) and thus was familiar with environmentally friendly technologies and products. The landowners decided to gradually reconvert the land through the use of organic farming methods. For the past 7-8 years, organic techniques - soil content studies, a crop rotation program, non-chemically treated seed selection, natural fertilizing and composting - have been implemented on the land. Initially, lack of experience and knowledge of organic farming practices were obstacles. Organic agricultural consultants with *Vida Sana* and *Instituto Técnico de Agricultura Biologica* (The Technical Institute of Biological Agriculture) provided technical advice and assistance. In addition, the farmers attended a bio-dynamic agricultural training course in Switzerland and a soil testing course in Austria. The organic farming practices cost approximately 150,000 pesetas per year. These costs are covered by the landowners themselves, but are now almost totally covered by the proceeds from selling the produce of the land, which includes wheat, alfalfa, wine, vegetable and beans for forage.

As a result of the use of organic methods of farming, several species of birds, insects and mammals have returned and their numbers have increased. Soil recovery has gradually occurred. The number of weeds and pests has decreased, and crop yields have improved in quality and quantity. The wells of the property could be kept free from nitrate and pesticide filtrations as well as other harmful residues. The Cottas' example encouraged neighboring tenant farmers to convert two hectares of land to organic farming.

**Postscript:** For her work in organic gardening, Ms. Cotta won UNEP's 1992 Global 500 Award. Ms. Cotta continues her work and is experimenting with various organic farming practices. This year, they began working with Andermatt Biocontrol AG by field testing their biological insect control program on fruit trees and potatoes.

## SUCCESS STORY: *Crann* - Re-treeing with Broad-Leaved Trees, Ireland

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**Subject:** EFS

**Problem:** Ireland's forests have dwindled, and the country relies heavily on imported hardwood timber from tropical forests. This causes deforestation in other parts of the world.

**Solution:** In 1986 Jan Alexander launched a group called *Crann* with the aim to "re-tree" Ireland with broad-leaved trees. *Crann* offers education to the public to support its objective, holding training workshops and producing educational materials.

Ireland's forests have dwindled through the years, and the country relies heavily on imported hardwood from tropical forests mainly in west coast Africa, causing deforestation in those regions.

In January 1986 the worst storm in 40 years swept across the country, and thousands of trees were toppled or made unsafe. County councils urged landowners to fell dangerous trees, but to her horror, Ms. Alexander also saw good trees being felled with impartial vigor. Clearances were being cut in stands of wood, making the surviving trees vulnerable to fresh, intrusive gales. Appalled, Jan Alexander wrote a letter to the *Irish Times*. As a result, she joined the Tree Committee of *Ain Taisee*, but she had more dynamic ideas than this conservation group. Her thinking was "to involve the public and to educate them through practical example and get them involved in the process of planting and cultivating trees."

Ms. Alexander met Ciaran McGinley, who had connections in Irish society. The two were instrumental in launching the group *Crann* in 1986 with the goal to "re-tree" Ireland with indigenous broad-leaved trees, and remain business partners. The group's philosophy about broad-leaved trees is that they create beauty, provide habitats for wildlife, enrich the soil and purify the air. In addition, broad-leaved trees provide valuable timber. *Crann* believes that reforesting Ireland can be beneficial by reviving Ireland's timber industry, thereby creating jobs in this sector as well as in tourism, while at the same time helping to prevent deforestation in other parts of the world.

During 1986-88, *Crann*, with the support of FAS, ran two 48-week training courses in woodland management for young people. FAS is the Irish Government's training and employment authority. The group also teaches one-day workshops in different parts of the country to instruct people about growing broad-leaved trees. *Crann* also produces educational video cassettes, slide sets and tree-planting guides.

Presently *Crann* has over 1,400 members throughout Ireland. As a result of the project called *Crann sa Chathair*, hundreds of urban dwellers learned how to plant trees. In 1988, 11,000 trees were planted in ten areas of Dublin. *Crann's* program for 1991-92 includes an environmentally and socially sound forestry plan for south Leitrim in conjunction with local land owners/farmers. *Crann* is working to develop branches through the employment of a full-time educational officer, and it is producing more educational material.

**Postscript:** Since *Crann's* inception, over 1,400 people have joined the group. In 1988, 11,000 trees were planted in ten areas of Dublin. Hundreds of urban dwellers learned how to plant trees as a result of the project.

## SUCCESS STORY: Making the Voice of Children Heard, *Norway*

**Presenter:** Kristin Eskeland

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**Country:** Norway

**Region:** EUROPE

**Subject:** EFS

**Problem:** Children know so much about the ills of the world, and they are the ones who will have to live with the results of the present decisions on their environment. However, usually no one is interested in the views of children.

**Solution:** In order to give the children a voice in the field of environment and their future, a Children's Hearing was organized in Norway. The children talked directly to top politicians, challenging them on environment and development questions.

Kristin Eskeland is with the Norwegian Campaign for Environment and Development, which was launched in 1987 to spread information about environment and development issues through Norwegian NGOs. Today 107 diverse organizations are connected with the Campaign. The task of Ms. Eskeland and her colleagues is to coordinate Norwegian NGO efforts and to facilitate their cooperation among themselves, as well as with the international network of NGOs, in the Brazil/UNCED process. Out of the Norwegian Campaign for Environment and Development the *Voice of the Children* Campaign was born, with its first hearing held in Bergen, Norway. In May 1990, Ms. Eskeland organized a Children's Hearing in a large concert hall in Bergen. At the hearing children talked to Norway's top politicians about the environment, telling them about their ideas and solutions. Afterwards, all the children participating in the hearing walked over to the ministers taking part in the international conference, "Our Common Future." They presented the ministers with the Children's Appeal, a compilation of children's statements on the environment and their future.

In the wake of this event in Bergen, a string of similar events have taken place all over the world. Children are being given the chance to be heard by people in power. Many children around the world are deeply worried about the future and decision makers should get a chance to hear their voices, their visions and their ideas. They should also hear their criticism and their demands.

There are now organizations in 35 countries all over the world taking part in this campaign. For example, the German *Kindergipfel* in September 1991 in Frankfurt involved thousands of children. During the United Nations Conference on Environment and Development, the Earth Summit in Brazil in June 1992, a Global Children's Hearing will be organized. At this hearing, children from all parts of the world will challenge world leaders. It is hoped that the campaign will turn into a continuous process in which children get the chance to re-create their own environment. This project links environmental care, development and the future. It is hoped the campaign will evolve into a continuous, democratic process.

**Postscript:** The campaign *Voice of The Children* has now spread to 42 countries all over the world. In all of these countries there have been local and national hearings where children have spoken to national leaders. Twenty children from 20 different countries attended the successful Global Children's Hearing at the Earth Summit in Brazil.

## SUCCESS STORY: Soroptimist Club of Hyeres, France Provides Forest Fire Prevention Information

**Presenter:** Jacqueline Francou

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**Subject:** EFS

**Problem:** An August 1989 fire destroyed the flora of the area surrounding Hyeres, France, a small town on the Cote d'Azur.

**Solution:** Forest fire prevention public awareness campaigns were begun. Both children and adults were given instructions to look for signs of fire on *Mistral* days and given the number to call should an indication of fire or arson be sighted.

A 1989 forest fire in the environs of Hyeres, France, a small town on the Cote d'Azur about 80 kilometers east of Marseille, caused substantial damage to the ecosystem. The fire was possibly caused by arson, but its effects were compounded by the presence of the *Mistral* wind, a three-month drought and a lack of preventative measures.

The Soroptimist Club of Hyeres joined with the Lion's Club and the Rotary Club in a public education program. A poster contest, "Let's Save our Forests," was organized for children ages 8-12, and monetary prizes to three winning posters were awarded. The contest concluded with nearly 100 entries and included an award ceremony involving area businesses. It received extensive coverage by several local newspapers. Jacqueline Francou originated the idea for the project. Dr. Scarbonchi and Janine Morey helped with mailings, media affairs, the organization of judges and meetings, etc.

The Soroptimist Club includes only women, and most of the school teachers who took part in the program are also women. The project has been in existence for one year and has been funded by the Soroptomists. Project costs totaled U.S. $1,200.

These events increased the public's feeling of responsibility toward the natural forests. They also indicated proactive responses to a fire or arson sighting which would protect forest resources in such an event. However, in order to measure the benefits of the project, the group will have to wait to test their effectiveness by a drop in the number of forest fires each year. The group plans to make posters out of the drawings submitted by the children.

**Postscript:** Public awareness has been heightened about the dangers of forest fires and their destruction of the environment. The natural forest are better protected and cared for.

## SUCCESS STORY: Building an NGO Coalition for Environment and Sustainable Development

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**Region:** EUROPE

**Subject:** EFS

**Problem:** Although there are numerous NGOs in the Netherlands, there was a lack of cooperation and understanding among the groups which limited their effectiveness in dealing with environmental problems.

**Solution:** A platform for exchange of information was created and was gradually built into a coalition with a common work plan, working groups, priority goals, and common views and strategies on the main environmental issues.

A small and overpopulated country like the Netherlands faces enormous environmental problems. Although there are numerous environmental NGOs in the Netherlands, there was a lack of cooperation and understanding among them. In addition, no exchange of information and cooperation existed with other social movements. As a consequence, there was a lack of effectiveness and a lack of an integrated approach to deal with the environmental problems facing the Netherlands. Moreover, the role and position of women in connection with the environment was neglected. Women played an active role on the voluntary grassroots level but were seldom offered responsible positions when organizations became "professional."

In the late 1970s, the National Environmental Platform (LMO) was created, and Marie Kranendonk began her work as national coordinator for the coalition. The LMO initially served as a platform for exchange of information, only gradually evolving into a coalition with a common work plan, working groups, priority goals, and common views and strategies on the main issues. It took several years to create an atmosphere of mutual understanding and willingness to discuss a division of tasks and the formation of common working groups. Organizations began to see the interrelation between advocacy, campaigning, research, development of sustainable alternatives and education. They realized that their environmental work is complementary, and that cooperation is essential to reach common goals and to be effective as a movement. Women played an important role in the building of understanding and commitment within the LMO and in overcoming periods of tension. The LMO has integrated women's and socioeconomic issues into the work of the environmental movement. Its latest joint project is on women and environment.

The Platform has developed into a coalition in which members have accepted a clear division of tasks. The Platform has developed structures for common campaigns, for advocacy, for development of common views, for cooperation with other social movements and for dialogue with other sectors in society. The result is a more united environmental movement and an ongoing discussion to broaden the coalition and transform it into a federation of 30 national and regional environment and nature conservation NGOs strongly linked with the grassroots level. Moreover, in the last six years, more women have been appointed to positions of responsibility in environmental groups. In addition to her work with the LMO, Ms. Kranendonk helped establish an alliance among the environment, peace and development movement in the Netherlands which has become an important forum for discussion and cooperation in the process towards sustainable development. In 1990 she helped create a comparable alliance for the EEC region.

**Postscript:** There is now a more united environmental movement. There is an ongoing discussion to broaden the coalition and transform it into a federation of 30 national and regional environmental and nature conservation NGOs strongly linked with the grassroots level.

## SUCCESS STORY: Agro-Tourism in Greece

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**Region:** EUROPE
**Subject:** EFS

**Problem:** A massive influx of tourists has created a need for large buildings and hotels, requiring land upon which area villages are dependent to sustain their primarily agricultural economy. There is a threat of potential environmental degradation.

**Solution:** Women on Lesvos Island were mobilized to form a cooperative which promoted a new concept: "agro-tourism".

The growing tourist trade in Greece threatened land area which supports the local agricultural economy. The ecosystem is potentially threatened by increased development activity; for example, the construction of big hotels and the slowing of the economy is causing young people to relocate to the large cities. Women in many villages in Greece, especially in the islands, have always worked in the tourist sector but mostly as unpaid workers in family-owned tourist enterprises. The money earned was taken by husbands, brothers and sons.

The female population was mobilized to develop a system of agro-tourism, remodeling present housing to accommodate increased tourism while at the same time maintaining agricultural activities and the livelihood of the local population. An agro-tourism cooperative was started in 1983 in Petra, a fishing village located on Lesvos Island. The cooperative houses 3,500 people per year. If this cooperative of houses did not exist, all of these tourists would have needed a "big cement hotel-monster" disproportionate to the size of the village. Such a hotel would have destroyed the picturesque fishermen's village. According to the "agro-tourism norms," the cooperative restaurant has to provide traditional, local food. Abandoned gardens were again planted with traditional vegetables. Women of the village started to raise chickens again in order to sell fresh eggs in the cooperative. Due to the interest of the tourists, the old abandoned historical sites of the region were taken care of by the Prefecture of Lesvos. The locals, especially women, developed a sense of pride in their culture. The project is still very active and is developing. Funding for the project comes from the Local Prefecture, the Agricultural Bank, the European Economic Community Social Fund and the Hellenic Tourist Office, among other government and local institutions. For the first year, the cost of the project was 1,834,000 Drachmas.

Young people can now find jobs in their home village and do not need to leave their village to find work. Young girls found jobs in the administration of the cooperative. Other young men and women opened shops to cover the needs of the fish commerce which had been abandoned. Young people also stayed to farm, because the local food products now provide them with an income. The women members of the cooperative have gained political and business skills. They often travel to share their experiences in other parts of Greece where other women's cooperatives are starting. The cooperative is now one of the most important institutions in the village and has contributed to the economical and social development of the region.

**Postscript:** There have been environmental and economic benefits for the village and the tourist trade. The cooperative had a hand in remodeling housing to accommodate tourists as an alternative to building modern hotels which occupy valuable land. Incoming tourists provided a market for local vegetables. Gardens that had been abandoned were replanted and cultivated providing income for the villagers.

## SUCCESS STORY: *Le Jour de la Terre* Raises Awareness of Environmental Issues in France

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**Region:** EUROPE
**Subject:** EFS

**Problem:** There was a general lack of awareness about environmental issues in France.

**Solution:** Organizers of *Le Jour de la Terre* (Earth Day, France) educated people through the media about actions they can take to preserve the environment and about environmental programs in other countries.

In France there was a lack of awareness about environmental issues and the measures that could be taken to protect the environment. Gilliane Le Gallic, a TV producer, heads the European Television Center (ETC), which has offices in both France and California. In the late 1980s, Ms. Le Gallic, although unaware of the Earth Day organized in 1970 by Denis Hayes, was considering organizing a similar type of event in France. While in California, she learned about the 1970 event and arranged to meet with Denis Hayes. He was just starting to organize Earth Day 1990. Ms. Le Gallic decided to help organize the event and immediately began gathering support for holding an Earth Day in France, Morocco and Belgium.

Ms. Le Gallic initially approached political leaders and her colleagues in the media. Having gained the support of many media decision makers, she contacted Parisian environmental groups for a press conference during Denis Hayes' 1989 visit to Europe. From discussions after the press conference, *Le Jour de la Terre* (Earth Day, France) was created, with the support of environmentally concerned groups, artists, politicians and media. They established an office at the ETC, which also provided all initial funding. A staff of 12 and many volunteers implemented the campaign, which was funded by sponsors (mainly TV broadcasters and producers), government grants and members' contributions. The group established offices at *Actual*, a major French magazine. One of their most successful activities to increase awareness and action on environmental issues was the publication in French of a practical booklet about what individuals can do to protect the environment. They initially printed 250,000 copies of this booklet, 100,000 of which were inserted into copies of *Actual*. The rest were sold to individuals, groups, etc. Another 150,000 were published after Earth Day.

By April 21 (Earth Day), virtually every newspaper, magazine, TV and radio station in France had helped increase environmental awareness; over 1,000 press clips, specials and covers in the print media and several hundred hours of radio and TV programming had brought home the issue of environmental responsibility to 50 million people. As a result, hundreds of thousands of people (most of whom had never taken part in any environmental association or action) participated in more than 600 environmental actions. Many of these activities, such as recycling projects and energy conservation, are ongoing. Media coverage of the environment has improved.

**Postscript:** Ms. Gallic has focused on launching a national recycling program in France. After preparing a comprehensive 3-year plan, she spent the first six months of 1992 setting the first phase, initiating and promoting recycling in the workplace, which was designed to reach the largest possible number of people. With *l'Association Jour de la Terre* as a base, a network of regional recycling offices have been set up across France.

## SUCCESS STORY: Environmental Counseling - A New Profession

**Presenter:** Esther Peter-Davis
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**Country:** France
**Region:** EUROPE
**Subject:** EFS

**Problem:** Lack of access to information pertaining to environmental issues affects both decision makers and pressure groups and leads to conflict situations.

**Solution:** Esther Peter-Davis created an organization which provides environmental information and counseling to a range of individuals and groups. This service includes specific vocational training.

Until recently, the urgency for environmental awareness and education has received little publicity around the world. The lack of attention paid to the environment could be attributed partially to the inability of the public and businesses to receive readily available information concerning important environmental issues. Furthermore, little action was taken to improve the environment either on the local or on the national level, and there was a distinct need for counseling and educational programs. It was clear that a means of informing the public through an organized body was necessary to ensure the promotion of environmental concerns and action-groups.

In 1985, Esther Peter-Davis published a story in *FORUM*, a Council of Europe publication, about a project undertaken by two German industrialists to counsel local authorities and households in environmental matters. The interest expressed by readers compelled Ms. Peter-Davis to introduce the eco-counseling (e-c) project in France. In 1986, as one of four international project leaders, she formed a team in Strasbourg, France and mobilized European, national, regional, and local funds to accomplish numerous goals promoting the environment. For example, using the e-c concept as a guideline, Ms. Peter-Davis set up ECO-Conseil, a nonprofit institute for environmental counseling to create experimental posts in four Alsatian cities in which three-year environmental training schemes were implemented for 100 people. This valuable training is taught with an emphasis on practical solutions and long-term impact analysis to prepare the trainee for vocational use. Counseling is made available to local authorities, business, farmers, educational bodies, associations, households and the public.

For her efforts and her successes, Ms. Peter-Davis received the PRIX RHIN-NOVATION in 1989, awarded by the *Fondation Alsace* for the most innovative trans-frontier initiative in the Upper Rhine Valley. More importantly, however, interest for the model developed in Strasbourg has been expressed by the Ministries for the Environment of Portugal, Canada and Japan. In addition, Ms. Peter-Davis' enterprise has received enquiries from Algeria, Morocco and the U.S.S.R. In 1991 approximately 700 trained eco-counselors trained in nine European countries are working with various sectors of the population on the urgent need to adopt environmentally-friendly behavior.

**Postscript:** ECO-Conseils activities are growing: a comprehensive training Programme in environmentally-friendly management of small firms is being prepared for 1993; avenues are being explored to turn the city of Alsace into a "laboratory region for sustainable development"; and environmental counselling projects are being planned in Africa and Asia.

## SUCCESS STORY: A Women's Perspective in Public Planning, Norway

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**Subject:** EFS

**Problem:** Local planning and administration was developed and implemented without the participation of women or consideration of environmental or women/children related concerns.

**Solution:** In a government pilot program, women's committees were formed to take an active role in municipal planning, to set environmental priorities from a women's perspective and to encourage participation and support for women's groups.

A general lack of environmental awareness and community participation from the inhabitants, especially the women, in the local planning and administration procedures was evident in the Norwegian municipality of Ramnes and in the surrounding areas. This provided the impetus for a government-sponsored pilot program in which women were responsible for developing a public planning document for each of the six municipalities.

Led by Mayor Eva Lian Takle, the group collaborated to discuss and set priorities on how women wanted their local environments to work and function. They lobbied for environmental issues to be placed on a higher level of priority and for women to play a more constructive role in implementing necessary policies and plans. The pilot project was a success and paved the way for increased community involvement in public planning. It particularly increased participation by women, who placed a greater emphasis on environmentally responsible resource management. A report was produced titled *Mobilizing Women in Local Planning and Decision-Making - A Guide to Why and How*.

Project implementors believe that the full participation of women in planning and decisionmaking is likely to secure better solutions, because the solutions will be based on broader knowledge and experience. This in turn favors more sustainable and even more affordable solutions, since people will be motivated to contribute to the implementation themselves.

**Postscript:** This program, in which a group of women were responsible for the development of a municipal public planning document, received a positive and enthusiastic reaction. Both women's issues in general and environmental concerns in particular were given higher priority through communication and community involvement.

## SUCCESS STORY: Olga Tsepilova Increases Understanding of the Green Movements in the U.S.S.R.

**Presenter:** Olga Tsepilova

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**Country:** USSR

**Region:** EUROPE

**Subject:** EFS

**Problem:** The emerging social movements in the U.S.S.R., including environmental movements, have received little scholarly attention in the Soviet Union.

**Solution:** Olga Tsepilova is a sociologist at the Institute of Sociology in Leningrad. She has conducted progressive research on green movements in the U.S.S.R. and provided consultative services to Soviet environmental groups.

Olga Tsepilova is a member of a small and extremely progressive team of sociologists who make up the Social Movement Sector at the Institute of Sociology in Leningrad. This team was formed in 1989 in order to pursue research on the emerging social movements, a new phenomenon in the U.S.S.R. and one which until then had received little scholarly attention in the Soviet Union. Rather than relying on survey techniques alone, as Soviet sociologists often do, this team turned to informal (*samizdat*) publications and activist interviews in order to provide a more complete picture of these emerging social movements.

Each member of the team specializes in a particular type of social movement (democratic, conservative, fascist, nationalist, workers or environmental) and works to gather as much information as possible in his or her area. Ms. Tsepilova focuses on the environmental movements. Her goal is to use surveys, interviews and the informal press to develop as complete a picture as possible of the green movement in the Soviet Union.

During the spring of 1990, Ms. Tsepilova and Jane Dawson, a researcher from the U.S., carried out a series of interviews with leading members of all the major environmental groups in Leningrad, as well as many of the smaller groups. They then interviewed leading members of various political associations and parties in order to learn about their environmental orientations. They composed a detailed chronology of the emergence of environmental activism in the Leningrad area, and attempted to provide an accurate characterization of this activism. The two women prepared a joint paper based on their research which is awaiting publication in the U.S.S.R.

In addition to this joint research project, Ms. Tsepilova has collected excellent data on the mass environmental movement in Kirish, near Leningrad, which peaked in 1989. She is in the process of turning this work into a doctoral dissertation. Ms. Tsepilova's work on environmental movements is among the most progressive and interesting that is now underway in the U.S.S.R. She also gives consultative help to the participants of environmental social movements.

As a result of Olga Tsepilova's research work on the development of environmental movements in the Soviet Union, there is a better understanding of this country's green movement.

**Postscript:** Knowledge of environmental movements in the Soviet Union and the factors that affect their development have increased.

## SUCCESS STORY: Irish Women's Environment Network

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**Country:** Ireland
**Region:** EUROPE
**Subject:** Waste

**Problem:** There is a need for leadership to educate and inform women of the power they have to change the environment through their purchasing and consumption patterns.

**Solution:** Audrey Dickson, chairwoman of the Environment Action Group of the Council for the Status of Women, organized a day-long conference attended by 300 women. She then established the Women's Environmental Network in Ireland.

Audrey Dickson, chairwoman of the Environment Action Group of the Council for the Status of Women, believes that women can play a strong role in reducing the amount of waste generated in Ireland. Irish women do 90% of the shopping for their households. As a result, they can insist on buying environmentally-friendly products. In this way, women can voice their concern for the environment and promote a more sustainable lifestyle.

In February 1991, Dickson organized a day-long conference at Trinity College, Dublin, Ireland entitled "Women in the Environment - What Can We Do?" At this conference attended by 300 women, Ms. Dickson stated, "Women seem to know instinctively that environmental protection is now urgent and essential if we are to leave a habitable planet for our children and grandchildren." This conference inspired 45 women to establish the Irish Women's Environmental Network (IWEN) in March 1991. Ms. Dickson convened a meeting of the women to identify skills and to establish groups to engage in research, education, fund raising and campaigns. The group publishes a monthly newsletter, *Green Sheet*, which commenced in May 1991. In June their *Action on Packaging* was covered by all major radio stations and from this, discussions have commenced with the plastics association and with the marketing manager of a leading supermarket. The group looked to WEN in the UK as a role model. (WEN UK successfully halted the use of chlorine to bleach tea bags, diapers and other sanitary products.) To date the group has been funded by subscriptions to the Network. They have about 60 members and have received about 1,500 Irish pounds.

Dickson says the issues Irish WEN will work on will mirror those of other WEN groups. Unnecessary packaging and thoughtless use of disposable goods will be their first priority. On their first Day of Action, they asked all shoppers to return their unnecessary packaging to the store manager asking him or her to take steps to have it reduced. The group will also concern itself with the use of chlorine-bleached products, as WEN UK has done and will call for a ban on all PVC products. Dickson says that dioxin, a by-product of the bleaching process, is particularly hazardous for women, and levels of dioxin found in breast milk are high in industrialized countries. The group aims to establish a "cradle to grave" approach for all manufactured goods and the reduction of disposable products.

**Postscript:** The Network has received grants from the Dept. of the Environment and from the Ireland America Fund that have helped the organization develop. Materials have been published, and the monthly newsletter expanded and their speakers' group will be launched in the fall of 92. The Irish WEN held a seminar "Women and the World - Global and Local Challenges" and were active in preparations for the Earth Summit and Global Forum.

## SUCCESS STORY: Schools in Saint-Calais, France Increase Community Awareness of Environmental Issues

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**Region:** EUROPE
**Subject:** Waste

**Problem:** Paper and cardboard constitute 15% of the weight of France's garbage. Saint-Calais lacked a recycling program for waste paper.

**Solution:** Edwige Guillon approached local schools and persuaded them to implement projects to teach the children about environmental protection and to organize events to increase awareness about paper recycling.

Although paper and cardboard make up 15% of the weight of France's garbage, there was no recycling program for waste paper in Saint-Calais, France. The Waste Treatment Syndicate, which serves a total of 32,000 residents in Saint-Calais and 36 rural commons, only collected glass for recycling. Three times a week, sidewalks were inundated by bins overflowing with paper and cardboard.

Beginning in November 1989, Edwige Guillon, a resident of Saint-Calais, approached the local school directors and persuaded them to teach children about environmental issues. Teachers, most of whom were women, developed projects for the children which incorporated environmental problems. They held conferences, exhibitions and tree-planting programs to increase awareness about environmental issues. All the state schools of Saint-Calais -- two kindergarten schools, one primary school and one high school -- participated in the program. The association *Le Jour de la Terre* (Earth Day, France) funded Ms. Guillon's efforts, which cost about $1,000 for telephone, printing, mailing and travel expenses.

As a result of these efforts, several collections of wastepaper were organized in Saint-Calais with Ms. Guillon's help. Approximately 15% of the population participated in these recycling activities and a large quantity of paper was eliminated from the solid waste stream. The success of these temporary drop-off sites led town leaders to decide to set up permanent containers for recycling paper. The Waste Treatment Syndicate has agreed to place paper containers around the area so that people can recycle paper at their convenience. The communities will cover the costs of the program. The school program also made local inhabitants aware of environmental problems in general: residents are concerned not only with reducing waste, but also with keeping Saint-Calais pollution free. They have formed a new association, *Association pour le developpement ole Caliais* (headed by a woman), to reduce pollution, increase attractiveness and improve the quality of life in the town. Area schoolchildren have planted 865 trees at home, and two schools have started arboretums or tree preservation areas.

**Postscript:** Local inhabitants have become concerned about protecting the environment of Saint-Calais and surroundings. Several paper recycling collections have been organized. Each school year, the group works with children on developing environmental awareness. There are plans to hold a French National Assembly of Women and the Environment in the near future. Ms. Guillon received UNEP's 1992 Global 500 Award.

## SUCCESS STORY: Kerry Recycling - A Recycling Cooperative in Ireland

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**Country:** Ireland
**Region:** EUROPE
**Subject:** Waste

**Problem:** Reusable and recyclable resources, e.g. cardboard, paper, glass, etc., take up valuable landfill space. Recycling is not practiced on a regular basis.

**Solution:** After thorough study of the problem, a group of unemployed people established Kerry Recycling, a recycling cooperative. The group also conducts Environmental Literacy Programs with householders, businesses, industry and schoolchildren.

Kerry Recycling, a recycling cooperative, was set up in July 1989 by a group of unemployed people in Tralee, Ireland. After researching waste issues (volume, generation, disposal, cost of disposal, etc.), they decided to initiate this collection and recycling project on a voluntary basis, with the intention of ultimately creating a viable trading unit to provide a means of support for these unemployed workers.

They found out, for example, that recycling is a labor-intensive exercise with considerable potential for sustainable jobs because of the volume of recyclable materials available, the amount of reclaimed materials needed by some Irish industries, e.g. the glass industry, and the potential capacity of local Irish industry to utilize reclaimed raw material, e.g. the paper industry. They also found out that un-recycled cans have a litter lifetime similar to that of the great Egyptian pyramids. Since it costs the Kerry County Council 14 Irish pounds a ton to landfill waste, the Co-op saw an opportunity to save the county money by reducing the amount of waste that went into the landfill. The Council recognizes this saving and pays the Co-op a rebate for every ton saved. According to the group, the most obvious saving is that there are nine fewer people on social welfare.

To increase public awareness about the benefits of recycling and environmental issues, Kerry Recycling produces slide shows, guides and other pertinent material. As a result, they have reduced the amount of salvageable waste dumped into landfills by industries and households, reduced imports of primary raw materials and finished projects, and provided an efficient service to waste generators in both industry and domestic sectors. The Department of the Environment has provided most of the funds for the project. Other funds come from private donations. The total cost of the project is 62,000 Irish pounds. Kerry County Council, along with Tralee and Killarney's Urban District Council, are now actively supporting the group's venture.

The Co-op has become a resource on environmental issues for local companies and local government. There are recycling depots in Tralee, Killarney and Castle Island. The Co-op plans to further develop these and other depots. The Department of the Environment is very receptive to the plans and has proposed that the idea of depots be used as a role model for the rest of the country. The group also plans to get involved in the manufacture of products using recyclable materials. In the last few months, Kerry Recycling has won five national environmental awards.

**Postscript:** Environmental and economic benefits for the participants and the community include reduction in tonnage dumped in local landfills, creation of jobs for people involved and provisions of energy and raw materials for industry. The group's educational outreach efforts have created awareness among adults and children alike. Ms. Sheehy received UNEP's 1992 Global 500 Award.

## SUCCESS STORY: U.K. Women's Network Raises Awareness About the Environmental and Health Effects of Chlorine-Bleached Paper Products

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**Region:** EUROPE

**Subject:** Waste

**Problem:** Chlorine-bleached paper products bought by women in the United Kingdom caused environmental damage to local ecosystems where production took place and posed potential health risks to those who used them.

**Solution:** As the Government would not pass legislation prohibiting importation from the companies responsible for production, public education campaigns were begun, including books, posters, TV segments and public informational meetings.

Women in the United Kingdom (U.K.), and generally the world over, are not aware of the environmental and health risks associated with chlorine-bleached paper products, including sanitary napkins, tampons and disposable nappies (diapers). While the U.K. is not a major producer of paper products, it imports 1,672,000 tons of paper each year, 87% of which is bleached. By importing products from companies which do not enforce responsible environmental policy, the U.K. is contributing to the ecological degradation of other nations' ecosystems and potentially endangering Britons' health.

The Women's Environmental Network (WEN) is a London-based nongovernmental organization dedicated to educating, informing and empowering women who care about the environment. In June 1988, with the help of four implementors and 50,000 participants, WEN began a public information and lobbying campaign on the environmental and health risks of chlorine-bleached paper products. The campaign was funded primarily by individual and organizational contributions and had a large volunteer component. WEN conducted extensive research into the possible impacts of sanitary napkins and disposable diapers on health and the environment. They obtained a grant and published a book based on their findings: *The Sanitary Protection Scandal.* Numerous newsletters, leaflets and television programs have created public awareness of both the threats posed by using chlorine-bleached paper products and the actions which can be taken to reduce or eliminate these pollution and health risks. WEN worked aggressively to establish legal precedents prohibiting the importation of chlorine-bleached pulp and paper products. Currently, the Pulp and Paper Products (Restriction) Bill has been introduced in Parliament. If passed, the bill would immediately prohibit the importation of some chlorine-bleached paper products, and would mandate that all paper be chlorine-free by 1992.

The project has prevented tons of organochlorines from being pumped into the environment and raised awareness of women around the country. A survey of the British paper industry indicated that 40% of the industry had changed, or intended to change, their use of chlorine-bleached pulp in favor of non-chlorine bleached or recycled paper. Also, for the first time in 10 years, the sales of terry toweling reusable nappies went up significantly. The project has already inspired women in other countries to conduct similar campaigns.

**Postscript:** Women have written letters asking for support from the British Parliament, established product boycotts and become more educated as to the health and environmental risks associated with chlorine-bleached personal products. For the first time in 10 years, sales of reusable nappies have risen significantly.

## SUCCESS STORY: Citizens Environmental Movement, USSR

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**Country:** USSR
**Region:** EUROPE
**Subject:** Water

**Problem:** A hydroelectric dam was planned which threatened to flood a beautiful historic wilderness area, erode fertile land, and leach mercury and other toxins out of the rock and into the drinking water of millions of Soviets living along the Katun and Ob Rivers.

**Solution:** Maria Cherkasova coordinated a five-year grassroots effort to block construction of the dam. Committees for the Salvation of the Katun River were established in six cities. Activists in these committees mobilized tens of thousands of local citizens.

The Katun is the main river of the Soviet Union's mountainous Altai region. The Katun and its valley are famous for their pristine beauty and contain many ancient cultural sites. In 1986 the blueprint was completed for a huge 200-meter-high hydroelectric dam on the Katun River. The dam project, pushed by local authorities and the Ministry of Energy, threatened to pollute the drinking water of millions of Soviets with mercury and other toxins. It would also flood hundreds of acres of wilderness, destroy wildlife and erode fertile land.

In 1986 Maria Cherkasova, a Soviet biologist and journalist long interested in environmental conservation, began coordinating a grassroots campaign to halt construction of the Katun Dam. Committees, each with a core of 10 or so activists, were established in six cities. They led a massive citizens' campaign to block the dam. Tens of thousands of local residents marched, set up a protest camp, petitioned and/or wrote letters. The Katun River project depended largely on volunteer efforts; however, approximately 30,000 rubles was raised through souvenir pin sales, benefit performances and the sponsorship of the Ecopolis Cooperative. After its founding in December 1988, the Socio-Ecological Union, an umbrella organization for 200 Soviet environmental groups, served as the campaign's base of operations.

Due to these efforts, independent scientists associated with environmental NGOs participated in the official expert commissions organized in 1987, 1988 and 1989 to assess the potential environmental repercussions of the project. Each commission declared the dam both economically and environmentally unsound. Construction of the dam has been postponed. Thus, the five-year campaign has won numerous battles, although the war is not over: local authorities are attempting to resurrect the project, claiming the Russian Parliament (which voted the project down in the summer of 1990) does not have authority over natural resources in the region. The movement raised Soviet consciousness about environmental issues, gave those involved broad experience in the techniques of environmental activism and led to some of the nation's first environmental conferences. The project also resulted in substantial networking among Soviet environmental NGOs and created linkages with international NGOs.

Maria Cherkasova now heads the Socio-Ecological Union. Under her leadership, the NGO has established international contacts and carried out a wide range of successful environmental campaigns and activities.

**Postscript:** Construction of the dam has been postponed. The movement raised Soviet consciousness about environmental issues, gave those involved broad experience in the techniques of environmental activism and led to some of the nation's first environmental conferences. Maria Cherkasova won UNEP's 1992 Global 500 Award for her outstanding work in protection of the environment.

## SUCCESS STORY: Increasing Public Awareness on the Importance of Protecting Ecosystems in the U.S.S.R.

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**Region:** EUROPE

**Subject:** Water

**Problem:** Human activities are having a negative influence on the ecological equilibrium of ecosystems. A lack of environmental education and information exacerbates the problem.

**Solution:** Natalia Salomatina, a Soviet biologist, conducted research into the long-term effects of human activities on amphibians. She also gave lectures to raise the public's awareness of the importance of protecting nature.

Human activities are destroying nature's balance. For example, amphibians are under severe pressure from humans. Pollution, pesticide usage, destruction of breeding places and the use of amphibians for food, study and scientific purposes threaten the existence of these creatures. The problem includes scientific, economic and environmental elements; a lack of environmental education, information and awareness exacerbates the problem.

A long-term program in the U.S.S.R. Academy of Sciences is studying the influence of human activity on amphibian populations in ecosystems. (The Academy provides the funding for this program.) Natalia Salomatina, a Soviet biologist with the Academy's Institute of Evolutionary Animal Morphology and Ecology, participates in this research program. Dr. Salomatina also gives lectures on the effects of human activity on amphibians in an effort to attract public attention to the general problems of nature protection by using amphibians as a concrete example of species diversity.

Public interest in the problems of nature protection is growing in the Soviet Union. There are about 1,000 ecological organizations throughout the U.S.S.R. A new organization of this type, "Women in Support of Ecological Programs," is being created within the Committee of Soviet Women. This organization's aim is to concentrate the public's attention on the special problems faced by women and the influence of different ecological, social and other factors on women, and to help organize support for women and children living in regions which are in ecological danger.

**Postscript:** Her efforts resulted in environmental and ecological benefits for participants and the community, including a more rational use of natural resources, a reduction in pesticide usage and the maintenance of ecological balance in ecosystems.

## SUCCESS STORY: Female Farmers in the Netherlands Organize for Sustainable Agriculture

**Presenter:** Johanna Schuurman

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**Country:** Netherlands

**Region:** EUROPE

**Subject:** Water

**Problem:** Agricultural developments and policies in the Netherlands and the EC have had serious consequences for the environment. Farmers are pushed to extensively apply chemical fertilizers, causing severe groundwater pollution.

**Solution:** By forming a coalition of those affected and concerned, a venue was created to discuss common problems and possible solutions. Hearings were held with agricultural experts and policymakers at the national and EC levels.

Agricultural developments and policies in the Netherlands and in the European Community (EC) as a whole have had serious consequences for the environment, farmers in developing countries and farm families in Europe. Every working day, eight farmers in the Netherlands have to close their farms. Animal feed is imported from developing countries, particularly from Thailand, thereby over-exploiting the land and the people there. The commercial agriculture practiced to export these crops is generally unsustainable and diverts land from food production. Moreover, small farmers are squeezed out by large-scale farming for export, while in the Netherlands, farmers are pushed to extensively apply chemical fertilizers in order to keep their farms running. That causes severe pollution of the groundwater. Another problem of EC agricultural policies is that agricultural subsidies for European farmers result in overproduction and are very costly. There was a need for a more rational approach to agriculture in the EC.

Johanna Schuurman has been a farmer in the Netherlands for many years. She experienced on her own family farm how the push to overproduction was destroying the environment and polluting the water. In addition, she became aware of the social and ecological linkages between their farm and farmers in less developed countries. In 1987 Johanna Schuurman founded the Critical Coalition for Agriculture (*Kritisch Landbouwberaad*) together with other female farmers as well as consumer, environmental and development NGOs. The coalition meets monthly to discuss the problems and potential solutions for developing environmentally sound and sustainable agriculture in the Netherlands.

In the context of the EC, it is not possible to reverse the situation on an individual basis. The support of experts and policymakers is essential. Therefore, the coalition organizes hearings with agricultural experts and policymakers. At these hearings women in particular come with their questions about the present situation. To support those farm families who are facing difficulties or who are trying to convert to more sustainable farm practices, *Kritisch Landbouwberaad* has established a telephone line run on a volunteer basis. Johanna Schuurman is extremely active in the organization. Almost every day she is somewhere in the Netherlands or elsewhere in Europe participating in meetings, hearings and discussions. In addition, she has met with women farmers in Zimbabwe and Kenya to share views and create mutual understanding about their problems.

**Postscript:** The very fact that farmers now have a common voice in which their concern for the environment is explicitly reflected has stimulated policymakers and parliamentarians to review the present situation and take the steps necessary to remedy the problem. The telephone hotline established by the group receives up to 150 calls per day.

## SUCCESS STORY: Exposing the Toxicity of the Elbe River Basin, East Germany

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**Region:** EUROPE

**Subject:** Water

**Problem:** Chemical and organic pollution in the Elbe River Basin has contaminated the drinking water supply, causing a health threat to the local people. However, there was a lack of hard data on the extent of the health risk posed by this pollution

**Solution:** Dr. Renate Walter led a research effort which studied the link between Elbe River pollution and public health. After the study found an increased cancer risk, Dr. Walter began a public awareness campaign to educate the affected population.

By the 1980s, the Elbe River Basin had become a highly contaminated source of drinking water for the people of that region. However, concrete data about the nature of the health risks posed by this pollution was unavailable because no study about the health effects of water pollution had ever been conducted in the German Democratic Republic (GDR). The public was poorly informed about the issue.

From March 1987 to April 1989, students at the Medical Academy of Dresden conducted research under the leadership of Dr. Renate Walter into the effects of Elbe River pollution on public health. The study, funded by the GDR Government, found that the risk of certain types of cancer for the populations in two of the three cities investigated who obtained water from the river basin was two to seven times the risk for the population supplied with groundwater. The combined population of these two cities was 100,000 at the time of the study. The government disputed the study's results, delayed responsive action and suppressed the findings. In response, Dr. Walter launched a public awareness campaign. Her goal was to alert the local people to the health hazards presented by pollution levels in the Elbe and to gather support for government action to establish and maintain a safe drinking water supply. She emigrated to Austria in 1989, mainly due to frustration over GDR environmental policy, and continued her efforts to inform the public. She presented a paper on the study at a conference in Tubingen, Germany; it was later published in an international scientific journal. In May 1990 at the invitation of Greenpeace, she participated in a press conference in Hamburg on the pollution of the Elbe. She also wrote letters to newspapers, gave speeches and assisted an Austrian TV company which produced a film about pollution of the Elbe.

As a result of Dr. Walter's research and her efforts to publicize the results, Germans became much more aware of the health risks posed by drinking water from the Elbe. For example, after her press conference, there was intensive discussion in the German media, particularly in Dresden, about the significance of source water quality and its impact on health. After German reunification, the Government began to close down most of the old factories which pollute the Elbe and to install wastewater treatment plants.

**Postscript:** Dr. Walter's research and her efforts to make the public aware of the study's findings have greatly increased awareness of water pollution and the health risks associated with inadequate fresh water supply.

# DESCRIPTIONS OF SUCCESS STORIES FROM LATIN AMERICA AND THE CARIBBEAN

REGIONAL BREAKDOWN OF
SUCCESS STORIES - LATIN AMERICA/CARIBBEAN

| Country | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| Antigua and Barbuda | 1 | | | | 1 |
| Argentina | 2 | | 1 | | 3 |
| Barbados | | 1 | | | 1 |
| Bolivia | | | 2 | | 2 |
| Brazil | 2 | 3 | 5 | | 10 |
| Colombia | | | 3 | | 3 |
| Costa Rica | | | | 1 | 1 |
| Dominica | | 1 | | | 1 |
| Dominican Republic | 1 | | | | 1 |
| Ecuador | | | | 1 | 1 |
| Haiti | | | 1 | 1 | 2 |
| Honduras | 2 | | | | 2 |
| Jamaica | | 1 | | 1 | 2 |
| Mexico | 3 | 3 | 1 | | 7 |
| Panama | | 1 | | | 1 |
| Paraguay | | | 1 | | 1 |
| Peru | | 2 | 1 | | 3 |
| Uruguay | 1 | | | | 1 |
| Venezuela | 1 | 2 | 2 | | 5 |
| | 13 | 14 | 17 | 4 | 48 |

## SUCCESS STORY: Seminars Train Urban Women as *Health Promoters* and Decrease Environmental Problems

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**Country:** Argentina

**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** EFS

**Problem:** The lack of proper waste disposal and sanitation in the poor areas of Greater Buenos Aires negatively affected health conditions. Children in particular suffered from higher incidences of sanitation-related ailments like diarrheal disease and parasitosis.

**Solution:** The project trains urban women leaders as health promoters. It particularly seeks to enable them to improve environmental conditions. The environmental education seminars focus on health and hygiene in the home and at the community level.

The boroughs surrounding Buenos Aires, Argentina suffer from poor sanitary conditions. Inadequate disposal of domestic solid waste and lack of access to potable water exacerbate health problems among the residents. Children, in particular, face an increased risk of diseases such as diarrhea and parasitosis due to the unhealthy environmental conditions.

Since 1986 a program in Argentina has trained urban women in the Greater Buenos Aires area as health promoters. The Argentine Government initiated this project in cooperation with UNIFEM. The project was initially implemented through the Ministry of Health as part of its Women, Health and Development Program; however, from 1989 to the present, the Foundation for Studies and Research on Women (FEIM) has funded and implemented the training project under the leadership of Mabel Bianco. The training program's objectives are to raise women's awareness of urban sanitation issues and to help them develop the skills and confidence needed to better manage health and environmental problems at the individual and community level. Seminar coordinators prepared training manuals and games that highlighted key relationships among health, hygiene and the environment. These were utilized to train the women, most of whom are housewives from working-class neighborhoods. Each training seminar consists of 6-8 three-hour sessions conducted over a 6-8 week period. Among other activities, participants develop didactic materials for use in the community and dissemination to the public. These included instructions about controlling insects and the benefits of proper garbage disposal, and booklets on child health and environmental sanitation. The seminars cost U.S. $500 each and follow-up costs U.S. $1,000 per year.

After attending these seminars, women organized other women in their communities to solve environmental problems like the lack of garbage collection, the poor access to potable water and the need for improvement of hygiene in order to diminish insects and other disease vectors. To extend water supply to their homes, the women organized working groups in their boroughs and FEIM provided the necessary materials. To address the garbage disposal problem, the women collected money and bought containers, which they placed in each sector. They also planned weekly garbage collection with local enterprises and authorities. Hygiene and sanitation in these areas improved due to these efforts of the urban health promoters trained by the program. Insects decreased and morbidity rates for such diseases as gastroenteritis, diarrhea and other water-transmitted diseases declined, especially in children. The women trained by the program improved their skills, gained self-confidence and increased their social status in their communities.

**Postscript:** Women trained by the program became actively involved in organizing their communities to solve health and environmental problems. As a result, hygiene and sanitation conditions have improved. The incidence of sanitation-related diseases like diarrhea, infectious gastroenteritis and parasitosis declined.

## SUCCESS STORY: International Environmental Alliance Forms to Avert the Threat of a Highway Project Outside Sao Paulo, Brazil

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** EFS

**Problem:** A major highway project proposal threatened the quality of life in a Sao Paulo suburb. It would have endangered a protected wildlife reserve and would have increased the intensity and frequency of floods in the area.

**Solution:** Vera Lucia da Silva Braga motivated the local and international communities by organizing service clubs and environmental organizations to oppose the project through newspaper and magazine articles and television campaigns.

Sao Paulo, Brazil is one of the world's most polluted cities. In 1987 the city almost gained another development project that would have exacerbated local environmental problems. The Valley Bottom Avenue Project proposed to build a major highway paralleling the course of Tremembe Creek and the channeling of the creek. This project threatened to increase the frequency and intensity of floods in what was already a flood-prone area. Funded by a loan of U.S. $48 million from the Inter-American Development Bank, the road would have been located in one of the last protected forest areas in the Sao Paulo urban area. The bordering areas of Horto Florestal and the Cantareira Reserve are both considered protected and of great social significance by the Food and Agriculture Organization of the United Nations. The project would have also brought significant pollution to one of San Paulo's last "green" suburbs and dislocated more than 5,000 families. The lives of one million people in this zone would have been adversely affected by the proposed project.

Vera Lucia da Silva Braga is the vice-president of the Community Council of the Northern Zone. She organized opposition to the highway, launching a grassroots movement through newspapers, magazines, television campaigns and service organizations such as Lions and Rotary Clubs to mobilize the community. The environmental groups OIKOS (Union of Defenders of the Earth), ADEMASP (Association of Defense of the Environment of Sao Paulo, Brazil) and GAIA Foundation were also involved. Braga and her group, working with CONAMA (National Council of the Environment), discovered that the project had violated the Brazilian Constitution's Chapter on the Environment, since it did not require an Environmental Impact Assessment. Then the group joined forces with a diverse group of environmental organizations including 10 American, 1 Canadian and 5 European NGOs to halt the project.

On May 18, 1988, the Inter-American Development Bank canceled the $48 million project and, in addition, canceled other projects in Sao Paulo because they lacked Environmental Impact Statements. The protected areas were preserved, flooding was prevented, and the quality of life for local community members remained stable. The group was so successful in its efforts that the president of the Inter-American Development Bank invited them to the IDB's 2nd Consultation on the Environment where he announced that the bank would become "The Environmental Bank of the Continent" and would apply $22 million in 1990/1991 only to projects which had solid environmental support from Latin America and the Caribbean.

**Postscript:** The Community Council faces new battles in its latest campaign to create Sao Paulo's Green Belt Biosphere Reserve. Despite the urgent need to preserve the Green Belt, the state of Sao Paulo intends to build a huge highway through the Green Belt surrounding the city. The Council is continuing its efforts to have the Green Belt declared as a Biosphere Reserve by UNESCO and to again pressure the Development Agencies to withdraw their support for the highway project.

## SUCCESS STORY: Training Program Helps Women in Bolivia *Improve* Their Environments

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**Region:** LATIN AMERICA/CARIBBEAN
**Subject:** EFS

**Problem:** Many low-income communities in Bolivia lack basic services and amenities such as potable water, waste disposal, adequate vegetation and safe play areas. As a result, the residents of these communities are exposed unnecessarily to health risks.

**Solution:** In cooperation with Bolivia's Ministry of Urban Affairs, the United Nations Center for Human Settlements initiated a training program that organized and enabled women and schoolchildren to improve their living environments.

Since 1987 the "Community Participation for Human Settlements" training program in Bolivia has helped 103 low-income communities to build or upgrade and maintain their homes. This United Nations Center for Human Settlements-HABITAT program is carried out in coordination with Bolivia's Ministry of Urban Affairs and targets women and young people for participation in self-help building projects. The plots of land where the people have built their homes do not always provide a safe and healthy living environment. They often lack basic services like clean water supplies and refuse disposal. In some areas, a lack of trees and other vegetation exacerbates problems: in the dry season the air is choked with dust; in the wet season, the streets are seas of mud.

Faced with these circumstances, women have organized to improve their environment with the help of the UNCHS-HABITAT training program. This program provides practical skills training and brings together the community and the appropriate authorities for the provision of services. Training activities include sensitization and practical skills training in topics such as: the links between hygiene in the home and preventable diseases; the maintenance and safe use of dwellings; the productive use of the family garden; tree-planting for shelter and the reduction of dust pollution; and the protection and maintenance of the water supply. Non-formal educational techniques are used to get the messages across. Through a process of group analysis, program participants develop a plan of action to collectively improve the use of their homes and family gardens, install and maintain clean water supply systems, obtain regular waste disposal, etc. To date, 7,397 community members (49% of them women) have participated in one of 245 training workshops. The program also targets young people, who are effective attitude changers within their families: a 1990 campaign organized through the schools and implemented by 14 women teachers helped 7,000 children to understand the link between health, housing and hygiene practices.

As a result of the project, inhospitable living spaces have been converted to developing communities which have the capacity to maintain their own services. Fifty percent of the new neighborhoods have obtained a clean water supply and 50% have obtained rubbish collection. Communities have initiated tree-planting campaigns and other neighborhood improvement activities. Women are better informed and equipped to intervene in the improvement and preservation of their dwellings and immediate environment, and in the control and management of services. This guarantees that services are well maintained and that the planning of the neighborhood meets women's needs.

**Postscript:** To date, the training program has assisted 103 low-income communities to improve the use of their homes and family gardens, install and maintain water supplies, secure rubbish disposal, etc., through self-help and collective action. Women in particular are now better informed and equipped to improve their environment.

## SUCCESS STORY: Haitian Women Farmers Adopt Soil Conservation Techniques and Recuperate Their Land

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**Subject:** EFS

**Problem:** Madèk village in Haiti was experiencing soil erosion. A farmer leader working in Madèk for the PADF *Pwojè Pyebwa* program had focused his efforts on encouraging the men to adopt soil conservation methods, to no avail.

**Solution:** The farmer leader approached a small group of women whom he had observed caring for their vegetable gardens, and he shared his knowledge of soil and water conservation methods with them.

Since 1981 the Pan American Development Foundation (PADF) Region I has worked with farmers in southwest Haiti on soil conservation techniques, including the plantation of fast-growing trees as erosion barriers. The goal of PADF's *Pwojè Pyebwa* or Tree Growing Project is to recover degraded gardens and build new fields suitable for food crops. Daniele Mangonès Dejean is the Training Coordinator for this program, which has assisted a number of villages, including Madèk. Like other villages in the region, Madèk was experiencing serious soil erosion. For several seasons a farmer leader (or animator) in PADF's agroforestry project tried in vain to motivate male farmers in Madèk to adopt soil conservation methods.

The farmer leader decided in 1990 to approach a small group of women farmers whom he had observed caring for small vegetable gardens. He used a participatory approach and elicited the women's perceptions regarding the environment. In the course of this exchange, solutions were sought and decisions made to use or not to use soil conservation methods. The women immediately displayed interest in and devotion to these techniques. They enrolled in training programs and began to apply soil conservation methods in their gardens, working cooperatively to improve each woman's land in turn. They established living hedgerows along hill contours with fast-growing wood species and grasses; dug water channels above the hedges to increase the soil's moisture infiltration and to slow erosion; and treated ravines with gully plugs, using rocks or cuttings to cut the force of rainwater runoff and trap topsoil. As they began to notice soil recuperation, the women, on their own, began to motivate other women to adopt these techniques. They also pooled their resources and bought maize to grow and resell at a profit. With that profit they established a rotating credit scheme whereby each woman in turn could borrow money to purchase vegetable seedlings in order to generate income from her land. The women achieved their success with less than U.S. $2,000 in technical assistance and training. USAID funded tree seedlings and extension through *Pwojè Pyebwa.*

The project's participatory approach has led to many benefits. Rainwater is conserved, soil is saved and agricultural lands are recuperated. Soil builds up in gully plugs, creating new farm land. Living terraces restore exhausted and eroded slopes. Where nitrogen-fixing tree species are used on bench terraces, as living hedges or in gully plug plantings, leaf litter enriches soils. Agricultural output has increased, which improves on-farm nutrition and generates income. Perennials planted for conservation purposes also provide fodder, shade and construction material. Other agroforestry program animators often bring farmers to Madek to see the impressive results that the women accomplished by organizing themselves and working together.

**Postscript:** The women have successfully applied soil conservation techniques in their gardens. The women, on their own, have motivated other women in their village to adopt these techniques of soil and water conservation. The collective savings scheme allows them to generate income from their plots.

## SUCCESS STORY: The Tayrona Park Debate in Colombia

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** EFS

**Problem:** The Government of Colombia had decided to erect a tourist hotel complex in Tayrona National Park. This would result in serious destruction of flora, fauna, coral reefs, an archaeological zone and beautiful natural scenery.

**Solution:** Alegria Fonseca conducted research on the park and the proposed project, mobilized public opinion and then, with public opinion behind her, presented a debate before the Congress of the Republic in order to oppose the development project.

Tayrona Park, located in the north of Colombia, has an area of 12,000 hectares, including 3,000 hectares of marine habitat. Declared a natural reserve in 1969, the park contains more than 100 species of mammals, 70 species of bats and 200 species of birds, including such rare species as the condor and the solitary eagle. It also contains forests and mangroves, a large variety of coral reefs and a cultural archeological zone of indigenous tribal civilization. In 1974 the national government decided to establish a tourist complex complete with luxury hotels within Tayrona Parks. The whole development catered to high-income Colombians and foreigners and was to be financed with an international loan. Furthermore, it would upset the ecological balance in the park and establish a dangerous precedent of destruction that could affect other natural reserves in Colombia.

Alegria Fonseca is the Director of *Fundación Alma*, a well-known Colombian nongovernmental organization dedicated to defending the environment. She is also a member of Colombia's House of Representatives. In that capacity, she initiated a 16-month research effort with a team of 10 experts. This included a field investigation to gather data on the park and a study of all the governmental documentation related to the project. During this time, she also worked with a team of five journalists who used various media of communication to direct public opinion and mobilize the citizenry. After this preparatory work, Ms. Fonseca presented a public debate in the Congress of the Republic in order to defend Tayrona Park, at which various government ministers and all the entities compromised by the tourist hotel development were cited. In the debate she confronted numerous members of the ruling class and the many members of Congress who defended the government project. This was the first "ecological debate" ever given in the Congress of the Republic of Colombia, and it counted on the support of various universities and national and international environmental organizations, and on public opinion. The debate succeeded in creating a hostile environment for the development project and resulted in the suspension and finally the revocation of the government resolution. *Fundación Alma* and community support covered the costs of the 100,000 peso campaign.

Ms. Fonseca's successful campaign to preserve Tayrona Park resulted in the protection of a megadiversity site and increased environmental awareness; however, interests opposed to the natural reserve have continued to threaten Tayrona Park. Thus, from 1974 until the present, she has had to continue defending the park. For example, in 1990 she had to reinitiate the "Tayrona Debate" in order to prevent the construction of a port in one of the park's bays. The project was subsequently canceled.

**Postscript:** The debate provoked the cancellation of the project and the development of conservation and educational activities in the zone. It also increased environmental awareness and served as a point of departure for development of a national environmental policy.

## SUCCESS STORY: Environmentally-Sound Mining in Tropical Forests, Brazil

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**Subject:** EFS

**Problem:** Uncontrolled growth and development within the Amazonian tropical forests was causing massive deforestation and environmental destruction.

**Solution:** A team designed and implemented an environmentally-sound mining project that could be used as a model worldwide.

Tropical forests are being lost at a rate of 50 acres per minute. This is due in part to the unrestricted growth and development of logging and mining projects within the forests. This project demonstrates that with careful planning, a mining project can be environmentally sound. The site of the project was chosen based on suitable geological formations. Ms. De Freitas served as the Environmental Coordinator for the project, headed the office and the campsites, and supervised a team of 46 technicians. This team consisted of an ecologist, a biologist, a regional planner, an architect, a forestry engineer and others responsible for addressing environmental issues during the five-year implementation phase. This implementation phase (1980-85) followed a feasibility study, which was conducted between 1972-74, and a basic design phase, which took place during 1974-80.

In order to preserve the forest habitat, the smallest possible area for the mines was cleared. A mining fine was instituted to promote water pollution control, a major issue due to the heavy rainy season. Other environmental issues addressed during the implementation phase included technical aspects of mining, compliance with environmental legislation, management of natural resources, research on flora and fauna, archeology and speleology. In addition, the housing, education, health, leisure, and training of the 8,000 employees of the enterprise were considered. Large numbers of individuals in the local community are employed by the mines. Adults and children receive year-round environmental training, and actively participate in monitoring local environmental conditions.

The cost of the implementation phase of the project was U.S. $3 billion. The sources of funding for the project were the CVRD Mining Company and the Development Bank of Brazil (56%), the World Bank (10%), the European Community (20%), and Japanese funders (14%). The operational phase of the project began in 1985. The mine is currently producing iron ore and manganese. Its yearly iron production level is 35 million tons. Pilot activities for mining copper and gold are now underway. The project has also demonstrated that preventative and proactive measures are less costly than corrective ones.

**Postscript:** The project has reduced the impact of growth and development on the tropical forests by taking a proactive approach to problems.

## SUCCESS STORY: Agroforestry and Income Generation Among Indigenous Women in Colombia

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**Subject:** EFS

**Problem:** Destruction of the environment and culture in the Colombian Middle Pacific has occurred due to "development projects" such as the building of big dams and roads without concern for the environment.

**Solution:** An education program consisting of workshops and seminars was carried out in the region to inform grassroots groups about sustainable agroforestry techniques.

Cultural erosion and environmental deterioration have been caused in the Colombian Middle Pacific region by over-exploitation of natural resources and ecosystems. The region has experienced massive deforestation of valuable trees, gold and platinum mining, the construction of dams and spontaneous colonization promoted by the opening of roads and paths. Two factors presently pose emergency situations: the impacts caused by the opening of a road connecting the Bajo Calima area with the sea through the rain forest, and the cholera epidemic which has started to decimate the population. Government agencies, national and multinational companies, and small groups of individuals are all responsible for the environmental destruction. Bajo Calima is particularly sensitive, because it is one of the most biodiverse areas on the planet.

Legeia Gonzalez, Project Manager for the Foundation for the Research and Protection of Environment, organized workshops, seminars and other activities for grassroots groups in the region. The project taught these groups about environmentally-safe technologies and systems. Indigenous and Afro-Colombian women used agroforestry techniques to produce income for themselves and for the community. The project implementors have increased the production of tetera as well as other fibers used as raw material for woven baskets. At the beginning of the project, the community had small plots planted with tetera. There are currently six hectares planted with approximately 30,000 plants per hectare. This will provide the community with enough wild fiber for production of woven baskets as well as for the sale of excess tetera to other communities. Women are learning business skills so they can increase their profit-making potential, and they are taking more active decision-making roles in the community.

The most beneficial environmental impact of this project is the identification of alternative and ecologically feasible ways to improve the income of people living in the rain forest. The project encompasses both generation of productive activities as well as dissemination of environmental information about the rain forest. The project has introduced environmentally-safe technologies for the solution of basic requirements, e.g. slow sand filters, economic wood stoves, rainwater collection and earthworm culture. The group has received funding from *Fundacion Para La Investigacion Y Proteccion Del Medio Ambiente* (FIPMA) and NORAD (Norway). The approximate budget is U.S. $800,000 for five years. Currently, the project is planning to introduce the agroforestry products into the international market.

**Postscript:** Women pursued income-generating activities using the new environmentally safe and labor-saving technologies. The communities have learned to use the rain forest as an "extractive reserve" to obtain what they need from the forest without interfering with its basic ecological processes. Ms. Gonzalez received UNEP's 1992 Global 500 Award.

## SUCCESS STORY: Women's Movement of Manizales Conducts Environmental Education in Colombia

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**Subject:** EFS

**Problem:** A lack of environmental knowledge prevents both rural and urban women from using their resources effectively and encourages consumer choices harmful to family health and the environment.

**Solution:** The *Movimiento Mujeres de Manizales* organized and conducted environmental education workshops for rural and urban women at the request of various women's groups and environmental organizations.

The lack of environmental education of the rural and urban population of Colombia, especially among the poor, has led to environmental problems such as deforestation, the exhaustion of water sources, soil degradation and the contamination of water, soils, air and food. In the home, lack of environmental awareness manifests itself in the consumption of food with chemical additives, the use of cleaning products containing harmful chemical substances, and inadequate management of household waste, water and energy. Lack of environmental education exacerbates environmental problems and generates health problems that diminish the quality of life.

*Movimiento Mujeres de Manizales* (MMM) is a Colombian nongovernmental organization formed in 1980 to promote the participation of women in action research relating to women and their living conditions, and to raise the status of women. MMM consists of 15 women, mostly social science professionals who incorporate the women, environment and development dimensions into their daily work. Since 1988 MMM has carried out an environmental education program. It includes organization of the event "Night of Fire, Night of Woman" as part of the annual International Festival of Theater in Manizales. It also involves the coordination of the workshop "Everyday Ecology," which MMM conducts with both urban and rural women at the request of organized women's groups and environmental organizations. The workshop raises environmental awareness, focusing particularly on the negative health and environmental effects of consumer choices, for example, the consumption of food containing chemical additives and the use of household products containing toxic materials. It uses non-formal educational methods that allow the active participation of the women and that enable the collective construction of strategies to diminish the effects of the eco-crisis. The NGOs that request the workshops and governmental agencies (Corfas, DIR Fund's Rural Woman Program) finance the courses. Maria Nohemy Londoño coordinates the Everyday Ecology Program.

These programs have resulted in a significant change in attitude and behavior concerning the environment, specifically in the adoption of patterns of green consumption, with a preference for natural products at the domestic level. The consumption of natural foods of better nutritional value has produced an improvement in family health. Household savings also result from the preference for foods grown in the home garden. The adequate management of garbage, the adoption of habits of cleanliness and the use of traditional cleaning methods has decreased the consumption of cleaning products containing harsh chemicals.

**Postscript:** The women who participated in the workshop exhibited a marked change in attitudes and habits relating to the environment. In particular, they adopted "green" patterns of consumption and developed a preference for natural products at the domestic level. This resulted in benefits to family health and the environment.

## *SUCCESS STORY:* Rural Program in Environmental Education (PREA) in Nova Friburgo, Brazil

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**Subject:** EFS

**Problem:** Lumiar, a mountainous rural town in Brazil, faces a variety of environmental problems, including water pollution due to untreated sewage and misuse of chemical fertilizers and pesticides.

**Solution:** The Rural Program in Environmental Education (PREA) organized efforts to educate and mobilize the community on a variety of environmental issues.

Lumiar is a mountainous rural town in the state of Rio de Janeiro, Brazil. It has a population of 800 families, most of whom are subsistence farmers. Population pressures have led to encroachment on native forests by slash-and-burn farming. Lumiar also faces major land erosion problems provoked by the use of conventional farm technologies. Moreover, the town faces serious water pollution problems in its river due to untreated sewage and the misuse of chemical fertilizers and pesticides.

Maria do Socorro Magalhàes is the coordinator of PREA, the Rural Program for Environmental Education. Active since 1988, PREA operates out of Lumiar with a core group of five people, four of them women. PREA works with local NGOs and community leaders to promote sustainable development and to address Lumiar's environmental problems through its four areas of work: rural communication, organic farming, environmental education and environmental technology.

PREA hosts a weekly radio program called *Trocando Ideias*, which covers environmental issues, dealing with problems such as pesticides, erosion, waste disposal, water pollution, etc., on an informal community station in Lumiar. The station broadcasts to 12 rural communities in a radius of 16 km., with a potential audience of 4,000. PREA organizes field trips with researchers, forms study groups with local technical staff, hold meetings with small farmers and community residents on environmental problems and solutions. Educational work with local farmers has reduced chemical and pesticide use and promoted sustainable farming practices. PREA works to encourage residents to install septic tanks, stop waste dumping along waterways, and to compost and recycle their household waste. In addition, PREA participates in the "Farm Yard" project at the local high school where it is responsible for two afternoons a week of classes and activities involving vermicompost and an agroforestry nursery.

In its community outreach work, PREA has empowered women, who have been excluded from traditional power structures, to play an active role in finding concrete solutions to environmental problems. PREA's activities have raised awareness and increased local activism on environmental concerns. Under Ms. Magalhàes' leadership, PREA has been successful in forging community networks to solve environmental problems. PREA has been supported financially by Christian Aid (UK), SACTES (German Technical Educational and Social Cooperation Service and Solideridad (Holland).

**Postscript:** Environmental education programs have been established on the radio, in the local high school and in the community. Women have become more involved in environmental management.

## SUCCESS STORY: *Fundacao PRO-TAMAR* Sea Turtle Conservation Program - Restoration of Biodiversity in Brazil

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**Subject:** EFS

**Problem:** The local community's lack of economic alternatives and lack of knowledge about the importance of marine turtles was contributing to the extinction of the species and loss of biodiversity.

**Solution:** Through the Sea Turtle Conservation Program, environmental education and conservation ideas were taught from 14 different stations along 700 kilometers of beach, where alternative economic resources were developed as well.

The local people of the northeast and north beach communities had very little understanding of the effects their actions were having on the marine turtles and on the biodiversity of coastal Brazil. They also did not perceive the need to develop alternatives to earning their living by hunting turtles and gathering their eggs.

In order to remedy the situation, the Brazilian Sea Turtle Conservation Program was created in 1980. Maria Marcovaldi is the Director of *Fundacao PRO-TAMAR*, a nongovernmental organization created for sea turtle conservation. She has been working for the organization since it began. The PRO-TAMAR program has 14 different stations along 700 kilometers of beach to manage coastal and marine resources and species such as turtles. At least one team member lives at each station. The team member is there to teach conservation in the local communities and to help community members with whatever they need. The less expensive methodology first implemented to save turtle nests and eggs was the transfer of sea turtle eggs to protected beach hatcheries. Now, in most of the stations, the eggs are marked in their original places. The estimated cost of the project is U.S. $800,000 per year. The group has been raising funds from the Brazilian Government, from private enterprises and from the sale of t-shirts, buttons, books, etc. It receives some funding from World Wildlife Fund-U.S.

The prevention of poaching was the most important goal of the program, and no poaching incidents have been recorded. The beaches and islands covered by the program are now safe zones for turtles. Female turtles that come onto the beach to nest are protected. Along with the education effort, alternative methods of economic stability were sought to allow the people to implement the new conservation concepts they were learning about. Eco-tourism is just beginning in this area. It is very important, because it benefits local people and would be considered a strong economic alternative. In addition, it helps the Sea Turtle Conservation Program to raise funds. It is hoped that with more knowledge and alternatives to the old way of surviving, the community will be able to live in better harmony with the local environment. This should help with the preservation of the marine turtles and, more generally, help maintain the biodiversity of the area.

**Postscript:** Community members now have a greater understanding of conservation and environmental principles and of the environmental effects of ignoring these principles. They are looking into eco-tourism as a new economic alternative.

## SUCCESS STORY: Small Farmers' Organizations Promote Preservation of Local Flora By Increasing Awareness of Their Medical Value, Brazil

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**Subject:** EFS

**Problem:** Many plant species with medicinal value were close to extinction, and the indigenous knowledge of the use of these plants was being lost.

**Solution:** A group of women agriculturalists conducted research which examined the use and properties of various indigenous species of medicinal plants. They then organized monthly meetings of rural women to share information about the use of these plants.

Brazil has a wealth of plant species. Traditionally, people that live in the Brazilian countryside had extensive knowledge of the medicinal use of plants. With the popularization of chemical remedies in the last 30 years, however, much knowledge has been forgotten. As a result, people are unaware of the value of many plants. In addition, medicinal plants used in the past have started to disappear due to habitat destruction.

The Association of Small Farmers in Turvo, Paraná State, like most small farmers' organizations in Brazil, attempts to enhance the poor health conditions in its rural communities. In 1983 a group of women agriculturalists with the association visited women in the communities to identify their most serious problem. Those interviewed identified health as their main concern, so the group began a study. They found that women used medicinal plants to treat family health problems 70% of the time. The work group organized a medicinal plant recipe contest. Many recipes were brought forth, and the utility of many local plants was discovered. The team then consulted literature and experts in order to validate the information gathered and organized meetings in the communities to discuss medicinal plants and improve their usage. Many women in other communities expressed interest in this information. In order to facilitate knowledge dissemination, the Health Commission (HC) was created in 1988. A representative from each community attends monthly meetings of the HC and learns about medicinal plants and other topics, and then shares this information with her community. These activities cost about U.S. $10,000/year per municipality. Many syndicates and associations of small farmers from other cities in the Central Region of Paraná State have begun similar programs. A Health Regional Commission (HRC) composed of municipal coordinators has been created to coordinate the medicinal plant activities of these syndicates and associations.

Over 110 groups or a total of 2,770 women have participated in the monthly meetings and in this way gained access to low-cost health remedies. Appreciation of the medicinal value of over 60 plant species has spread, increasing awareness of the importance of flora preservation. HRC has initiated a project to conduct botanic classification of medicinal plants and to train women in the communities to identify and cultivate those species threatened with extinction. Funding constraints limit the development of these activities, however.

**Postscript:** Environmental consciousness was raised, especially on the importance of preserving the flora. Data was gathered on the status and utility of 60 plant species. Women's groups were strengthened and networks developed. Rural women gained access to low-cost health remedies.

## SUCCESS STORY: Club de Madres Revives Traditional Farming Practices and Preserves Native Seed Stocks

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**Subject:** EFS

**Problem:** Government food-support programs in an Andean settlement had led to a loss of traditional farming practices. This was causing malnutrition, soil erosion and the dwindling of native seed stocks.

**Solution:** Starting with a small plot of land and using native seeds and traditional farming methods, the women were encouraged to cultivate vegetables using environmentally-friendly practices.

*El Caserio de Caruaquero* is a small settlement located in the Andean Mountains in Cajamarca, Peru. The inhabitants of this zone are generally dedicated to subsistence agriculture and animal husbandry. In 1986, through a government program, women in *El Caserio de Caruaquero* were organized into *Clubs de Madres* (Mothers' Clubs) and provided with free food. These clubs also offered literacy classes and organized the women in craft production. As they became involved in the clubs, the women stopped cultivating and maintaining their land. This led to native seed stock losses, soil erosion and malnutrition, since their altered diet supplied less protein and energy than their traditional diet.

Socorro Vasquez Muñoz heads the Pilot Project of Andean Ecosystems (PPEA), a United Nations Environment Programme project co-sponsored by the Peruvian Government through the National University of Cajamarca and the Regional Government (RENOM). In January 1989, PPEA initiated a sub-project to conserve local resources and enable the recovery of native seeds in El Caserio de Caruaquero, at the request of the local government. The project promoted the cultivation of vegetables by local women, initially on a small plot of land. These activities were implemented through the cooperation of the *Club de Madres*, which donated the land with which to start the project and organized the work required for vegetable cultivation. Women provided all labor, from land preparation through harvesting of the crops. An agricultural engineer provided technical assistance. The women received vegetable seeds through the project, with the sowing of native seeds receiving top priority. They then began growing a wide variety of vegetables on the small plot of land, using traditional farming methods such as diversified sowing. The good harvest they reaped attracted the attention of more local women, and larger plots of land were cultivated the following year. The plot of land on which the women grow vegetables has increased to 1/2 hectare in 1990. The women's group also acquired 2,000 square meters on which to grow potatoes. At the request of the *Club de Madres*, the project contributed 17 arrobas (~425 pounds) of potato seed to sow in this area. The harvest obtained from these seeds has enabled the women's group to distribute 25 arrobas (~625 pounds) of potato seeds, while returning a share of the seeds to the project. In this way, the women have obtained their own seeds.

As a result of this UNEP sub-project, which has cost U.S. $5,000 to date, women in the area are again able to feed their families and to take care of their own nutritional needs. The soil is being cultivated in an environmentally-sound manner, and the local seed stock is being maintained and increased. In addition, the women have begun to revive their knowledge of small farm management.

**Postscript:** Each year the plots planted for vegetable cultivation are expanding and attracting more community involvement. As a result of the project, women are better able to meet their own nutritional needs, maintain an ecological balance within their environment and ensure a renewable stock of local seeds.

## SUCCESS STORY: PROE Helps Peasant Families in Mexico to Use Ecotechniques and Appropriate Technology on their Farms

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**Subject:** EFS

**Problem:** Poor farming and cultivation methods, inadequate waste management and insufficient use of alternative sources of energy has led to an agricultural crisis and increased pollution of the environment.

**Solution:** PROE helped rural people to establish *Conjuntos Ecologicos Autosuficientes* (Self-sufficient Ecological Units or COEAs) on their farms. This appropriate technology permits the integrated use of natural resources and energy sources.

In many rural areas of Mexico, frequent agricultural shortages have kept most peasant families in poverty. Poor farming methods, lack of waste management and insufficient use of alternative sources of energy are contaminating the air and the soil.

*Promocion Ecologica Campesina, A.C.* (PROE), a Mexican nongovernmental organization, was formed in November 1980 to promote the use of self-sufficient ecological units or COEAs (*Conjuntos Ecologicos Autosuficientes*) in rural areas, and in this way promote sustainable, self-sufficient and environmentally friendly development. The objective of COEA is to obtain an integrated use of available energy in the peasant's environment through the use of ecological techniques and adapted technologies that permit the integration of several energetic systems. COEA relies on seven open systems that enable the peasant family to meet basic needs and generate income. For example, one system enables the collection and storage of rainwater. Another system raises chickens and rabbits together to take advantage of their complementarity. The SUTRANE system (Unit system of Treatment and Reuse of Water Nutrients and Energy) makes possible the usage and recovery of domestic wastewaters; for example, by using enriched water to irrigate vegetable gardens. A team of four people from PROE introduced COEAs on 25 farms in Muñoztlan, Tlaxc. Maria del Carmen Olivera, a biologist, was a key member of this team. She served the project as a researcher, technical-scientific coordinator, advisor and trainer. The Interamerican Foundation and the National Housing Fund (FONHAPO) helped finance the construction of the COEAs.

The program has been successful in many areas. On the economic level, given adequate management, COEA investment costs are recovered within two and a half years. Also, more abundant food crops have brought surplus to the peasant communities, thereby improving their quality of life. Diversification of food crops has improved nutritional intake and thus the health of the community. Pollution has been reduced through proper management of natural resources (particularly fresh water) and organic wastes. Perhaps the greatest environmental impact resulted from the introduction of SUTRANE , which prevented environmental contamination due to waste. The COEAs implemented in Muñoztlan, Tlaxc. are serving as a demonstration center not only at the local level, but also at the state and national levels: the project has received 6,500 visitors and has trained 347 persons from different institutions, regions, professions, etc. with the object of disseminating the technologies. PROE also conducts research and advises and consults at the regional and national level.

**Postscript:** The new approach linking agriculture and the environment improved the participants' food production, health status and quality of life. For example, the SUTRANE system prevents wastewater generated at the farm level from contaminating the environment. COEA technology is being disseminated to other regions in Mexico.

## SUCCESS STORY: Woman Spearheads Campaign Against Destruction of the Amazon, Brazil

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**Subject:** EFS

**Problem:** Use of chemical herbicides to clear forest in the Amazon for the Tucurui Dam, the largest dam ever built in a tropical rain forest, is believed to have killed at least 500 people and caused considerable ecological damage. A series of 25 larger dams are planned.

**Solution:** The Brazilian Movement in the Defense of Life (BMDI), under the leadership of Sonia Regina de Burito Pereira, has led the campaign to investigate the charges of chemical use and to save the Amazon from further destruction.

In 1976 the Brazilian State Electric Supply Authority, Electronorte constructed the largest dam ever built in a tropical rain forest, the Tucururi Dam. The Tucurui Dam is one of a series of dam projects, 25 in all, to be built in the Amazon basin to provide electricity to power industrial development downstream. There is evidence that chemical herbicides were used to kill vast areas of the forest in the 2,432 square kilometer reservoir of the Tucurui Dam. It is alleged that the two firms hired to clear the area, Agromax and Capemi, used Dordon 101BR and Dordon 155 supplied by the Dow Chemical Company or a dioxin similar to the "Agent Orange" manufactured by Dow Chemical and used as a defoliant in the Vietnam War. The chemicals have endangered the families downstream along the Tocantines River and have caused great ecological damage. It is believed that the chemicals used are responsible for at least 500 deaths.

In 1983 investigations were started after crops failed and cattle began dying. Police began a survey of local families to find out who had died or was ill. Several exhumations and autopsies were ordered. Soon afterwards though, the investigations were halted, access to the area was cut off and the scheduled date for flooding of the reservoir area was brought forward. Ms. Sonia Pereira, an environmental lawyer and president of the Brazilian Movement in Defense of Life, believes there is a cover-up. Ms. Pereira has been in the forefront of the campaign to preserve the Amazon. BMDI has worked with the Asia-Pacific People's environment Network (APPEN), *Sahabat Alam Malaysia* (SAM) and other organizations to stop the deforestation and destruction of the Amazon. In September 1985, the coalition of environmental groups observed Tucurui Solidarity Day in order to raise awareness about events surrounding the Tucurui Dam.

Ms. Pereira has taken Electronorte to court, charging them with genocide and violations of numerous state and federal civil, criminal, human rights and environmental laws. She has traveled to Nairobi to tell United Nations authorities of this ecological disaster she believes is being covered up. Ms. Pereira's efforts have brought worldwide attention to the endangered Amazon forest and to the plight of the indigenous populations as well.

**Postscript:** There is an increased awareness about the Amazon and the activities endangering the forest and the indigenous way of life. Ms. Pereira has taken the case to the Brazilian courts and to the international community by traveling to the United Nations Environment Programme in Nairobi to inform officials of the drastic situation.

## SUCCESS STORY: *Juegos Ecologicos en Los Parques* - Enhancing Children's Attitudes Towards the Environment

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**Subject:** EFS

**Problem:** There was a lack of environmental education programs for children. Children in Venezuela generally do not have access to green spaces where they can spend their free time.

**Solution:** Maritza Pulido Santana founded an education program called *Juegos Ecologicos en Los Parques* (Ecological Games in the Parks) to promote environmental awareness among children.

During the 20th century, the main Venezuelan cities experienced a rapid growth rate, with disordered urban and industrial development. Population density has dramatically increased in these cities. Open spaces and recreational places are scarce, and many of these areas are converted to more profitable commercial and urban development uses. Most children and teenagers spend their free time playing or talking in the streets, competing for space with automobiles and trucks. In this environment, the youngsters are introduced to cigarettes, alcoholic beverages and drugs. Citizens are starting to realize the importance of open places and parks in conjunction with children's free time.

*Juegos Ecologicos en Los Parques* (Ecological Games in the Parks) is a Venezuelan program started in 1979. This program, based on Maritza Santana's knowledge of nature, has put in practice a creative and innovative way for children to play and enjoy their free time. This 10-year Latin American experience demonstrates that the playing approach enhances and reinforces children's values and attitudes toward the environment, society and themselves. *Juegos Ecologicos* is the most important educational and recreational program promoted by the *Instituto Nacional de Parques* (INPARQUES), an official Venezuelan institution that administers the national parks system, natural monuments as well as a nationwide recreation parks network. With *Juegos Ecologicos*, INPARQUES aims to enhance the use of the areas under its administration as a permanent resource for environmental education.

*Juegos Ecologicos* is a five-week vacation program for children 5-12 years old. The goals of the program are: 1) to promote children's sensory awareness towards their environment; 2) to encourage children's personal recognition of themselves as important elements of the environment; 3) to foster cooperation as a basic means for improving the condition of the environment; and 4) to impart necessary skills for understanding natural systems and environmental problem solving.

*Juegos Ecologicos* started as a pilot project in the *Parque del Este*, Caracas in August 1979 with 50 children. Since then, the number of participants has increased by leaps and bounds, inducing INPARQUES to extend the program nationwide in 1982. The program has reached a total of 16,000 children, and now takes place in 15 recreational parks with 3,000 children. It is hoped that other parks can be incorporated progressively. The organizers of the program believe that an educational program focused on children can accomplish a change of people's attitudes and values towards the natural and social environment.

**Postscript:** The program has involved more than 16,000 children from 15 cities around Venezuela and has succeeded in increasing children's sensitivity towards nature.

## SUCCESS STORY: Coordination of Successful Campaign Against Holding TransAmazonic Road Rally, Venezuela

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**Subject:** EFS

**Problem:** A proposed TransAmazonic Rally (a massive car race) would have negatively affected the ecosystems of the Great Savannah and of the Canaima National Park. The publicity would have negatively affected environmental awareness.

**Solution:** In January 1987, a massive campaign by environmental groups was organized to prevent the government agencies and the powerful international corporate sponsors from carrying out their plan for the rally.

The Gran Sabana, bounded by Brazil on the south and Guyana on the east, is one of the few remaining pristine and unspoiled wilderness areas on the planet. The Grand Sabana is a watershed which feeds the Caroni River. It is an inexhaustible source of water and its genetic heritage is unmatched in any other part of the world. In spite of the Guri Dam, one of the largest in the world, a symbiotic convergence of ecological and economical interest now favors the preservation of the Gran Sabana, as well as the preservation of the Canaima National Park and the basin of the Caroni River in the Venezuelan Guyana.

On January 31, 1987, a member of the Audubon Society of Venezuela called the Society of Friends in Defense of the Gran Sabana (AmiGranSa) and alerted them to a massive automobile rally planned for the following November. Six hundred vehicles and about 3000 people intended to pass through the Gran Sabana and the Amazon Forest and six other South American countries. AmiGranSa set to work and was able to coordinate research on the rally, formulate strategy, disseminate information to sensitize the public, and focus international attention on the defense of the Gran Sabana. The AmiGranSa document was sent to different ministries, social workers, scientists, political leaders and other government officials. The media publicized the rally's threat to, and incompatibility with, the environmental integrity of the Gran Sabana, including its indigenous populations.

Ms. Scarton and her colleagues at AmiGranSa were able to overcome the powerful national and international economic forces that pressured many government agencies, the media and the public. Armed with well-documented information, the coordinators were able to enlist the help of environmental groups and ordinary citizens to put pressure on the Ministry of the Environment, the Council of Ministers, and the President of Venezuela to ban the rally. In January 1988, the Venezuelan Government officially banned the rally from passing through Venezuelan territory. In a gesture of international solidarity, the environmentalists sent all the information on the banning of the rally to Brazilian environmental groups and to officials of the Brazilian Government. The environmental coalition opposed to the Paris-Dakar Rally in Paris also mobilized its contacts in Brazil. Brazil subsequently also banned the rally from passing through its territory.

**Postscript:** The creation of the Coalition of Environmental Groups Against the Rally was a successful international effort. In January 1988, the government of Venezuela decided to ban the rally. Brazil also decided to ban the rally from any area in its territory.

## SUCCESS STORY: The Women of the Kallawaya Culture in Bolivia Work to Preserve their Culture and Ecologically Sound Lifestyle

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**Subject:** EFS

**Problem:** Development poses serious threats to the lifestyle of the traditional Kallawaya culture in Bolivia. The Kallawaya culture faces possible extinction.

**Solution:** *Tarpuymita* is implementing a holistic project to save the Kallawaya culture from extinction, halt desertification, prevent ecological damage, increase productivity by applying traditional farming methods and stop acculturization.

The Kallawaya culture in Bolivia predates the Spanish colonial and Inca Empire periods. It has survived thanks to cultural coherence, sound ecological practices and the difficult accessibility of the territory. The culture seeks to strike a balance between humans, Earth and the cosmos. This balance is reflected in all aspects of their lifestyle: terrace cultivation to prevent soil erosion, the use of natural fertilizers, the protection of plants to preserve biodiversity, and the use of nondestructive farming equipment and natural dyes. Kallawaya women provide a principle axis in maintaining this balance, because they hold the knowledge of the culture which they pass from generation to generation. The culture has survived in a silent struggle for 500 years, but the traditional ecological lifestyle of the Kallawaya faces extinction from acculturization processes. Threats to their lifestyle include irrigation system destruction, the use of chemicals in farming, crop substitution and the introduction of depredating animals and crops.

Dr. Torres recognized the plight of the Kallawaya people and devised a plan to accomplish the goal of rescuing and perpetuating the Kallawaya culture through work in seven areas: environment, agronomy, medicine, human settlements, education and communication and socio-culture. The project is divided into three stages. The first stage focuses on gathering information, field diagnosis and project elaboration. The second stage deals with project implementation. The third stage is concerned with the support of sustained ecodevelopment of the culture. The direct participants are the Kallawaya communities and a five-person multidisciplinary group *Tarpuymita* (Time to Sow). Most members of the group also belong to the PRODENA-Association in Defense of Nature. The first stage cost approximately U.S. $118,000. The participants financed the activities.

Women in particular have been playing a key role in implementing the project, since they are already involved in practicing and transmitting all aspects of an ecological lifestyle. In the agricultural realm, they are involved in terrace cropping, highly nutritious crop production, seed selection and improvement, climate prediction and use of natural fertilizers. They are also in charge of irrigation systems. To date, the project has awakened the community's conscience to the need for preservation of both their culture and environment in order for their region to develop in an ecologically sound way. The initial steps have been taken to obtain Cultural Heritage Status from UNESCO and Protected Area Status from the Bolivian Government for the Kalinga region.

**Postscript:** The project is now focused on traditional medicinal production, recognizing the dual needs of cultivation and preservation of biodiversity. The second area of focus is on textile art using traditional methods with natural dyes and llama wool. The projects are providing an additional income to local families.

## SUCCESS STORY: PRONATURA Helps Children in Paraguay to Become "Guardians of Nature"

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** EFS

**Problem:** Desertification was a problem in Paraguay, in part due to the indiscriminate burning of forests by wealthy landowners for agricultural "progress" and cattle grazing. Trees and debris dumped into riverbeds created pollution and blocked water flow.

**Solution:** PRONATURA established "Guardians of Nature" clubs for schoolchildren. Through extracurricular activities, members increase their environmental awareness and improve the environment. For example, they plant 1,000 trees annually.

Destruction of forested areas, initially by Brazilians and later by both Brazilians and Paraguayans, has denuded the green areas of Paraguay. This has led to desertification, soil erosion, and pollution and blockage of rivers.

In 1976 a group of professional Paraguayan women founded PRONATURA, an association dedicated to the protection of nature. Dr. Rosa M. Villamayor led the founding group and continues to actively participate in the management and implementation of PRONATURA's various programs. One of the group's most successful initiatives has been its Guardians of Nature program. This program organizes children aged 9 to 16 into Guardians of Nature clubs. Guardians of Nature act individually and collectively to prevent environmental degradation. To date, the program has established 45 groups in schools in the Trinidad, Fernando de la Mora and Capiata zones. These groups consist of 15 members each and are located in both urban and more rural areas. They participate in environmentally related extracurricular activities, attending weekly classes, going on camping trips, learning to design and produce information materials, and planting and caring for trees. Teachers, principals, mothers and university students support the clubs. In-kind contributions such as manure, transportation and protective fencing for trees help fund the program. The Municipality and the Forestry Service contribute 1000 trees each year, which the children and young people plant along avenues, streets, public squares, schools, river beds, creeks, etc. PRONATURA is currently implementing a U.S. $45,000 project to strengthen the Guardians of Nature through improvements in infrastructure and equipment. This will allow the program to expand and thus increase its positive impact on the environment.

After 15 years, the results are encouraging. Trees planted by the Guardians of Nature have checked soil erosion, particularly during the heavy rainy season. They also protect the riverbeds and allow the river waters to flow again. Environmental awareness has increased among the participants and in the community at large. Several adult environmentalists owe their interest to the training they received in school through the Guardians of Nature. In 1987 UNEP honored the Guardians of Nature with the Global 500 Award. It is the only Paraguayan institution supported by the efforts of children and young people that is internationally known for its work in defense of natural resources. PRONATURA is still far from reaching its goal of planting one million trees, however. Also, new environmental threats such as the massive destruction of forests by landowners keen to avoid government distribution of their unused land create new challenges.

**Postscript:** Desertification has diminished, green areas have increased and soil erosion in these semi-rural areas has been checked. Environmental awareness has increased. A number of adults who participated in the Guardians of Nature as schoolchildren have chosen careers in the environmental field.

## SUCCESS STORY: Solar Cookers For Haiti

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**Subject:** Energy

**Problem:** Deforestation is a problem partly due to the high demand for cooking fuel.

**Solution:** The introduction of solar cookers helps alleviate the need for wood and charcoal.

Deforestation on the island of Haiti is a major problem, since wood is the major source of fuel for cooking. The entire country is very affected by this situation, but the worst off are the poorer families who must buy charcoal in order to cook their meals. This forces them to spend money that could otherwise be used to meet health, nutrition and other needs.

Mme. Gerda Bien Aime saw the idea of solar cooking as a way to help alleviate the problem of deforestation by utilizing the energy of the sun as a source of cooking fuel. Her project was initiated in May 1987 and is ongoing. It was financed by her partner, who is from Powell River in Canada, and the Haitian Government. The first phase of the project cost approximately US$ 1,600. The second phase, which will include the creation of a workshop on solar cooking and the popularization and experimentation on a national scale, will cost about U.S. $50,000. The fixed price as well as the method of payment will be determined by the interested parties during the course of the second and third phases of the project.

This project began as the result of a "twinning" program initiated in October 1985 between the cities of Saint Marc and Powell River. The purpose of the "twinning" program is to unite the people of different cities in a work partnership in order to study the future prospects for their respective countries. To introduce the idea of the solar cooker and demonstrate its benefits to the general population, Mme. Bien Aime and her committee held solar cooker demonstrations at schools in the area. Several large contests were held to help promote the idea as well. The project's current focus is to introduce the cookers into households and teach women how to cook with them. The principal barriers they need to overcome are the practical difficulties of adapting traditional food preparation methods to solar cookers.

A major advantage of solar energy is that as more people get used to using the solar cooker, the demand for wood on the island will be dramatically reduced. Deforestation is a major problem on the island, and while there are a variety of reforestation efforts underway, the demand for wood greatly exceeds these efforts. It is also hoped that as families are able to spend less money on fuel, they will have more disposable income which they can then direct to their other needs.

**Postscript:** As the need for wood and charcoal declines due to increased use of solar cookers, the effects of reforestation efforts are becoming more noticeable. Families are able to spend less money on fuel, thus increasing their disposable income.

## SUCCESS STORY: Ecuadoran Institute for the Research and Training of Women (IECAIM) Decreases Rural Women's Demand for Fuelwood

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Energy

**Problem:** The demand for fuelwood in the rural areas of Ecuador is increasing the rate of deforestation. This adversely affects the local ecology and creates hardships for women forced to travel great distances to find fuelwood for their cooking needs.

**Solution:** IECAIM (Ecuadoran Institute for the Research and Training of Women) initiated a program that trains rural women on new and renewable sources of energy. Women learned how to construct energy-conserving stoves and other simple devices.

In the rural areas of Ecuador, fuelwood shortages are contributing to deforestation and are creating hardships for rural women. Women are forced to waste their time, health and energy in the daily search for fuelwood, a search which often requires traveling long distances.

IECAIM is a national focal point of INSTRAW (the United Nations' International Institute of Research and Training for the Promotion of Women). Fabiola Cuvi Ortiz directs this autonomous national organization founded in 1986. In August 1989, IECAIM initiated a training program for rural women designed to provide a practical solution to the problem of deforestation in Ecuador's countryside. In collaboration with INSTRAW and INE (the National Institute of Energy), IECAIM conducts training courses for rural women that enable them to utilize new sources of energy in their agricultural and household tasks. The participants, rural women belonging to the *comunas campesinas* or peasant cooperatives, are instructed in the use of alternative energy sources (solar, biomass, geothermal, etc.) Participants also learn how to construct simple devices that save energy and/or utilize alternative energy sources. These include an energy-conserving stove that can use fuelwood, biomass, charcoal or other combustibles; a grain dryer based on solar and wind energy, and solar devices for the heating of water and the dwelling. Civil servants from IECAIM and the INE, representatives of landowners and members of NGOs help organize and teach the courses, which cost approximately US$100 a day. The program is funded by the Ecuadoran Government (through IECAIM and INE), the surrounding land-and-cattle ranches and NGOs from each rural sector selected for participation in the course.

To date, 70 rural women have participated in the training program. As a result, they have access to improved stoves and grain dryers. The new stoves save fuel and decrease women's exposure to the noxious effects of smoke. The improved grain dryers based on solar and wind energy protect the grains from animals, rain, etc. The use of these devices that conserve fuel or utilize alternative sources of energy decreases the necessity for traveling long distances in search of fuelwood. It also prevents deforestation, which causes so much ecological harm. An additional benefit of the program is the creation of income-generating opportunities for participants, who may eventually earn income by constructing and selling these new devices to other rural women. The IECAIM project is ongoing; however, the lack of financial resources presents an obstacle to the program's expansion.

**Postscript:** The use of devices such as fuel-efficient stoves and solar-based apparatus for heating water alleviates deforestation. It also saves women from wasting their time, health and energy on long treks in search of fuelwood. In addition, the use of improved stoves decreases women's exposure to the harmful effects of smoke.

## SUCCESS STORY: The Women's Solar Oven Group of Oriente in Costa Rica

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**Region:** LATIN AMERICA/CARIBBEAN
**Subject:** Energy

**Problem:** The northern province of Costa Rica faces severe deforestation. Firewood, the primary cooking fuel, is scarce and expensive.

**Solution:** The Women's Solar Oven Group of Oriente was formed to construct solar ovens and high-efficiency wood cooking stoves. The group formed a cooperative to promote and sell high-efficiency wood cooking stoves in their own and nearby communities.

The northern province of Costa Rica, Guanancaste, once covered with woodlands, has been cleared over the years by cattle ranchers and the logging industry. The region has become one of the hottest and driest in the the country. The deforestation is exacerbated by the rural population's dependence on wood as their primary cooking fuel.

Concerned over the scarcity and high cost of firewood, the Women's Solar Oven Group of Oriente formed in 1988 to produce solar ovens. With the help of technical facilitators, two construction workshops took place in 1989 and 1990. Vilma Soto and other members of the Women's Solar Oven Group of Oriente gathered every day for three weeks to learn to saw, hammer and nail, and use planes, clamps and other carpentry tools. Twenty-four women participants built their own solar ovens. In addition, the Varney stove, an inexpensive fuel-efficient wood stove, was introduced in July 1989. The Women's Solar Oven Group decided to undertake the production of the Varney stove as a small group business venture with the donation of a special tool kit and initial working capital in the form of a revolving fund for materials. The first 48 stoves had buyers in the community before they were even constructed. The stove can be constructed in about 15 minutes, using a set of tools that cost about $100. In Costa Rica, the unit cost of manufacturing the stove is $5.00. The women of Oriente sell it for $8.00, using $2.00 from each sale to pay themselves a wage and adding $1.00 to their rotating fund.

Ms. Soto has been active as a community leader for many years. She has led the solar oven and Varney stove projects. She and another woman presented their solar oven experience at the 6th Annual Workshop on Solar Thermal Devices at the National University, Heredia, Costa Rica. In December 1990 the entire group of eight women made a three-day visit to an organization of *campesina* (peasant) women in Acosta, a very poor central region of Costa Rica. Their exchange focused primarily on the solar oven and Varney cook stove, and both these cooking devices are now being promoted in Acosta.

Since forming, the Oriente group has participated in radio programs and used socio-drama to recreate their organizing experience with the solar ovens. Several articles on the group have appeared in both the Spanish and English media. Over 200 stoves have been sold, and consumer demand continues. With part of their proceeds, the women have begun a communal garden where they grow vegetables for their own consumption. Future plans include marketing produce from the communal garden.

**Postscript:** The solar oven project has proved to be an important vehicle not only in terms of organizing and solidifying the women's group, but also in sensitizing the women to issues of health and environment. With solar ovens in their yards and high efficiency wood stoves in their patios, the women have become educators-by-example.

## SUCCESS STORY: Jamaican Solar Cooking Project

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**Region:** LATIN AMERICA/CARIBBEAN
**Subject:** Energy

**Problem:** The cost of cooking gas had skyrocketed in Jamaica and placed a substantial burden on households, given the dire economic condition of the country. People had few alternative fuels and were depleting the forests for firewood.

**Solution:** Claudette Wilmot and others introduced and implemented solar box cooker technology which allows for environmentally sound and inexpensive cooking practices.

There are high economic and ecological costs of fuel use in Kingston, Jamaica. The price of cooking gas has doubled and forests are being depleted for fuelwood. The Ministry of Energy has not encouraged solar energy use because of the expense of solar water heaters, which were sold only with an accompanying "backup" electric water heater. Ms. Wilmot, a teacher at the School of Hope for mentally and physically handicapped students in Kingston, Jamaica, decided to take action. She learned of the solar box cooking technology and obtained a small sum of money from the Jamaica Flour Mills to build and introduce the first cookers into the community.

Ms. Wilmot, along with six handicapped students, one senior handicapped teacher and two other teachers, implemented the project. After receiving the initial grant, students at the School of Hope constructed a number of the boxes and displayed them to leaders of women's and consumer groups and government representatives. Ms. Wilmot began to collaborate with the Women's Bureau (a department of the Ministry of Labour) to develop a series of "do-it-yourself" workshops to teach rural people how to use solar cookers. Two problems that arose were the fear of theft of food left in the boxes in the absence of owners, and the issue raised by the Bureau of Standards, when testing the boxes, that the use of black paint containing lead to coat the outside of cooking pots might be dangerous. (The boxes are black to maximize heating.) Locks were devised for the boxes, and the outside of the boxes were wood-fire "blackened" to avoid the lead paint use. A current campaign is to educate rural women to use the solar box cookers to sterilize drinking water. This is particularly important since in the event of a hurricane or other natural disaster, regular water supplies are disrupted and other sources are frequently contaminated. The project faces financial constraints, and Ms. Wilmot is seeking help from women's groups and elsewhere to cover costs of printing material and demonstrations. The Jamaican entity set up to encourage investments, JAMPRO, has offered assistance in introducing the project to possible investors.

Positive reception of the technology has led to mutual benefits for all: the students at the School of Hope were employed to produce the cookers and the members of the community obtained access to inexpensive cooking technology. The Ministry of Labour has assisted with workshops and educational material and the Ministry of Education has discussed the possibility of including the teaching of solar cooking as part of the school curriculum. The project has received wide publicity and the workshops across the country have gathered "packed houses." Ties between grassroots organizations and government agencies have been strengthened for future collaboration on environmental problems.

**Postscript:** Solar cooker workshops reach the rural people across the country, spreading the word and increasing energy conservation. Handicapped students and their teachers are employed in constructing the solar box cookers. Ties between grassroots organizations and government agencies have been strengthened.

## SUCCESS STORY: The Center for Applied Scientific Studies (CECA) Addresses Both the Ecological and Social Problems at the Chitré Dump, Panama

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**Subject:** Waste

**Problem:** A municipal dump was contaminating the environment, especially the adjacent mangroves. A number of families lived a very marginal existence collecting recyclables from the dump and selling them to exploitative middlemen.

**Solution:** CECA implemented a project that enabled the people, once organized, to improve their recycling activities and that increased their environmental awareness. CECA advised the local government on rational planning and design of waste disposal sites.

The Center for Applied Scientific Studies (CECA) is a Panamanian nongovernmental organization whose membership includes professionals in the environmental field and high school-aged youths. Since 1985 CECA has studied environmental contamination in and around Chitré District (28,000 inhabitants). One of the more problematic local issues was the existence of a municipal dump that discharged waste into the adjacent ecosystems. In particular, the marked contamination of the mangroves and swamps next to the dump threatened the region's main fishery zone. CECA discovered through its research that a social problem also existed due to the presence of 20 marginalized families who collected recyclable materials at the dump and sold them to exploitative middleman. Among this group, which included a number of single mothers, some of the women were engaged in prostitution and some of the young people were taking drugs.

In January 1991, CECA initiated a project to support these people and to remedy the environmental problems caused by the dump. CECA worked closely with these families, who were initially skeptical and suspicious, to gain their confidence in order to analyze the community's problems and find practical solutions. This initial step of gaining the trust of the community was critical for the success of the project. The project works in four areas: improvement of housing and health, rational planning of the dump, correcting impacts on the surrounding ecosystems and marketing of recycled products. The project provides the families with technical assistance, equipment and administrative support to improve the selection and marketing of recyclable materials. CECA provided environmental education for the women and their children. The children were organized into a conservationist group called *Los Mapaches* (The Raccoons), which includes children from well-to-do families, and were given educational talks and taken on outings. CECA also provides environmental education through its publications and weekly radio program. Besides this work, CECA has advised the local government on how to manage spaces dedicated to rubbish disposal in order to minimize negative environmental impacts. A team of four women headed by Raquel C. de Chang implements this U.S. $110,000 project. A U.S. $50,000 grant from the Interamerican Foundation, contributions in kind from CECA and the active participation of beneficiaries fund the program.

The project is improving the quality of life of these marginalized families and remedying environmental problems relating to waste management and disposal. The beneficiaries, previously exploited by middlemen, have increased their volumes by 35%, improved the quality of materials collected and raised their daily income by $2.50 to $5.00 per person. Environmental problems related to the dump have declined.

**Postscript:** The space that the municipality uses to dispose of its refuse has been organized to limit environmental degradation. Black, septic water is no longer poured into the mangroves, and toxic waste is no longer incinerated. The incomes and standard of living of the scavengers has risen. Social re-integration of delinquent children and women forced into prostitution has improved the quality of life.

## SUCCESS STORY: Women Fight Against the Erosion of the Land in Mexico

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** Mexico suffers from massive soil erosion and declining soil productivity. This increases Mexico's dependence on foreign countries for food and accelerates the emigration of rural people to the cities. Chemical fertilizers impoverish the soil.

**Solution:** A group of housewives formed CACRETEM and initiated a campaign in which housewives voluntarily separate their organic waste. CACRETEM collects and uses the organic material to fertilize and enrich agricultural soils.

In February 1974 Mexican newspapers announced that the country had lost 28 million hectares of soil due to erosion. Soil erosion leads to a number of problems, such as an increased dependence on imported food and the acceleration of rural-urban migration. Moreover, the use of chemical fertilizers had impoverished agricultural soils. On the other hand, enriching agricultural soils with organic materials would increase the productivity of the land and prevent erosion.

In 1974 a group of housewives residing in Super Blocks 1 and 2 in Villa Coapa, Tlalpan, México, D.F. formed an organization to combat soil erosion, the *Campaña de Amas de Casa para Regenerar Las Tierras Erosionadas de México* (Housewives' Campaign to Regenerate the Eroded Lands of Mexico) or CACRETEM. Gema Zendejas is the general coordinator of CACRETEM. Under her leadership, CACRETEM mobilized the other women residents to separate the organic waste generated in their homes. Their slogan was "From the Kitchen to the Countryside with Love." They also mobilized the collection and recycling of organic wastes for soil recovery in schools and markets. The watchword was to recover the organic waste to renourish the land. Although CACRETEM did not initially receive much support or cooperation from the government, the local newspaper assisted CACRETEM in its efforts to motivate the 6,000 households in Villa Coapa. In addition, the Director of Agrobiology at the Autonomous University of Chapingo put a soil laboratory at CACRETEM's disposal to enable the group to evaluate the effects of their actions on the soil. In 1982 the growing gravity of ecological problems generated a change in the political line of the government. They opened the doors of mass communication to the project and CACRETEM obtained the support of radio, television, magazines and publications; this enabled the group to diffuse its campaign and initiate a similar movement on the opposite side of the city. In 1988 CACRETEM's activities evolved further with the support of the Delegate of Tlalpan, who put two trucks at their disposal. With these vehicles, CACRETEM transports recyclable inorganic materials to industry and recycled organic material to the countryside in Topilejo, where it fertilizes an experimental land owned by a peasant.

These women were pioneers in the recycling of organic materials in Mexico. CACRETEM was the first movement of housewives whose daily actions were oriented to improving agricultural soils. They not only successfully organized the residents of their own community, but they also served as the catalyst for similar efforts in various zones of Mexico D.F.

**Postscript:** The women successfully mobilized the residents of their community to voluntarily recycle their organic waste and replenish the soil. They also served as the catalyst for similar efforts in various zones of Mexico D.F. and in various communities in the country.

## SUCCESS STORY: Barbados Environmental Association's *Gully Clean* Project Combats Illegal Dumping of Domestic Waste

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**Subject:** Waste

**Problem:** Massive heaps of garbage were illegally dumped by local residents in many of the country's beautiful gullies. One spot in particular had piles of garbage about 30 feet high and 50 feet wide.

**Solution:** The BEA formed a Gully Group consisting of BEA members and other local civic associations to remove an estimated 805 tons of garbage from one of the most notorious illegal dump sites, Jack-in-the-Box Gully.

The gullies of Barbados serve as diverse ecological habitats for flora and fauna. Many Barbadian residents used gullies on the island as dump sites despite a legally mandated penalty for illegal dumping of up to $5,000 (Bds) or 12 months in jail. Massive dumping may damage the nature of the gullies, endangering plant and animal species, as well as inducing soil erosion, sedimentation and flooding. One of the most notorious sites was the Jack-in-the-Box Gully in St. Thomas, where the piles of garbage on both sides of the road were more than 30 feet high and 50 feet wide and extended the length of two cricket pitches. The gully was so filled with garbage that it spilled over the parapet bordering the gully and into the roadway.

The Barbados Environmental Association (BEA), which is directed by an executive committee (73%women), initiated a gully project and formed a Gully Group consisting of representatives from the Barbados Museum and Historical Society, the Barbados National Trust, the Bellairs Research Institute and the Caribbean Conservation Association. They organized a "National Gully Week," during which a series of activities highlighted the plight of polluted gullies and brought the beauty and significance of the gullies to the attention of the public. The Gully Group produced educational posters, gully fact sheets, bumper stickers, radio competitions on gullies, church sermons focusing on the issue, etc. The main message was that illegal dumping was a serious problem and that it was the responsibility of every citizen to practice proper disposal of waste.

The cleanup of Jack-In-The-Box Gully lasted for a three-week period, during which time 805 tons of garbage were removed. All contributions to the cleanup effort were voluntary, and only $200 (Bds) was actually spent by the BEA on the cleanup. Had services and equipment not been provided voluntarily, the actual cost of the cleanup would have been $40,000 (Bds). Now, one year after the project, there are many signs indicating that these efforts have positively affected the Barbadian community. The Jack-in-the-Box gully is garbage free and beautiful. Government, school, community and religious groups are all focusing more on environmental issues such as littering, recycling, illegal dumping and water pollution. As a result, there has been a reduction in illegal dumping, and watersheds are now better protected. Plans are under consideration to investigate the cleanup of other gullies.

**Postscript:** Now, over a year after this cleanup, the gully is still garbage free and community groups are focusing on educating the public about proper waste management practices. Ms. Mahon received UNEP's 1992 Global 500 Award presented on World Environment Day.

## SUCCESS STORY: *FundaGrea* - Controlled Decomposition Systems in Venezuela

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**Subject:** Waste

**Problem:** Many Venezuelan communities lack programs to address the health and environmental problems caused by poor waste management and indiscriminate use of biocides and chemical fertilizers.

**Solution:** *FundaGrea* (Foundation for the Development of Ecological Agriculture, Recycling and Alternative Energy Sources) developed a controlled decomposition project based on local resources, simple technologies and community participation.

In Venezuela, there was widespread pollution and contamination caused by waste and the utilization of toxic products such as pesticides and chemical fertilizers. The problem was partly the result of poor waste management. *FundaGrea* (Foundation for the Development of Ecological Agriculture, Recycling and Alternative Energy Sources) is a Venezuelan nongovernmental organization founded in 1979. Constituted by professionals with experience in ecological agriculture, appropriate technology, nutrition and health, recycling and other areas of general interest, *FundaGrea's* main objective is to facilitate practical and theoretical tools that will enable the satisfaction of basic human needs without environmental deterioration. Azucena Martinez is currently the Director of the nonprofit group.

*FundaGrea* realized the urgent need for a program that would address the health and environmental problems caused by poor waste management and indiscriminate use of biocides and chemical fertilizers. Thus, Ms. Martinez led a group of four in implementing projects which introduced controlled decomposition systems based on aerobic and anaerobic respiration (composting and "biodigestors"). The projects also focused on improving the diet of the community by introducing community vegetable gardens and technology for natural conservation of foodstuffs. To ensure success, the projects were designed to encourage maximum community participation. *FundaGrea* designed a plan that included an initial phase to motivate and sensitize the people in order to generate interest in the activities. Subsequently, strategies were designed to ensure the active participation of community members by implementing activities meaningful to them - in other words, activities that would present practical solutions to their problems. The implementors organized courses, held workshops and carried out simple experimental activities with the community. These activities relied on existing resources in the area and simple technologies in order to ensure their viability and success. An important part of the program design was the inclusion of follow-up activities once management and implementation functions were transferred completely to the community.

The establishment of composting and biodigestors and the increased availability of vegetables greatly improved the health of community members. The activities carried out in connection with recycling, the vegetable gardens and the conservation of foodstuffs also provided dignified ways for unemployed people to earn an income and gave rise to the organization of micro-businesses and cooperatives. The program's source of success was its use of solutions based on simple technologies, active community participation and the reality of local circumstances and existing resources.

**Postscript:** The community's health improved, and the people learned better methods of food cultivation and conservation that brought economic benefits.

## SUCCESS STORY: A New Drainage System for Reino Encantado, Brazil

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** Migration of farm workers from the interior of the state created overcrowding in Reino Encantado and resulted in sanitation and water supply problems. The absence of a drainage system particularly created severe problems.

**Solution:** Community groups were organized and educated about the problems facing Reino Encantado, with the goal of implementing an improved drainage system and paving the area.

Farm workers from the interior of the state of Ceara in Brazil used to migrate in large numbers to the city of Fortaleza to escape drought conditions. They arrived in the area of Reino Encantado and built shanty towns without any infrastructure. This large influx of people created a heavy strain on the scarce resources of the Reino Encantado area, exacerbating existing sanitation and water supply problems. There was an increase in water-borne diseases and respiratory diseases, especially among the young. Building a drainage system to eliminate the presence of standing water in Reino Encantado has been a matter of concern for the past 12 years.

Several organizations, including the Christian Children's Fund (CCF) and AUMEF, an organ of the state government responsible for sewers, drainage and pavement, set up meetings with the local people to discuss the problems. The people came to realize that the community needed to work together to improve the situations they faced. Three associations in particular were instrumental in getting this program underway: *Association Sonho Infantil* (Infant Dream Association), *Lutar para Vencer* (Fight to Win) and *Renascer* (Rebirth). The administrations of these associations are composed exclusively of women, who manage the resources of the the associations with the support of some specialists. The women participate in meetings, training sessions and various other activities. Ms. de Brito Melo plays a leadership role in the sewage project.

A project to install a drainage system was begun in September 1990 and is due for completion in 1992. So far, 1,898 square meters of road have been paved with cobble stones after part of the drainage system was constructed. CCF specialists from the national office in Fortaleza analyzed the plans and the budget, making suggestions, providing follow-up and evaluating the projects. Inspection of the drainage work was delegated to a council of women. The estimated cost of the project is U.S. $81,967. The state treasury financed the project with funds collected through taxes levied on residents of Fortaleza.

Already the effects of the drainage system have been felt: there has been a 30% decrease of respiratory infections, skin disorders, worms, etc., associated with the presence of stagnant water. It is believed that the cases of infant mortality due to respiratory ailments will drop, the cases of parasites and worms will be reduced, and in general, the health of the local population will improve as their access to healthy drinking water improves, and the improved sewage system helps alleviate the sanitation problems.

**Postscript:** A new drainage system is in the process of being installed. There has been a clear improvement in the health and environment of the community.

## SUCCESS STORY: Transforming Waste Into Flowers in Mexico

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**Country:** Mexico

**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** Mexico City is one of the most polluted cities in the world. Much of the solid and liquid waste contaminating the environment is produced by households. Land around Mexico City has been degraded by the use of chemical fertilizers.

**Solution:** The *Grupo de Tecnologia Alternativa* (GTA) joined efforts with a group of 20 families in Mexico City. These families formed a collective land ownership and as a pilot project designed their housing incorporating an integral system of recycling.

In 1983 the *Grupo de Tecnologia Alternativa S.C.* (Alternative Technology Group) joined efforts with a group of 20 families, who were aware and concerned of the environmental and health problems, to implement a pilot project in Mexico City. The families formed a *Condominio* (collective ownership of land) and designed their housing incorporating an integral system of recycling developed by GTA. The recycling unit was built in 1984-85 and has been in operation since 1986. Women have organized waste separation at the home level and water reuse for gardening. With the organic solid waste, they have produced biofertilizer used in their own gardens and in other GTA pilot projects. They are now using the biofertilizer produced by their recycling system in a commercial project producing flowers in Tepji del Rio near Mexico City.

With financing from the IDRC (International Development Research Centre) of Ottowa, Canada, this pilot project served as a research unit during 1989-91. The results of the research done by GTA with IDRC support established the basis of SIRDQ, a Mexican recycling process scientifically different from composting. Compared to composting, the SIRDQ process produces a higher quality biofertilizer, and the system's removal of pathogens is particularly excellent. GTA has obtained a Mexican patent for the SIRDQ recycling process.

The example provided by the pilot project has generated three larger projects around the same area in Tepepan in which 80 more families will be recycling their water and solid waste voluntarily to improve environmental conditions. The experience with this pilot project has increased women's consciousness, not only inside their own environment and surroundings, but also in their work. They are taking the responsibility to encourage other environmental projects with women and children of other neighborhoods. The experience gained in this pilot project will stimulate technological development in Mexico. It will also assist in the establishment of schemes for women's participation in environment and development projects.

**Postscript:** The *Grupo de Tecnologia Alternativa* has helped form an organization, *Comite Tecnicociudadano de Naucalpan* linking more than 24,000 families of varying socioeconomic backgrounds to fight an illegal solid waste landfill in their neighborhood. The community members have received death threats for opposing the landfill but have won the first legal battle. The GTA has proposed alternative solutions based on their pilot project research.

## SUCCESS STORY: Citizen's Group Organizes to Halt the Importation of Contaminated Foodstuffs in Venezuela

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**Subject:** Waste

**Problem:** Food exposed to radioactive fallout, such as food exposed in the Chernobyl accident, was being imported into Venezuela. Radioactive powdered milk was imported in huge quantities from Western Europe for domestic consumption.

**Solution:** A citizens action group was formed to stop the contaminated milk from being processed and distributed. They gathered technical information on the effects of the milk and organized public forums and press conferences to publicize their concerns.

As soon as it became public knowledge in Venezuela that contaminated powdered milk was being shipped from Europe to Third World countries at dumping prices, a group of concerned citizens, all middle class professionals, got together to discuss strategies to stop the huge quantities of milk being imported. Giovanna Merola, an assistant professor of environmental conditioning at the Central University of Venezuela, was on the forefront of this citizens' campaign.

The group suspected that certain politicians were permitting the importation in order to obtain a "kick-back" from the importing companies. They gathered a pool of technical information on the side-effects of humans ingesting the radioactive powdered milk. Papers were written on the topic and distributed to press members, concerned institutions and citizens, mainly in Caracas, but in other cities as well. Public seminars, forums and discussion round tables were organized through concerned institutions and neighbors' associations to inform the public and the press about the dangers of the imported milk.

Confronted by this organized campaign, the Government revoked Resolution No. 9, adopted July 9, 1986, which permitted levels of radioactivity in imported foodstuffs that the group believed were too high and dangerous to human health. After the citizens' group won this battle, other cases involving the importation of contaminated food (such as contaminated meat in 1986-87) and toxic waste dumping in Venezuela became easier to make public. Once the cases were made public, citizens were more apt to challenge government policies.

Although the contaminated powdered milk (Chernobyl milk) could not be stopped from being processed and distributed, a high level of awareness was gained on the part of the population regarding the importance of environmental impact on food quality, and hence on health and individual well-being. A greater sensitivity to environmental issues and problems exists in Venezuela since the powdered milk case became highly publicized.

**Postscript:** The Government revoked a resolution stating the permitted level of contamination, which the group thought was set too high. Citizens have become more conscious about health policies. The group learned how to interact with officials and the press to effectively publicize the issues concerned.

## SUCCESS STORY: CEPIA Raises Awareness on Health and Environment in Sao Gonçalo, Brazil

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** The municipality of Sao Gonçalo suffered from a degraded urban environment and extreme poverty. Lack of communication between women, community groups and government health and sanitation services contributed to this problem.

**Solution:** CEPIA initiated a project that targeted women for environmental education. Implemented through four schools with the involvement of local public health services, the project reached 420 women with environmental education.

Degraded urban environments and extreme poverty are prevalent in Brazil, where 75% of the population lives in urban areas. The community in Sao Gonçalo, a very large and poor municipality of Rio de Janeiro State, was typical in this respect. Lack of communication among community leaders, women's groups and government health and sanitation services exacerbated the environmental problems. Women, in particular, were never involved in planning; the general perception was that they had nothing useful to contribute.

CEPIA (Citizenship, Studies, Information and Action) is a Brazilian nongovernmental organization that promotes the rights of citizens through its work in such areas as health, environment, violence, human rights and poverty. CEPIA initiated a project in March 1991 called Women, Health and Environment to help citizens exercise their right to a healthy environment. This project on health and environmental education has as one of its objectives the modification of the mindset of the community and of the local authorities as to these issues. This will permit the establishment of public policies to reduce the social and environmental degradation, making it possible, in both the short and long term to diminish the enormous sacrifices to which this population, mainly the women, are submitted in their daily lives. CEPIA used educational material, including songs and clay video, and participatory planning to educate the community about sanitation problems. The project targeted women for its educational program, which was implemented through four different public schools, using cultural animators. The project also involved the public health services located in the neighborhood of the schools. The Jessie Smith Noyes Foundation has funded the project to date with U.S. $30,000. The Sao Gonçalo Municipality provided a counterpart of U.S. $15,000. Jacqueline Pitanguy is CEPIA's president and participates in the project's coordination committee.

The project has resulted in greater community awareness and consciousness about women's health and environmental health. Dialogue and communication among health services, schools, community leaders and women's groups has been established. Four hundred and twenty women have received health and environmental education, creating a pool of potential leaders and knowledge disseminators in their communities. Apart from the women already trained, the project aims to reach the whole population of the Sao Gonçalo Municipality, estimated at 1,000,000 inhabitants, through the use of educational materials such as primers, folders, popular education books and videos and through the use of the local media.

**Postscript:** The community's awareness and consciousness about women's health and environmental health in general has been raised. Dialogue and communication has been established among health services, schools, community leaders and women's groups.

## SUCCESS STORY: Alternative Methods of Waste Collection *in Peru*

**Presenter:** Rosa Aquino Portal

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** Conventional methods of garbage collection could not serve Lima's marginal communities. Burning rubbish polluted the air and household waste accumulated in rivers, on the ground and in the streets. Disease-carrying insects and rodents thrived.

**Solution:** With the strong participation of local women, the *Instituto de Desarrollo y Medio Ambiente* (Institute of Development and Environment) in Lima developed and introduced a novel waste collection scheme that used small vehicles to access marginal communities.

Accumulation of waste is a major problem in Lima, Peru, especially in marginal communities. The conventional method of garbage collection using compactor trucks is ill-suited to these areas, where narrow streets, bad roads and steep inclines often prevent access and shorten the life of the expensive, imported trucks. Consequently, marginal communities often lack regular garbage collection; residents either burn their rubbish, which creates air pollution, or simply throw their garbage into the river, streets, vacant lots, etc. Disease-carrying rodents and insects thrive amidst the accumulated household waste.

Rosa Aquino Portal led a one-year pilot project launched by the *Instituto de Desarrollo y Medio Ambiente* (Institute of Development and Environment - IDMA) in 1987 to develop and test an alternative method of waste collection for marginal communities in Lima. In the system developed by IDMA, small vehicles (tricycles, motorbikes, etc.) follow micro-routes and collect garbage from street to street, periodically returning to a strategically-located collection center to exchange full containers for empty ones. Workers also carry out recycling activities at the center. Once a day, a municipal garbage truck comes to the center and transports the collected waste to a disposal site. Catholic Relief Services and the *Institut fur Internationalen Zusammenarbeith* helped fund the U.S. $25,000 collaborative effort by IDMA, the affected communities (in particular, local women's groups) and the municipalities. The project focused on increasing environmental awareness and involved neighborhood organizations, particularly women's groups, in all phases of the project - from preliminary research and system design through project evaluation. The pilot project covered three communities with a total of 5,500 people.

The alternative collection scheme works; it has cleaned up the streets in participating communities and reduced air, water and soil pollution. The labor-intensive scheme has many advantages, for example, its low cost ($8-12/metric ton versus $9-20/metric ton for the conventional method), easy implementation, minimal initial investment requirements, ability to generate employment, ability to service areas inaccessible to compactor trucks, and promotion of environmental education. Other institutions and municipalities in Lima have adopted and adapted this system. Thirty garbage collection micro-enterprises (each composed of about 10 people and 4 tricycles) currently operate in Lima's marginal communities, using the technology developed by IDMA.

**Postscript:** Environmental awareness increased immensely and sanitary conditions improved. The garbage was removed from the streets, and the amount of air and water pollution was drastically reduced. Other institutions and municipalities in Lima adopted the scheme; the 30 micro-enterprises created employ over 150 women.

## SUCCESS STORY: Composting in Jamaica - A Student Science Project

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**Subject:** Waste

**Problem:** Unsightly dumps littered the landscape and polluted the island environment. Pests such as flies, mice and rats were attracted by the garbage and caused the spread of diseases.

**Solution:** The student Science Club at the St. Andrew High School for Girls chose composting as their science project. The girls tended a compost pile in their school, learning how the process works and what the benefits are.

Waste management is a pressing problem in Jamaica. Composting has many virtues compared to chemical fertilizers including the reduction of the amount of waste thrown in local dumps. Moreover, it does not easily wash out of the soil, it does not burn plants and it retains valuable moisture. Compost is relatively cheap; therefore, its use can result in saving Jamaica valuable foreign exchange. It is especially useful when placed under young seedlings because it keeps them moist. It can also be used to improve clay and sandy soils.

Veronica Irene Joy Royes has been a teacher at St. Andrew High School for Girls for the past 18 years. She is the chairperson of the Association of Science Teachers of Jamaica and the vice chairperson of the National Environment Societies Trust. She was in charge of the school science club at St. Andrews, which conducts a project each year on the students' topic of choice. Her group chose a composting project, since waste management is a pressing problem in Jamaica. The students tended a compost pile consisting of kitchen waste, leaves and manure brought in by their parents. They layered the organic matter in eight boxes and discovered they could prevent pest problems by covering the boxes and by frequently turning the material. They bought ammonium sulfate with the club's funds to aid in the composting process. The students conducted a survey to determine where the composted material would best be marketed. They concluded that households were the most likely target group. No outside funding was necessary to complete the project. The project has been in existence for nine months.

The location of the boxes next to the car park and in front of the biology laboratory made the project highly visible. Parents, visitors and other students not involved in the project became curious about the group's activities. The project was exhibited at the Association of Science Teachers of Jamaica, Eastern Zone, where it won first prize for grade twelve students. The students who participated gained valuable biological knowledge on the composting process and on how to control pests. They now understand why composting is a better alternative to chemical fertilizers. In the end, the students used the compost to grow peas - a fruitful experience for all. Another project which has arisen in relation to composting is the use of natural pesticides. These have been extracted from common plants and have been used as an alternative to chemical pesticides in projects carried out by the students.

**Postscript:** Ms. Royes continues to foster an appreciation of science in her students and they have expanded their recycling activities. New projects are being developed to prepare students for a future in which they are equipped to solve environmental problems. Ms. Royes received the UNEP's 1992 Global 500 Award for her work.

## SUCCESS STORY: Peruvian Women Plan Sanitary Education Against Cholera Epidemic in Comas District

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**Subject:** Waste

**Problem:** The principal problem facing the people of Comas is one of survival. The people lack access to work, health care and education. A massive cholera epidemic in the Comas District of Peru had spread due to poor environmental management and lack of adequate

**Solution:** *Vaso de Leche de Comas* (Glass of Milk of Comas), in cooperation with the Association of Social Progress and Development and the local health commission, organized an emergency awareness and prevention program to combat the epidemic.

Due to extreme poverty in Lima, Peru's Comas District, 60% of the inhabitants lack potable water and adequate sewage and drainage systems. Hence, the struggle against infectious disease is unending. In January 1991, a severe cholera epidemic broke out which could have spread easily because of the conditions in which the population lived. Large rodent and insect populations were attracted by the garbage which accumulated in the area. Latrines were poorly maintained and water was stored in unhygienic areas.

*Vaso de Leche de Comas* (Glass of Milk of Comas) is a Peruvian nongovernmental organization that works on preventative health, employment and nutrition issues basic to the survival of the poor. The group collaborates with various organizations such as UNICEF, municipal authorities and the Association of Social Progress (APDES), to achieve its goals. For example, under the leadership of Director Rosa Arteaga Sato, APDES provides technical assistance to Glass of Milk. In February 1991, Glass of Milk of Comas and APDES began working with the local health commission to implement an emergency cholera awareness and prevention campaign in 62 human settlements in Comas. The campaign was incorporated into the Plan of Sanitary Education, a program for women which had been in place for several years.

Glass of Milk of Comas obtained the commitment of 200 women coordinators belonging to its organization, who then assumed responsibility for initiating activities throughout the district. They distributed 10,000 pamphlets that explained the basic preventative measures to take against the epidemic. They also started a public cleanup campaign, eliminating the accumulated garbage that constituted critical points for the spread of the epidemic, fumigating 5,000 centers where milk is prepared and distributed to beneficiaries, and organizing 3,000 latrine cleanups. Finally, the women placed notices about the epidemic in key public places such as schools, health centers and markets. Approximately 1,500 mothers belonging to the grassroots-level committees of Glass of Milk in Comas participated in the campaign. APDES supported these efforts by providing weekly training focused on hygiene, environment and environmental sanitation to 100 coordinators/directors from the 92 pueblos that participate in Glass of Milk. NCOS of Belgium, TROCAIRE of Ireland and SIMAVI of Holland provided U.S. $20,600 in funding for the project.

As a result of the project, the epidemic was prevented from growing to disastrous proportions. In addition, environmental awareness increased in Comas: waste and rubbish are not discarded in the streets as frequently as they were prior to the program. Approximately 20,000 families benefited.

**Postscript:** Poverty is the greatest threat to the area and the organizations Glass of Milk and APDES have increased their efforts to alleviate the extreme conditions that thousands of families live in. The third and fourth phase of their emergency sanitation plan concentrates on providing safe water and waste management for the community. An intense information campaign is underway to educate and assist the community in improving their immediate environment.

## SUCCESS STORY: Waste Management in Merida, Mexico

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**Subject:** Waste

**Problem:** Over 325 tons of garbage and 7.5 tons of pathological wastes are generated daily in Merida, a town in the Yucatan with over 650,000 inhabitants. Inadequate pickup and disposal services led to widespread pollution, disease and contamination.

**Solution:** Through workshops and meetings with waste generators, local authorities and ecology groups, a municipal law was proposed and a plan to develop waste disposal facilities including a recycling and composting plant was prepared.

The town of Merida, generates over 325 tons of solid wastes a day, including hospital, commercial and residential wastes. The town itself lacked adequate disposal services due in part to economic problems and a lack of planning. The garbage collectors were able to collect only 37% of the city's garbage. Local inhabitants were forced to find their own means of disposing of the garbage and resorted to storing it on patios or leaving it around garbage containers located near the highways. This led to an increase in infectious diseases as well as the contamination of air, water and soil.

In 1985, led by Gabriela de Carreto, a group of inhabitants got together to offer workshops to hospital workers and those responsible for producing hazardous wastes in order to educate them on more appropriate methods of hazardous waste disposal. A proposal to build a municipal incineration plant was prepared. Local inhabitants were educated on the need to recycle and dispose of their waste properly. The group also convinced local politicians that the public was ready to recycle and that the town needed a comprehensive waste disposal plan in order to upgrade their standard of living. The conclusions of these workshops, together with several meetings held with the federal and state governments and ecology groups, led to the preparation of municipal legislation for solid waste management.

The plan was submitted to the World Bank, which, together with the Mexican federal, state and municipal governments, provided funds to build a recycling and composting plant as well as a communal incinerator for hazardous wastes. The municipal government absorbed the taxes and administrative costs for the project and donated 75 acres of land for the recycling and composting plant.

This effort has resulted in Merida being the first city in Mexico to have a comprehensive waste disposal management plan. Merida, a regional center for many communities in southeastern Mexico, has over 80 clinics and hospitals. The addition of the incinerator will greatly reduce the medical waste component and thus the hazards of contamination and the spread of disease; the recycling plant will promote the creation of industries using recycled material; and composting will create new hope for the peasants presently facing poor and depleted soils. A second phase of the project is planned which includes the privatization of waste collection in Merida.

**Postscript:** A recycling plant has already been built using technology that was locally developed. The first incinerator for hazardous wastes in Mexico has been built and is being run by the local government. Merida will be the first city in Mexico to have a comprehensive plan for managing waste.

## SUCCESS STORY: Lead/Cadmium Reduction Project in State of Bahia, Brazil

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Waste

**Problem:** A lead metallurgy plant in the State of Bahia operated without proper emission controls and freely distributed smelter dret. This resulted in high lead and cadmium contamination levels and residues in the local population.

**Solution:** Under Dr. Tania Tavares' leadership, students and scientists from the University of Bahia were mobilized to research these problems, develop data and guide the local authorities as to the necessary actions to take as indicated by the research.

The operation of a lead metallurgy plant caused lead and cadmium contamination in the local population. The plant, situated in the middle of the State of Bahia, Brazil, has been operating for the past 21 years without a proper atmospheric emission abatement system. Cadmium levels were the highest in the world, and lead levels were among the highest. By 1976, the industry admitted to having emitted 400 tons of cadmium into the environment and even greater amounts of lead to the air and the Subae River. Additionally, the industry offered free "dret" (powdered solid wastes left after lead extraction and containing 21% cadmium) to the poorer population for use in paving home gardens, backyards and roads. They also gave out the used filters from their chimneys to be used in homes as bedspreads, carpets and rags. The population of children living around the industry have some of the highest levels of lead and cadmium poisoning in the world, with 10% of them considered highly intoxicated and another 17.5% under the risk of intoxication. Intoxication causes brain and kidney damage.

Since 1976, Dr. Tavares has mobilized and led a team of scientists and students of chemistry, biology and medicine from the University of Bahia to channel their expertise into studying these local environmental problems. With international financial support from the Rockefeller Foundation, and at some cost to the University, a technical report was written that outlined the data and recommendations to decrease emissions. These recommendations were adopted by the industry and have resulted in a reduction of contamination in the local population, although the levels are still high and more work remains to be done. This study, together with a case study of mercury in a human population also done by the team, raised awareness of environmental conditions in the State of Bahia. For Brazil as a whole, it brought attention to the danger of heavy metal emissions. Both studies were the first ones to receive wide media attention.

Due to the persistence and dedication of Dr. Tavares and her co-workers, the contamination levels of lead decreased by 37.7%, and cadmium levels decreased by 67.8%. The industry now operates within a stricter set of guidelines, thus reducing emissions. Six hundred and thirty children and families under risk of intoxication benefited from reductions. Ten percent of these children received treatment for intoxication. The local population is now more aware of the effects of heavy metal emissions and the health hazards to which they are susceptible. Dr. Tavares' team continues to research this problem, since lead and cadmium levels in the local population are still high.

**Postscript:** The industry has had to adopt more environmentally-responsible emissions guidelines and be responsible for the medical needs of the affected population. These measures lowered the lead and cadmium levels in the local population.

## SUCCESS STORY: Year of Environment and Shelter (YES) in Dominica

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**Subject:** Waste

**Problem:** There was no waste management system. Refuse was dumped at random sites in villages in Dominica. Rats and mosquitoes infested the area and increased the spread of diseases.

**Solution:** The YES Committee (Year of Environment and Shelter) immediately formed subcommittees to control the outbreak of pests in the different villages.

The Village of Salisbury is situated in the middle area of the leeward portion of Dominica. Prior to the Year of Environmental Health and Shelter in Dominica, the health of residents in Salisbury was in a dreadful state. The community did not have a waste management system, and residents disposed of garbage at random sites in the area. Diffuse piles of garbage looked unsightly and posed a health threat because rodents and mosquitoes attracted by the garbage spread diseases. About three years ago, it was discovered that children and adults alike were being hospitalized for typhoid fever, and in some cases, people died from leptospirosis, a disease carried by rats. Another problem that needed to be addressed was deforestation caused by excessive use of wood for charcoal and woodboards.

A group of people from different government divisions, namely the Forestry Division, Local Government, Education and Health Divisions, came together to discuss the problem and formed the Year of Environment and Shelter (YES) in 1988. Sectional meetings were held in the towns and villages, and village councils were called on to form Health Committees in the different areas throughout the island. The YES Committee, consisting of 13 people, was the steering committee for all the subcommittees. The YES Committee informed the subcommittees of the hazards facing the island, primarily the dumping of waste, which was attracting rodents. YES helped by providing extensive education, technical advice and the delivery of forklifts and garbage containers. Twelve energetic people in Salisbury analyzed the situation in their village with the assistance of YES and worked to improve the terrible conditions there.

Villagers were informed of necessary steps to treat drinking water in order to prevent the spread of diseases. They were instructed to boil their water to prevent typhoid fever and to avoid leaving empty containers for water collection to prevent mosquitoes from breeding there. The YES Committee then embarked on a tree-planting project in an intensive push to halt deforestation. Trees were planted along the boundaries of churches, hospitals and public buildings to beautify the surroundings and to prevent soil erosion.

The YES Committee was in existence for two and a half years and had a good impact on towns and villages. Before the project, much food infested by rodents had to be thrown out. Less food went to waste following the project.

**Postscript:** Illegal dumping sites were cleaned up. Environmental awareness has increased and the community's health has improved. Flowers were planted around houses and a competition was held to see who could keep the environment the cleanest.

## SUCCESS STORY: Sara Aguilera Organizes Artisanal Fishermen and Small Farmers To Resist Wetlands Conversion in Honduras

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Water

**Problem:** The creation of a new shrimping industry threatened to destroy more than 1,000 hectares of wetlands and forest along the southern coast of Honduras. This threatened wildlife, birds and marine life as well as the livelihoods of 2,000 families.

**Solution:** The people in the surrounding communities were organized under the direction of Dona Sara Aguilera to halt the continued destruction and takeover of this area by corporate concerns.

Along the southern coast of Honduras is a land rich in wetlands and mangrove forests that have traditionally supported the people of the area. A new shrimping industry was being developed in the area with strong backing from powerful interests and the government. Consequently, *El Jicarito*, a 1,000-hectare lagoon located in Namasique Municipality, Choluteca, was slated for conversion into a shrimp farm. This threatened the wetlands and forest as well as the livelihood of 2,000 families. The wood from the forests and the fish from the lagoon are an integral part of their economic survival, and the protein component that the fish and wildlife add to local diets has an important role in maintaining health. In addition, the lagoon supports 50 species of birds, over 20 species of forest dwellers and hundreds of species of marine life. The developers had posted armed guards and put up a barbed fence around 3,000+ meters of land, denying the community access to their sources of food and energy.

CODDEFFAGOLF (Committee for the Defense and Development of the Flora and Fauna of the Gulf of Fonseca) is an environment and development association composed of thousands of artisanal fishermen and small farmers living along the southern coast of Honduras. In 1987 Sara Aguilera, with the support of CODDEFFAGOLF, initiated activities to prevent conversion of *El Jicarito* into a shrimp farm. She helped to organize the 20 different communities surrounding the lagoon into a united group. Ms. Aguilera was elected president of this group and subsequently was elected Secretary General of CODDEFFAGOLF. She tried to negotiate an end to the use of force in the area, made many statements on radio and television and presented her views to public officials. She also collaborated with legal measures directed at preventing the destruction of the lagoon. Powerful interests and the shrimp industry's strong desire for land presented major obstacles. Her efforts did not obtain an immediate positive response. One night hundreds of fishermen and farmers gathered at the guards' gates and proceeded to disarm the guards, burn down the buildings and destroy the fence blocking their access to the forests and lagoon.

Due to the efforts of CODDEFFAGOLF, the people are once again able to fish and farm the area and the Ministry of Natural Resources has designated *El Jicarito* lagoon as a "reserve area for wildlife and artisanal fishery." Protection of the lagoon from conversion - and thus preservation of habitat - has been achieved, at least temporarily. The Government has not delimited the reserve, however; therefore, the pressure on the part of the shrimpers for the lagoon's destruction continues.

**Postscript:** The people are once again able to earn their livings and feed themselves from the land. The Ministry of Natural Resources has designated *El Jicarito* lagoon as a "reserve area for wildlife and artisanal fishery." The wetlands and surrounding forest have been protected from destruction, at least for the time being.

## SUCCESS STORY: Laubach Literacy International's Clean Water and Fish Pond Project, Tinaja de Negrete, Mexico

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**Region:** LATIN AMERICA/CARIBBEAN
**Subject:** Water

**Problem:** The inhabitants of the Tinaja de Negrete area of Mexico, a very arid region, lacked a source of clean drinking water. Polluted water caused intestinal diseases.

**Solution:** The Mexican staff of Laubach Literacy International initiated a problem-solving literacy program. Participants acquired basic literacy skills through discussions that focused on their local problems. They worked together to solve these problems.

When asked by the Mexican staff of Laubach Literacy International what problems they faced, program participants in Tinaja de Negrete, Mexico, did not hesitate to identify them: "We have no clean drinking water; our children are always sick; we don't have enough food to eat." This arid region is inhospitable to almost all forms of animal husbandry. Residents drank polluted drinking water for lack of a clean water supply and suffered from intestinal illness.

In 1986 a problem-solving literacy program was initiated by the Mexican staff of Laubach Literacy International and by community leaders, most of them women. Participants of this program gained basic literacy skills through group discussions that focused on what they described as their most pressing problems. These shared problems became the theme of adult basic literacy classes, and participants carried out community improvement projects to address the problems they had identified. Projects included corn grinding/tortilla cooperatives, community gardens, an income-generating sewing cooperative, clean water supply and aquaculture. The women of Tinaja were willing and active participants, helping to plan and organize classes and projects. They learned to cooperate with others to initiate change and acquired basic organizational skills.

Participants overcame almost insurmountable obstacles to drill a well for clean water. They spent years raising money from local families and negotiated with government officials for matching funds. They waited through a severe recession during which public funding was drastically reduced. Matching funds were finally granted, and the well was drilled, supplying clean water to the people of Tinaja de Negrete for the first time. With this accomplished, they then tackled the problem of inadequate diet by undertaking an aquaculture project. They established a fish farm and raised pigs in stalls nearby for meat. Waste from the pigs was channeled to the pond to feed algae, a source of nourishment for the fish. Enriched pond water was used to irrigate nearby strawberry fields.

Through this program, 5,800 people obtained safe drinking water and improved their diets using environmentally-friendly technologies. Precious water was recycled, and products were fertilized naturally without the use of harmful chemicals. Project participants gained the skills and information needed to initiate and carry out environmentally-sound community improvement projects. The Mexican staff of Laubach has shared this highly successful literacy program with other educators in Mexico.

**Postscript:** The project has been very successful and has improved the quality of life in all respects: health, education, nutrition, livelihood, community solidarity and the overall environment. The literacy program is being replicated in other areas of the country.

## SUCCESS STORY: Training to Allow Participation of the Community in Projects Concerning Water and Sanitation, Mexico

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**Subject:** Water

**Problem:** Typically, there has been little or no participation of the affected communities in water and sanitation projects at the beginning and intermediate phases. These phases include analysis of operations and maintenance, among other activities.

**Solution:** *Sarar Capacitacion* helps government agencies and nongovernmental organizations to train people in the community to organize and administer their own projects.

In rural communities it is the women who spend considerable time in the provision of water; however, they are not included when it is time to make important decisions about the installation of water supplies and the administration of these projects. In order to maximize community participation, it is necessary to begin a process of training that includes a methodology along with techniques and materials which look for alternative solutions to the problems.

Norma Barreiro works with *Sarar Capacitacion*, a Mexican organization that helps government agencies and nongovernmental organizations to train people of the community to organize and administer their own projects. In the last five years, *Sarar Capacitacion* has worked with UNICEF in programs of child survival and at PROWWESS/UNDP, where a linkage was made with water and sanitation problems and primary health programs in Mexico.

This community participation methodology has been used in Mexico with the Association of Huastecas Veracruzana Women (AMCHAC) in order to promote independent organization and the implementation of small projects. Presently, this group of 100 women is installing a factory where they will produce hand water pumps for their community.

This methodology has also been used in a World Bank/UNDP project known as project *Yacupaj*. This year the project provided water to 1,250 families of different communities of Antiplano, Bolivia. With the help of *Sarar Capacitacion*, a strategy was designed to include the community and the participation of women in the administration of the water systems. During the training, *Sarar Capacitacion* tested a series of educational materials which facilitate the open investigation of resources and problems facing the community regarding the use of water, proper health and the role of women in these projects.

As a result of this training, people of the community and technicians make decisions together, helping to promote the continuity of the projects.

**Postscript:** The training program has encouraged community efforts to manage natural resources with appropriate technologies that respect traditions and culture.

## SUCCESS STORY: Protection of Fresh and Brackish Water Fishery Resources in Uruguay

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**Subject:** Water

**Problem:** The most important species in the coastal lagoons of the Uruguayan province of Rocha, particularly pink shrimp, are being overfished. Fishery productivity fluctuates widely from year to year.

**Solution:** The *Instituto Nacional de Pesca* and the provincial government organized a research program based on regulating the opening of sand bars and observing the impact of this management on aquatic life. Artisanal fishermen participated in the program.

Uruguay possesses six important lagoons along its Atlantic coast. These lagoons support a number of artisanal fishermen; however, the most commercially important species - the blue crab, flounder, mullet and particularly the pink shrimp - are being overfished. The methods of extraction used by the fishermen are detrimental to these species. In addition, environmental variables that are difficult to regulate influence the life cycles of these aquatic creatures through their effect on the opening and closing of sand bars between fresh and salt waters. Thus, fishery productivity fluctuates greatly. Also, middlemen reap financial benefits at the expense of the fishermen by buying the seafood in times of high supply, freezing it and then selling the catch for higher prices during times of low supply. Few systematic research efforts have been conducted on fishery resources in the brackish water lagoons and their relation to human populations.

Graciela Fabiano has studied the coastal lagoons in Uruguay since 1986, when she was a researcher and professor at the University of the Republic. She has analyzed coastal lagoon artisanal fisheries and the biology, dynamics and structure of the various populations of crustaceans found there. Dr. Fabiano currently heads the Management of the Coastal Lagoon Program at the *Instituto Nacional de Pesca* (National Fisheries Institute or INAPE). (INAPE is the governmental organization responsible for the evaluation and determination of methods of managing fishing resources.) In 1990 INAPE and the provincial government of Rocha (IMR) initiated a coordinated research program on fishery resources in the coastal lagoons in order to support the area's artisanal fishermen. Through activities in three brackish water lagoons, the project team is implementing a resource management program based on the regulation of the opening of the sand bars and the observation of the changes produced by this management in aquatic life and in fishing activities. The project interviewed the artisanal fishermen as part of the research program. It also enabled them to freeze their shrimp catch themselves and market it directly. INAPE and IMR funds the ongoing program, which costs U.S. $15,000 annually, excluding researchers' salaries, equipment purchase and laboratory fees.

This project has contributed to the protection of coastal ecosystem aquatic life. The research effort has generated sufficient information to establish norms for the management of the fishing resources. For the artisanal fishermen, this will mean the future stability of the shrimp catch. Moreover, this program has a dynamic role in the fishery activity in the zone, generating environmental awareness and the development of safe capture methods. Finally, the artisanal fishermen obtained enormous financial benefits by freezing their own catch. In 1991 the activities will be extended to the lagoons in the Province of Maldonado.

**Postscript:** The research effort generated sufficient information to establish norms for the management of the fishing resources. This will enable the preservation of aquatic life in the coastal ecosystems and benefit artisanal fishermen by stabilizing the shrimp catch. The project is generating environmental awareness among the fishermen.

## SUCCESS STORY: An Innovative Breakthrough for Clean Water in the Amazon Region, Brazil

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**Subject:** Water

**Problem:** The very high water table in the Amazon region and contamination by human waste, coupled with the hot climate, pose a serious health risk. Traditional technical solutions such as deep wells and/or centralized water systems are too expensive.

**Solution:** A project was carried out where water was pulled from the superficial water table and decontaminated by passing it through simple, durable and low-cost equipment. This inexpensive and reliable method makes small decentralized systems economical.

It is no small irony that one of the most important environmental problems facing poor people in the water-rich Amazon is access to potable water and adequate sanitation. As in other low-lying areas of the humid tropics, the very high water table is easily contaminated by human wastes. The contamination spreads widely, even into rivers. This fact, together with the hot climate, means that communities in such an environment are especially at risk of diarrheal diseases. Traditional technical responses to the problem consist of deep wells and/or the installation of modern centralized water systems, both far too expensive for governments to extend to small villages and burgeoning urban slums in the short term.

With support from UNICEF, a small interdisciplinary team of sociologists and sanitary engineers at the Federal University of Para in Belem have achieved a major breakthrough. Nazare Imbiriba played a key role in this project. As the Executive Secretary of the Association of Amazonian Universities (UNAMAZ), she called UNICEF's attention to the need for support. She was also one of the main initiators and coordinators of the project. The university team had devised a new appropriate technology which, together with new forms of organization and community participation, they felt could make potable water available at reduced costs. The new technology is based on extremely simple and durable low-cost equipment, which basically decontaminates water by passing it through titanium alloy plates (they are now working on graphite plates, which can be manufactured locally) charged with a very low DC electrical current. This allows water to be pulled from the contaminated superficial water table, which drastically reduces costs, since decontamination is extremely cheap and reliable. It also makes small, decentralized systems economical, which makes community mobilization to install them organizationally more viable. However, this was all theoretical and laboratory models until the university team, with UNICEF support, launched a pilot project to introduce the new water system. The application included not only the hardware technology, but also intensive community participation in planning, installing and operating the water system.

The project was highly successful: the technology worked better, community response was greater than had been expected, and costs turned out to be only one-fifth of the previous lowest-cost alternative. Local and state government are enthusiastic about these findings, and the whole approach is now being adopted by the state government of Para (which has half the population of the Brazilian Amazon) for a massive potable water campaign. Professor Imbiriba's team, out of local initiative and ingenuity, has therefore opened up a whole new opportunity for bringing drastically improved sanitation to the poor.

**Postscript:** Safe, clean water is provided at a cost that is only one-fifth the previous lowest alternative, and community response in participation has been very positive. The state government of Para has decided to adopt this approach for a massive potable water campaign.

## SUCCESS STORY: Project Raises Awareness about Pollution in Mantanza-Riachuelo River, Argentina

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**Subject:** Water

**Problem:** Chemical and organic pollution contaminates the river basin surrounding Buenos Aires. The effect is a dearth of clean water for people who lack running water, which is the majority of the poor inhabitants.

**Solution:** Maria Onestini directed a project to create awareness of the problem and the consequent health effects on the population. The task entailed helping existing organizations to become aware of the grave pollution problem of the river basin.

Buenos Aires, Argentina was built on a flood plain, and unplanned growth has caused problems related to this feature of the area. The poor drainage system that existed has been aggravated by construction with no planned drainage over most of the area and by construction on areas below flood level. In addition, one of the poorest areas of the Greater Buenos Aires urban area, with over six million inhabitants, faced serious health threats due to disposal of organic pollutants and chemical pollutants from heavy industry into the Matanza-Riachuelo River. In zones where flooding is directly connected to the river, the contaminated waters are the ones that flood the urban area. Moreover, the water has reached such levels of pollution that it cannot be used for any purpose. People without running water, the majority of the poor inhabitants in the area, lack clean water due to the chemical and organic pollution of the river basin. No scientific evidence linking pollution with the health of the community had been brought to the public's attention.

This project is directed by Maria Onestini, the current director of the Department of Environmental Evaluation with the Buenos Aires City Council and Co-Director of the Centro de Estudios Ambientale (CEDEA). Its goal is to create an awareness of the magnitude of the pollution problem and its health effects. The project has been in existence for one year. Consciousness raising has taken the form of talks and consulting activity in which scientific data from research of the area is explained and the information disseminated. Other activities include providing the local media with comprehensive scientific information on the extent of the pollution in the river and advising local neighborhood groups about the problems and possible solutions. Participation in international events in order to gain support for cleaning up the river has become a focus of activity at this time.

A complete analysis of the case was presented by CEDEA at the International Water Tribunal (IWT) based in the Netherlands. The report is to include the extent of the pollution, origins of pollutants, legal framework, potentially responsible parties and ways and means by which solutions can be achieved. The Tribunal has provided funds to research the case for presentation at IWT. The total cost for research is estimated at U.S. $5,000. Other support comes from international cooperation funds from the Italian Government. In the past months, several informed groups have expressed interest in joining forces to help solve the pollution problem. Several neighborhood associations are pressing for changes as well.

**Postscript:** The project succeeded in increasing the community's awareness about the link between pollution and health. Media, governmental/NGO liaison groups and neighborhood groups have mobilized to seek solutions. As a result of the International Water Tribunal, one of the transnational polluting companies has accepted the charges and has agreed to incorporate the manufacturing process used in industrialized countries in order to meet Argentine law.

## SUCCESS STORY: CODERENA Works to Prevent a Mining Project Near La Vega, Dominican Republic

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**Subject:** Water

**Problem:** A major mining project was planned less than seven kilometers from La Vega. According to studies, this project threatened the animal and plant life of the area and would pollute the rivers and streams that provide water to the general population.

**Solution:** A citizen's group, CODERENA, was formed to help educate the area's population about the effects that this mining project would have on their local environment.

In March 1988, the organization GRUPORENA presented an environmental impact statement to a group of 35 organizations and interested individuals, concerning the impact of a proposed mining project that had been signed by the Government of the Dominican Republic with the Falconbridge Corporation. This mining project was to take place in the Loma Ortega-Guaigui Forest, approximately seven kilometers from the town of La Vega. Two agricultural engineers, Felix Diaz Tejada and Ramonita Garcia, drew up this document after several site visits. Based on their findings, the damage to the plant and animal life of the area would be extensive, as would be the threat to the rivers and streams from which the population, both human and animal, derives its water for consumption. This water is also important for irrigation purposes in cultivable areas of the zone.

As a result of this meeting, the organization CODERENA (*Comite de Defensa de los Recursos Naturales*) was formed. The group, consisting of members of various local organizations, proceeded to develop a plan of action. This included such activities as camping out on the site; journeying to the agricultural subdivisions to inform these agricultural communities of the project and its effects; writing articles for the local newspapers; creating radio and television programs; visiting the local authorities; developing educational material; and organizing marches, vigils and other public demonstrations. The local Bishop even sent a communication to all the parishes in the area about the proposed project and the need to stop its progress. Wilfrida Ramona Perez had the responsibility for organizing and coordinating tasks for the formation of CODERENA. She also helped to advertise and disseminate educational information about the project and helped to develop support committees.

To date, the mining project has not begun, even though it was scheduled to start in the beginning of 1989. There still exists, however, a contract between the Government and the Falconbridge Corporation to mine in the La Vega area. CODERENA hopes to get the area declared a regional park and is working towards this end. By preserving the Loma Ortega-Guargui, the life of the Camu River would be guaranteed. The preservation of the flora and fauna of the zone, of the Camu River, and of the Yata Clara, Pontry and Terrero streams would prevent the pollution of the environment.

**Postscript:** The movement has succeeded in delaying the start of the mining project originally set for early 1989. While the Dominican Government still has a contract with the mining company, the goal of CODERENA is to have the forest designated as a regional park.

## SUCCESS STORY: Socioeconomic Program for Women's Organizations: The Experience of Tempoal, Mexico

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**Subject:** Water

**Problem:** Women in Tempoal are poor and overburdened, often working 18-hour days, including three hours daily to fetch water and two hours to search for firewood. They lacked training, credit opportunities and paid employment.

**Solution:** A project funded by UNIFEM, ZONTA and the Mexican Government promoted women's organization, training and the dissemination of simple technological implements that save time and energy spent on household and production tasks.

The problems and needs of women in Tempoal were not too different from those of women in other regions and countries. They are poor and overburdened, working 18 hour days including three hours daily to fetch water and two hours to search for firewood. They lacked training, credit opportunities and income-generating opportunities. They did not have a voice in decision-making processes.

UNIFEM developed a project that focused on participatory research, including training, strengthening women's organizing skills and the dissemination of appropriate technologies. The implementors are working to solve the problems through the broadening of women's opportunities for income generation and employment. Other major goals of the project are to promote the dissemination of simple technological implements which will help to reduce time and energy spent on household and production activities. The first phase of the project involved the establishment of a revolving fund and the initiation of small projects such as fish and poultry farming.

The second and third phases of the project emphasize the reduction of women's work burden through the dissemination of appropriate technologies, e.g. a metal workshop for the production of small hand-operated water pumps. These pumps are designed by the Appropriate Technology Center of Las Gaviotas of Colombia.

The project has been successful in strengthening grassroots organizations. This project is a good example of cooperation between grassroots organizations and the government. In 1987 eight grassroots women's groups formed Mexico's first regional women's organization: AMCHAC (*Associacion de Mujeres Campesinas de la Huasteca, A.S.*). AMCHAC is the executing agency and collaborates with the project's funders, UNIFEM, ZONTA and the Mexican Government.

As a result of the project, women's income-earning abilities have been increased and so has their independence. The project potentially can produce about 5,000 hand water pumps per year. It already has produced about 300 hand water pumps, creating employment for 12 full-time specialists. Moreover, the project is reducing other women's workloads as well as their daily burdens in collecting clean drinking water.

**Postscript:** The project has been successful in strengthening grassroots organizations and women's groups. The project has produced 300 hand water pumps to date, creating employment for 20 full-time specialists and reducing other women's workloads as well as their daily burdens in collecting clean drinking water.

## SUCCESS STORY: GEMA Raises Awareness of Mercury *Contamination in the* Gold Mines of Guayana, Venezuela

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**Subject:** Water

**Problem:** The use of mercury in the gold mines of the Guayana region has contaminated the water, soil and air. Mercury contamination is widespread among the population.

**Solution:** GEMA initiated a project to raise awareness among gold miners and the indigenous population on the dangers of mercury contamination and to bring the environmental problem to the attention of the national and international communities.

Venezuela contains one of the oldest and richest geological formations of gold in the world. This area, known as *El Maciso Guayanes*, encompasses almost one third of the country. Gold deposits lie in the area's great rivers - Cuyuni, Caroni and Orinco - and forests. The region contains millions of unique flora and fauna species, and is the homeland of indigenous peoples (and less permanently, large numbers of nomadic gold miners). In the Guayana region, mercury is used extensively and carelessly in the mining process. As a result, the water, soil, air and people in proximity to the gold fields have become seriously contaminated. A study of one mining area found that just living there resulted in mercury poisoning, even if one did not directly work with the mercury. The Coroni River, one of the largest and most important in Venezuela, is threatened by mercury contamination due to mining activities. Also, cities such as San Felix and Puerto Ordaz (with more than 300,000 inhabitants) are at risk because mining activity takes place near their sources of water. The miners use mercury to amalgamate the gold and then throw the residues in the river.

*Grupo de Estudio Sobre Mujeres y Ambiente* (Study Group on Women and Environment) is a Venezuelan NGO created in February 1990. The group's objective is to contribute to the search for and implementation of alternatives which improve the situation of women, the family and the community in a manner that permits the protection and preservation of the environment. GEMA carries out research, action, and information dissemination and exchange related to this goal. One of the members of GEMA, Rosa Trujillo, produced an audio-visual work about the ecological problem caused by gold mining in *la Guayana Venezolana*. GEMA has used this project to help generate awareness of the environmental crisis at national and international events. GEMA has also initiated a participatory action research project in *la Gran Sabana* designed to raise the people's awareness of the dangers of mercury contamination. GEMA developed the project, "Research on the Daily Life of Women in the Mines of the Gran Sabana," together with the Alcion Community, an NGO established in the area. This project is aimed at compiling the life stories of women in the mining areas and at implementing a program of environmental education and of preventive health among the miners and indigenous population in *la Gran Sabana.*

To date, GEMA has visited the area five times and conducted preliminary interviews with 12 miners, six of them men and six of them women. The project has cost U.S. $7,000, provided entirely by the personal funds of the group members. They estimate that they will need U.S. $20,000 to complete the project. Funding constraints have limited project activity from moving more quickly, but GEMA works to spread awareness of the environmental problem in order to change public policy.

**Postscript:** GEMA has completed the initial phase of the project by collecting scientific information, participating in foras throughout Venezuela, exploring mining zones and conducting preliminary interviews with miners. In addition, GEMA generated awareness of the problem by participating in national and international events.

## SUCCESS STORY: Women's Group in Tripoli, Honduras Addresses Watershed Degradation Related to Deforestation

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**Region:** LATIN AMERICA/CARIBBEAN

**Subject:** Water

**Problem:** Watershed degradation and contamination related to deforestation were primary problems affecting the mountainous region near Tripoli. Polluted water particularly affected the children.

**Solution:** The women of Tripoli formed a group in order to address the problems with the help of the Office of Natural Resources. A program implemented by the agency and funded by FAO provided the women with practical training on environmental issues.

Tripoli, located on the north coast of Honduras, is bordered on one side by mountains and on the other side by the ocean. The mountains are severely deforested, causing the watershed to be polluted. The government installed a water system in this area two years ago; however, hillside agriculture, deforestation, the lack of trees around the water source and mountainside grazing have led to the constant build-up of sedimentation in this system, blocking the system's tubing. Hence, the water was not potable and caused many diseases. Other local environmental problems included the improper use of land for cultivation, the lack of a proper waste disposal system and the pollution and health hazards posed by inefficient wood stoves.

Carmen Tiodora Bustillo Turcios is Rural Promoter of Women's Groups for the Honduran Government's Office of Natural Resources. This government environmental agency provides support to rural villages. As part of this program, Ms. Bustillo had been visiting the area of Tripoli frequently. In 1990 the severity of the problems facing the community led the women of Tripoli to form a group in order to address their problems. Ms. Bustillo approached the newly-formed women's group and stated her desire to aid the village. She subsequently initiated a project in August 1990 that enabled the women to become more effective environmental managers. The project educated women through lectures, demonstrations and hands-on experience. A Peace Corps volunteer assisted the project and the United Nations Food and Agriculture Organization (FAO) funded it. The program has cost U.S. $25,000 to date. Initially, many husbands had negative reactions to the organization of the women's group; however, as the program showed positive results, many husbands joined the sessions.

The effects of the project were so positive that the FAO plans to replicate the program worldwide. The program enabled the people in Tripoli to understand why conservation is important and how it affects their daily lives. As a result, they now use soil and water conservation techniques. The community has learned about deforestation and is now helping to prevent it. They built Lorena wood-conserving stoves, the use of which decreases the demand for fuelwood and protects women and their families from harmful smoke. On Arbor Day, women planted donated trees in deforested areas where the government water pipes lie. *Pilas* (outdoor cement sinks) were built, which decreased health problems. Knowledge of proper waste disposal gained through the program also improved community health. In addition, the program taught the women gardening techniques. Each woman in the group now has a garden and has been helping others to establish their own gardens. Thus, families in the community have access to fresh food and can save money.

**Postscript:** The pilot project had a very positive impact and will be made into an official program of the FAO. People have a better understanding of why soil and water conservation techniques are important and have begun using them in their daily lives. Erosion in the mountains has been reduced by nearly 50%, decreasing watershed degradation.

## SUCCESS STORY: Environmental Impact Considered *in Dam Projects* in Argentina

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**Subject:** Water

**Problem:** Industrial and energy projects, such as dam projects along the Patagonia Negro and Tropical-Subtropical Parana River Basins, have caused water pollution and environmental degradation. The affected populations lacked awareness of the issues.

**Solution:** Ms. Wais de Bagden launched an education program to mobilize the affected populations to take action.

The Parana River is one of the most important rivers in the Del Plata Basin and one of the longest in South America. The development of large impoundments along this river has resulted in serious ecological imbalances. Dam activity such as the large Paranean dam projects attracted large industries in search of "cheap energy". However, industrial and agricultural activities have resulted in a variety of problems including fertilizer runoff and water-borne diseases such as schistosomiasis or "reservoir illness", particularly among populations located around the Patagonia Negro and Tropical-Subtropical Parana River Basins.

The affected populations were unaware of the causes of water pollution and needed to be educated about the issues. Inhabitants did not know why blue-green algae accumulated in certain parts of the river. They did not know how to keep fertilizers and other agrochemicals from running off into large water bodies. Water pollution was widespread, as were other ecological disturbances, and of special concern was the threat to a nursery for the most important freshwater fisheries in the region.

In 1987 Ms. Wais de Bagden and her group of 17 collaborators began working on an environmental education project called PROE-DICITTA (which generally translates into "Program of Environmental Education and the Dissemination of Scientific and Technical Information on the Environment"). With funding from the Ambientis Foundation, they set out to provide local inhabitants with relevant information about the causes of water pollution and the means of its control. They organized an environmental education program through the mass media to educate the population about the environmental problems and possible solutions. As awareness grows, groups from different disciplines - scientific researchers, engineers, lawyers, doctors and involved local people - have opened lines of communication to try to solve the environmental problems.

As people have become more educated, they have pressed local authorities to take action to improve conditions and to contemplate the environmental impacts, not simply the economic impacts, of dam projects. As a consequence, local decision makers are now obliged to consider the environmental and ecological aspects of these river basin development projects.

**Postscript:** Ms. Wais de Bagden's project was effective in educating the public on the environmental threats concerning dam projects along the Parana River. Local inhabitants are now pressing authorities to take action to solve these problems and to require that new development projects take into account any potential environmental problems.

## SUCCESS STORY: Woman's Campaign Moves Government to Stop Groundwater Contamination in Antigua, West Indies

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**Subject:** Water

**Problem:** There was serious contamination of groundwater used for domestic purposes in some areas of Antigua.

**Solution:** Veronica Yearwood campaigned for a groundwater management program to provide clean and safe drinking water to poor families.

Antigua, West Indies is a small island with a population of 80,000. The island has an arid climate and the only existing surface water is in the form of tiny seasonal streams or gushing gullies following heavy downpours. Dams and reservoirs store the potable water which comes exclusively from rainfall. Rainfall on the island may vary from a high of 67 inches to a low of 27 inches due to Antigua's dry climate and relatively flat terrain. Over the years, a combination of human-made and natural pollutants had begun to contaminate some of the groundwater aquifers. The pollution was particularly prevalent in two regions of the island, where coliform and pathological bacteria, pesticides from surrounding farms and a rise in salinity due to a rapid depletion in the water table were all contributing factors. Moreover, the more than 1,000 residents of the two affected regions had expressed alarm at the obvious health risks associated with the consumption of water from contaminated aquifers or wells.

In 1986 Veronica Yearwood, a hydrologist employed with the Antigua and Barbuda Public Utilities Authority (APUA), convinced the APUA to conduct a series of chemical tests on the regions' groundwater aquifers to ascertain the extent of the pollution. She then persuaded her superiors to provide U.S. $1,500 to fund a groundwater management program, with the argument that the APUA's long-term benefits of reduced dependence on more expensive desalinated water would far outweigh the monetary cost of implementing the program. Under the aegis of the APUA, a team of 25 staff members headed by Ms. Yearwood was given responsibility for devising and implementing the groundwater management project. The team examined the local laws pertaining to building codes and pollution. The relevant laws were then applied to improve conditions in areas most affected by contamination. The overwhelming success of the initial phase of the project owes a great debt to Ms. Yearwood and the many women residents in the affected area, who were organized into teams to publicize the project and to educate the other residents of the long-term damage that could result from a contaminated aquifer or well.

The APUA has now instituted a permanent island-wide groundwater management program. All known aquifers have been identified and tested for contamination and groundwater systems throughout the entire island are being monitored. In addition, the sources of contamination of groundwater have been identified and the necessary steps taken to eliminate those health hazards from drinking water.

**Postscript:** A cost-effective groundwater management program was implemented that resulted in cheaper and safer drinking water in the affected areas.

# DESCRIPTIONS OF SUCCESS STORIES FROM NORTH AMERICA

## REGIONAL BREAKDOWN OF SUCCESS STORIES - NORTH AMERICA

| Country | Water | Waste | EFS | Energy | Total |
|---|---|---|---|---|---|
| Canada | | | 1 | | 1 |
| USA | 12 | 14 | 10 | 3 | 39 |
| | 12 | 14 | 11 | 3 | 40 |

## SUCCESS STORY: Caretakers of the Environment *Mobilize High* School Students and Teachers on Environmental Problems

**Presenter:** Isabel Abrams

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**Country:** USA

**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** There is a lack of awareness among the youth about the global extent and nature of environmental problems facing the nations of the world.

**Solution:** Caretakers of the Environment International increases global awareness, leadership skills and international cooperation by having high school teachers and students work on local environmental projects and share them at international conferences.

In 1987 Isabel Abrams was nominated by U.S. Friends of the United Nations Environment Programme (UNEP) as one of the 500 outstanding environmental achievers of the year for her work as an environmental writer. Abrams is one of the three co-founders of Caretakers of the Environment International (CEI), a nonprofit, nongovernmental, international organization established in 1987. She is also co-founder of the national network Caretakers of the Environment International/USA. CEI aims to educate high school students and teachers on global environmental issues and prepare them to become environmental leaders.

A key philosophy of the organization is that the youth must recognize the planet as one interdependent environment and understand their own role as its caretakers. CEI encourages environmental awareness, work on local projects and international cooperation by holding yearly conferences at which youth and teachers from various countries exhibit projects and discuss their environmental concerns. The first conference was held in 1987 in the Netherlands on "The Sea: Pollution and Protection." Since then, CEI has held the following conferences: "Natural and Cultural Heritage," Spain, 1988; "Technology and the Environment," the United States, 1989; "Environment: Conflict or Cooperation," England, 1990; and "Environment and Development," Peru, 1991. The host country raises funds, provides accommodations and chooses the conference theme, which is explored through tours and discussions.

Participating schools are selected on the basis of the projects they accomplished in their home countries. During the international conference, students and teachers present their projects, share ideas and participate in social activities designed to promote respect for other cultures and a spirit of friendship that encourages them to work together as caretakers of the environment.

Sixteen countries participated in the first conference in 1987. By the time of the 1992 conference in Portugal on Tourism and Environment, 45 countries joined the network. These high school teachers and youth work on local problems, cooperate on international projects, and communicate through a magazine.

**Postscript:** Caretakers of the Environment continues to educate students around the world on the need for cooperation and leadership on the environment. National networks have been started in some countries.

## SUCCESS STORY: WEED - First Canadian Foundation to Link Women and the Environment

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**Region:** NORTH AMERICA
**Subject:** EFS

**Problem:** There was a lack of awareness about the roles women can play in mitigating environmental problems. Women were keenly interested in environmental matters and lacked role models and a forum for linking their interest and concern to action.

**Solution:** The WEED (Women and Environments Education and Development) Foundation organized a Women and Environments Conference at the University of Toronto. The group also publishes the quarterly magazine *Women and Environments*.

In Ontario, Canada, women's perspectives on environmental issues receive little attention despite growing public awareness on the environment. The significant efforts of women and their vast potential for contributing to the restructuring of society along more environmentally rational lines went unrecognized. There was clearly a need for a forum which would highlight women's roles and draw attention to women's perspectives. In addition, the area lacked a network for women involved in environmental issues and management.

The WEED Foundation (Women and Environments Education and Development Foundation) received nonprofit incorporation in 1987. Its first major activity was to organize a conference called "Women and the Environment: Charting a New Environmental Course." The conference, which took place in May 1990, provided a forum in Ontario to discuss such environmental issues as sustainable development, technology, energy, chemicals, health, housing, planning, forests, water and agriculture from women's perspectives. The conference brought together many people from a range of social and occupational groups in and around the Ontario area to discuss important environmental issues. Women from the academic community, environmental groups, government agencies, international organizations, native organizations and the private sector attended the conference. The conference highlighted the initiatives that women have taken and continue to take in environmental activities through presentations and discussions of their struggles, successes and frustrations. The WEED Foundation has published a quarterly magazine, *Women and Environments*, since 1976 to raise public awareness on environmental issues as they relate to women.

Although the impacts of educational projects are difficult to measure, the WEED Foundation has succeeded in raising the awareness of the roles women can play in mitigating environmental problems and in establishing a network of women involved in and interested in activity on environmental matters. WEED's magazine, *Women and Environments*, currently has 1,200 subscribers and continues to inform people.

**Postscript:** WEED has launched a nation-wide *Stop the Whitewash* campaign, in conjunction with the publication of Whitewash, a book by WEED members Liz Armstrong and Adrienne Scott, to eliminate the bleaching of sanitary products and diapers. WEED's President, Miriam Wyman, was the representative for women on Canada's official delegation to UNCED. WEED has also produced Power, Population and the Environment: Woman Speak.

## SUCCESS STORY: The Dolphin Project at Earth Island Institute Promotes the Use of Dolphin-Safe Technology

**Presenter:** Brenda Killian

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** The technique of using purse-seine nets on dolphins and/or drift/gill nets to catch tuna results in the death of hundred of thousands of dolphins who are intentionally and/or incidentally caught in the nets.

**Solution:** The Earth Island Institute's Save the Dolphins Project initiated a campaign to encourage tuna companies to sell only tuna caught without the use of driftnets or purse-seine nets set on dolphins and monitored the industry's compliance.

Schools of yellowfin tuna swim underneath dolphins in the eastern tropical Pacific, a zone which extends from San Diego to Chile. Tuna fishers in this area set their nets on dolphins, hoping to net the large yellowfin tuna which swim underneath. Over six million dolphins have been killed in this manner. Dolphins and many other marine species are also threatened by the use of huge drift/gill nets, which indiscriminately ensnare most things that cross their path. As long as a market exists for drift/gill netted fish, fishers will use this wasteful method.

Brenda Killian is Associate Director of the Dolphin Project of the Earth Island Institute, a U.S. environmental group founded in 1982. The dolphin campaign, which costs $600,000 annually, took off in 1988, when a biologist working with the Institute hired onto a tuna fishing boat and videotaped dolphins drowning in tuna nets. Television news programs broadcast the disturbing images. The Dolphin Project called for consumer boycotts of tuna and ran newspaper ads urging H.J. Heinz, the largest producer of canned tuna, to end the "dolphin massacre." Heinz, marketers of Starkist brand tuna, announced in April 1990 that it would no longer purchase tuna from fishing boats that used techniques which endanger dolphins. Bumble Bee and Van Camp (which markets Chicken of the Sea) made announcements later the same day that they were suspending the purchase of dolphin-unsafe tuna as well.

The Dolphin Project established the Global Monitoring Program, headed by Ms. Killian, to ensure the companies' compliance with their dolphin-safe pledge. Ms. Killian has made numerous trips throughout Asia, enabling the project to collaborate with environmental, governmental and industry officials to monitor how and where tuna and seafood products are caught and to ensure that tuna canneries, companies and processing facilities are accepting only certified dolphin-safe seafood products. In October 1990, Ms. Killian discovered during a monitoring trip to Thailand that Unicord, the parent company of Bumblebee, had purchased 2,200 tons of dolphin-unsafe tuna. Earth Island organized a demonstration and ran full-page ads in major newspapers charging Bumble Bee/Unicord with failing to enact policies to prevent dolphin-unsafe tuna from being purchased. The press covered the story extensively. Bumble Bee/Unicord finally promised to provide all the verification needed to meet a fully dolphin-safe standard. All three companies now appear to be complying with their pledge to purchase, process and sell only certifiably dolphin-safe tuna. The Dolphin Project's efforts have saved hundreds of thousands of dolphins, as well as the many other marine species subject to destruction due to the use of drift nets.

**Postscript:** Three of the largest producers of canned tuna - H.J. Heinz, Van Camp and Bumble Bee - agreed to halt the purchase of tuna from fishing boats that could not certify that their tuna was caught without endangering dolphins. The monitoring program discovered and publicized Bumble Bee's failure to comply with this policy.

## SUCCESS STORY: Mothers and Others for Safe Food

**Presenter:** Kathleen Lemler

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** The public is uninformed about the dangers of food contamination from pesticides and chemical fertilizers.

**Solution:** Mothers and Others for Safe Food formed to educate the public and to reduce pesticide use.

Agriculture in California uses 400 million pounds of the 2.6 billion pounds of chemicals sold in the U.S. each year. Vegetables and fruits are often sprayed repeatedly with pesticides during cultivation and as they travel to market. The public is often unaware of the potential dangers, and people typically have little access to information on how the food they consume was grown.

Out of concern over the dangers of pesticide residues in food, Mothers and Others for Safe Food was organized in March 1989, in Ventura County, California. Mothers and Others was founded by Frances Scharli and consists of 75 members, primarily mothers working both inside and outside the home, and a mailing list of over 1000 persons. The organization educates the public about harmful chemicals found in food, provides consumer information on organic produce and informs the public about existing laws and pending legislation as they relate to the pesticide issue. Other food safety issues are also addressed.

Mothers and Others For Safe Food has spread the word by staffing educational booths at county and street fairs, organizing community forums about organic agriculture, publishing a newsletter and the *Food Buying Guide*, and participating in conferences and Earth Day events. Mothers and Others also have a speakers' bureau where members make presentations to parent and service organizations on food safety issues. In addition, the group participates in the Ventura Food Safety Study Group, convened by the University of California Cooperative Extension Program.

Mothers and Others has been successful in raising public awareness of the need for farmers to use less pesticides in their farming practices. The group has been instrumental in increasing consumer demand for organic produce and therefore creating a greater market for organically grown crops in Ventura County. As a result, consumers have begun to examine the consequences of farming with harmful pesticides and chemical fertilizers. The group has plans to create a database to increase access to information on food safety and related issues. Mothers and Others for Safe Food has been recognized by Renew America and the United Nations Environment Programme for its environmental work.

**Postscript:** More people are aware of the dangers of pesticides. There has been an increase in consumer demand for food grown without pesticides and chemical fertilizers.

## SUCCESS STORY: Community Garden Program Provides Food for Houston's Hungry

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** Houston, Texas has a high number of hungry people yet allocates little funding to health and human services: half of all applications for food stamps are denied. The city lacked gardens and greenery in the inner city.

**Solution:** Community gardens were developed to add food, enhance nutrition and improve the local environment.

Houston, Texas, like many of America's big cities, has an estimated 400,000 hungry persons - many of whom are children and the elderly. Nutritional needs are severe, and diets are especially lacking in fresh produce. The Interfaith Hunger Coalition (IHC) of Houston Metropolitan Ministries (HMM) is a nonprofit organization whose primary goal is to alleviate hunger. Jean Joslin, a VISTA volunteer, started the IHC Garden Program in 1987. Ellen B. Mitchell has been the program director of IHC since 1987.

The IHC and its partner in this endeavor, Harris County Agricultural Extension, have planted 33 community gardens and have more in the planning stages or under construction. Funding has come from hundreds of congregations of all faiths, individual donations, United Way and, most importantly, from low-income gardeners themselves. All of the gardens have volunteer coordinators and gardeners. Conservation of organic wastes is done through a local firm that produces the compost for Houston's heavy clay soils. The gardeners, especially those with skill, need an initial investment of $500-$4,000. This initial cost is high because Houston's excessive flooding and clay soils require adaptions such as raised beds and adequate drainage and irrigation systems. IHC's efforts on this project also include translating the planting schedules and other information into Spanish in order to start gardens this year in the burgeoning immigrant barrios. Another recent garden project is in a subdivision of houses being renovated for homeless families.

The produce grown is either consumed by the low-income gardeners themselves or taken to nearby emergency food pantries and distributed along with other food items. Since the IHC gardens began they have produced over 200,000 servings of food, an average of 450 per garden per month. The gardens have improved the appearance and morale of inner-city neighborhoods. They have become a place for outdoor activity and exercise where people from different backgrounds join and work together. The gardens serve as local "libraries of horticulture" where people can learn about gardening. IHC's goal is to establish a first-rate community garden in every neighborhood in Houston.

The Interfaith Hunger Coalition received Renew America's 1990 National Environmental Achievement Award.

**Postscript:** The garden project has resulted in an outstanding show of public and private support in the community. Community morale boosted as the land was transformed from a garbage and weed infested lot to a productive and appealing garden.

## SUCCESS STORY: Kids for the Earth, Mount Vernon, New York

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**Region:** NORTH AMERICA
**Subject:** EFS

**Problem:** Young people lacked environmental awareness and education.

**Solution:** Patricia Monahan created an after-school club known as "Kids for the Earth" to educate and involve youth in environmental education and restoration programs.

Disturbed by the lack of environmental awareness around her, Patricia Monahan, a teacher at Nichols Middle School in Mount Vernon, New York, began to introduce ecological themes into her English classes. In 1988 under her leadership and guidance, her pupils formed Kids for the Earth, an after-school club. Patricia Monahan and her students began by discussing and researching environmental issues. Through a variety of means - poster contests, letter-writing campaigns, presentations, etc., - the club made significant headway in increasing environmental awareness in their school and community.

Kids for the Earth started a newsletter which they filled with articles, poems, stories and artwork on the environment in order to raise awareness in their school. After a presentation to the Board of Education on the dangers of chloroflourocarbons, Kids for the Earth succeeded in their efforts to ban the use of polystyrene in their schools, at least temporarily. The club also convinced the management of a large apartment building to institute the first apartment recycling project in Mount Vernon. In addition, by writing to their mayor, they were able to get city property for an organic gardening project. In 1991, after a year-long letter-writing campaign by the students, the U.S. Environmental Protection Agency stopped sending bulk mailings in plastic bubble-lined envelopes; the agency now uses recycled fiber envelopes. The club is now in its second year of desktop paper recycling and has served as a model for several other schools. They have also initiated tree-planting activities on school grounds. Kids for the Earth supports its activities through the sale of Earth Day T-shirts and green mesh shopping bags. A $500 grant from the Wallace-Reader's Digest Community Foundation funds their tree-planting activities.

Kids for the Earth's success has generated attention not only from the community, but from all over the country, with many organizations and schools following their lead. The program has fostered values and attitudes among young people which have empowered them to make a difference for the environment in their school and community.

**Postscript:** The project increased environmental consciousness and activities such as publication of an environmental newsletter, establishment of a recycling program in an apartment complex and organization of tree-planting activities.

## SUCCESS STORY: The Burlington Woman's Club Uses *State and* Local Resources to Educate Young Children in North Carolina

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** There are few environmental programs for young people in the Burlington, North Carolina community.

**Solution:** The Burlington Woman's Club organized a children's environmental education program at a nature park. Using qualified volunteers from the community, the club has harnessed existing resources to provide relevant information.

In order to prevent future deterioration of the environment, education needs to begin at a young age. The Burlington Woman's Club in Alamance County, North Carolina focuses their environmental education program on fourth and fifth graders. Their most successful project is "A Day in the Park" in which classes are taught at a 55-acre nature park on the outskirts of Burlington. This wooded tract of land, bordered on one side by the Haw River, lends itself as an excellent teaching ground. Learning stations are set up along the winding nature trails and in an open meadow.

Club members choose the curriculum, locate qualified instructors and serve as teachers' aides and guides. Fourth and fifth graders from each of the six city elementary schools attend. Each school has its own visiting day in the spring or fall. Qualified volunteers from the community serve as instructors. Instructors have included the following persons: two education specialists with the North Carolina Wildlife Commission, who used ecology games from "Project Wild" and presented a unit on spiders; the Director of Water and Sewer Department, who led a program on stream life in the park and explained how the water quality is affected; a fisheries biologist, who brought a boat, nets and traps to explain how state biologists do samplings of pond and river fish populations; a herpetologist, who shared her personal collection of turtles, snakes and lizards; and personnel from the North Carolina Museum of Natural Science, who presented a program on reptiles and amphibians.

The project has cost the club very little money. In 1988 the cost was $150 for the North Carolina Museum of Natural Science program. In 1989 $55 was spent to hire a substitute teacher for one of the instructors. The Burlington Woman's Club has exposed close to 900 students in two years to the joys of learning about the wilderness. The children have explored the differences in meadow and wooded environments, learned about wildlife habitat in the midst of the city, identified local plants and trees and developed a very real appreciation for water quality through random testing of the Haw River.

The success of "A Day in the Park" is evident; many program participants have returned to become involved in maintaining and protecting the park. Interaction with nature at a young age can be a powerful influence for future environmental conservation. In 1990 Burlington's Woman's Club received Renew America's National Environmental Achievement Award.

**Postscript:** The program has helped children to develop an appreciation for the environment, and they are beginning to understand the importance of preserving it. Many of the program's participants have returned as adults to help out the nature park.

## SUCCESS STORY: Wildlife Preservation and Protection Program, General Federation of Women's Clubs

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**Subject:** EFS

**Problem:** The public lacks adequate knowledge, concern and understanding about the plight and ecological value of endangered species.

**Solution:** A joint program was established between the General Federation of Women's Clubs (GFWC) and the Humane Society of the United States to develop projects for the preservation and protection of wildlife.

The General Federation of Women's Clubs (GFWC) is an international service organization of volunteer women. When Phyllis Roberts became International President of GFWC in 1986, she decided to initiate an ambitious wildlife protection program during her two-year term in office. She established contact with the Humane Society, and the two organizations joined forces to educate GFWC's membership and the public about wildlife and conservation issues. The partnership produced the Preservation of Endangered Species Project as well as the Wildlife Conservation, "Kids and Kindness" and "Companion Animals" projects.

Ms. Roberts promoted the wildlife preservation program to the 400,000 members of GFWC by speaking in every state and organizing 22 national and regional conferences which educated the membership on wildlife preservation issues. The *GFWC Clubwoman*, the organization's magazine for members, featured articles on endangered species. GFWC's 9,000 clubs were also sent a variety of other materials related to the wildlife preservation project from GFWC and various wildlife organizations and federal agencies. GFWC members were urged to join a conservation group, become informed about wildlife and conservation issues in their area, boycott products made from endangered or threatened species, report violations of wildlife laws, etc. Many wildlife organizations assisted GFWC in its promotion of the wildlife preservation program by sharing their expertise.

As a result of these efforts, GFWC members became involved in a variety of activities to protect and preserve wildlife. A fund-raising drive initiated by Ms. Roberts among the membership netted $50,000. $30,000 of this was used to establish a wildlife reserve in Utah in conjunction with The Nature Conservancy. GFWC donated the remaining $20,000 to other wildlife organizations. GFWC members contributed an additional $153,930 to wildlife groups as a result of their increased awareness. They also lobbied the U.S. Congress to ban the importation of wildlife products and to reauthorize the Endangered Species and Marine Mammal Protection Acts. These acts were subsequently reauthorized. In addition, GFWC members started "Kids and Kindness" programs in more than 1,100 schools. These programs teach children the value of justice, goodwill and humanity toward all life. State federations of Women's Clubs also established their own wildlife protection projects: they adopted whales, established sanctuaries, etc. By educating its large membership, GFWC created many new advocates for wildlife and conservation.

**Postscript:** The program increased awareness of the plight of endangered species among GFWC members and the public in general. GFWC members donated $173,930 to wildlife organizations, contributed 80,776 hours in volunteer service, raised $30,000 for the establishment of a wildlife preserve, and lobbied for environmental legislation.

## SUCCESS STORY: Center for Environmental Information Improves Public Access to Information

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** The public lacked access to environmental information and education opportunities. There was a growing need for timely, accurate and comprehensive information on environmental issues.

**Solution:** With a $5,000 grant from the Junior League of Rochester, Elizabeth Thorndike established an environmental clearinghouse to improve the availability of environmental information to the public.

There was a growing need for all sectors of the population to have timely, accurate and comprehensive information on environmental issues. Many people could not afford to pay for specialized information services, but needed information about an environmental problem. In response to this, Elizabeth Thorndike founded an environmental clearinghouse in 1974 with a $5,000 grant and volunteer assistance from the Junior League of Rochester, New York.

Ms. Thorndike had been working in Rochester on local environmental issues - editing the Sierra Club's local publication, organizing citizens opposed to road construction slated for a park, serving on a state senator's steering committee, etc. Through these efforts, Ms. Thorndike met Jean Thompson, who was on the Junior League's environment committee. She helped Ms. Thorndike obtain a $5,000 grant from the Junior League to start the Center for Environmental Information (CEI). The group also began with a commitment from the Environmental Management Council to pay for the printing of the first few issues of a newsletter. Later that year, the Gannett Foundation gave the center a $5,000 grant. In its early stages, the organization was managed by Ms. Thorndike, CEI's lone part-time staffer, and a group of 10 "founding mothers," volunteers from the Junior League. Ms. Thorndike's initial work at CEI included laying the foundation for the center's library and publishing its newsletter. The Center sought to meet the need for an independent, comprehensive and credible organization.

Over the last 17 years, CEI has expanded its activities and programs to an amazing extent. It still provides information from its library free to anyone seeking it, but it also puts out a variety of publications, and sponsors educational programs and conferences on issues such as global climate change, acid rain, environmental law, natural resource preservation and solid waste initiatives. In its programs, CEI strives to link the scientific community, decision makers and the public. Under Elizabeth Thorndike's stewardship, the organization has become an internationally renowned resource recognized for its unbiased information on environmental issues. It has a budget of more than $500,000 and 19 full- and part-time staffers. Approximately 80,000 persons over the past 17 years have been equipped to respond or cope more effectively with environmental problems by using CEI's library/information services, reading CEI publications or participating in CEI educational conferences, courses and workshops.

**Postscript:** CEI's multi-faceted program of publications, educational programs and information services related to the environment has become an internationally renowned resource utilized by approximately 80,000 people. Increased awareness and knowledge benefit resolution or mitigation of environmental problems.

## SUCCESS STORY: The Student Conservation Association Helps Protect and Preserve National Parks

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**Region:** NORTH AMERICA

**Subject:** EFS

**Problem:** The U.S. national parks were deteriorating due to lack of funding and human resources.

**Solution:** Elizabeth Cushman Titus organized a program which enables volunteer participants, mostly students, to accomplish quality work in national parks, forests, wildlife refuges and other public lands, under the guidance of highly qualified supervisors.

In the early 1950s, many National Park Service areas were being "loved to death." The agency's lack of money and human resources and a multitude of visitors were causing these national treasures to deteriorate. After realizing the problem, Elizabeth Titus and her teammate, Martha Hayne Talbot, organized a Student Conservation Association (SCA) in order to restore the parks, as proposed in Titus' college thesis of 1955. They were inhibited in their efforts by a lack of money, but had the support and help of many people. It took two years to get organized, funded and ready for the first four pilot projects, which took place in 1957 in two national parks. Thirty-two high school students repaired a nature trail that first year, while 22 college and graduate men and women assisted in a variety of capacities such as helping to organize a park museum, assisting the park naturalist and biologist with research, and assisting rangers and naturalists on duty.

SCA has expanded greatly over the last 34 years. Participants were once American students who volunteered exclusively for the U.S. National Park Service. Now SCA programs also include non-students of all ages and participants of many nationalities: participants come from all 50 states and more than 30 foreign countries and serve one of the five U.S. agencies involved in natural resource management. They work in one of 250 national parks, forests, wildlife refuges or other public lands. There are opportunities for minorities and special interest groups as well (the handicapped, the hearing impaired, the developmentally delayed, etc.) The program also has exchange programs with the USSR and with Mexico.

SCA programs have had a major direct impact on the country's protected areas. SCA volunteers undertake a vast array of activities to maintain, preserve, protect and improve wilderness areas. They repair trails, build bridges, collect data on wildlife, improve timber stands, do revegetative work, conduct interpretive programs for the public, etc. Their efforts result in an annual net gain of $1.2 million for cooperating agencies. SCA has also had an indirect impact on the environment through its effect on the lives of SCA program participants. Many alumni pursue careers in natural resource management or contribute to the environment in other ways. For example, one of the first participants in the program later became the first woman in the National Park Service to become a park biologist. It costs SCA $2500 to place one volunteer. Approximately 3/4 of these costs are covered by the agencies where the participants work; the remainder comes from private sources.

**Postscript:** Now in its 34th year, the Student Conservation Association has placed a total of 16,200 volunteers with one of the five U.S. agencies dealing with natural resources. The cooperating agencies have stated that their annual net gain has been $1.2 million of needed work accomplished.

## SUCCESS STORY: Preserving the Monongahela *National Forest*

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**Region:** NORTH AMERICA
**Subject:** EFS

**Problem:** The government had prepared a forest plan for the Monongahela National Forest in West Virginia. The draft of the plan was available for public comment during a period in 1984.

**Solution:** A committee organized by Mary Wimmer reviewed the forest plan. Ms. Wimmer then toured the state, urging citizens to get involved through a public awareness campaign that included making speeches and utilizing TV, radio and print media.

In 1984, a U.S. Government Forest Plan for the Monongahela National Forest in West Virginia had been drafted and was open to public comment.

Mary Wimmer, a Sierra Club member since 1982, was chosen to be the first co-chair of the new West Virginia Chapter's Conservation Committee in 1984. Her first task was to review the three-inch-thick draft Forest Plan for the Monongahela National Forest. She organized a committee of Sierra Club members to study the draft plan. The group prepared an 82-page evaluation of the Forest Plan which found that the plan placed too much emphasis on timber harvesting and not enough on recreation and wildlife.

Following the completion of this report, Ms. Wimmer spent five weeks touring West Virginia, urging people to get involved and comment on the proposed Monongahela National Forest Plan. She gave numerous speeches. She also utilized the mass media, presenting her message through TV, radio and newspaper articles and editorials. By the end of the forest plan's public comment period, the Forest Service had received nearly 4,000 letters and phone calls from concerned citizens. Ms. Wimmer's public awareness campaign had helped generate one of the highest response levels ever seen for a draft plan of a national forest.

Ms. Wimmer worked closely with the Forest Service during negotiations over the final version of the forest plan. The Forest Service decided to break with tradition and open their doors to the public during the drafting of the final plan. Ms. Wimmer's persistence and excellent working relationship with the Forest Service resulted in the preservation of 14.5% of the Monongahela National Forest.

When the final draft of the forest plan was completed, Ms. Wimmer wanted to ensure that the new plan would actually be implemented. During the development of the forest plan, Ms. Wimmer had continually updated the West Virginia congressional delegation. When the time came for legislators to appropriate funding for the plan, Ms. Wimmer and others reminded legislators that they were now responsible for funding and enacting the plan the public wanted. Because Mary Wimmer had kept them informed during the planning process, they were easily convinced. For her superb work with the Monongahela National Forest in West Virginia, Mary Wimmer received the Sierra Club's Special Achievement Award.

**Postscript:** Ms. Wimmer's work helped develop a more rational forest plan. activism has opened new doors for public involvement with government agencies concerning the use of natural resources.

## SUCCESS STORY: "Solviva" Winter Garden - An Innovative Energy-Efficient Solar Greenhouse

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**Region:** NORTH AMERICA

**Subject:** Energy

**Problem:** There is a need for agricultural and waste management systems which do not pollute the environment.

**Solution:** Anna Edey designed and built an experimental greenhouse that uses no fossil or nuclear energy resources for heating, cooling and electricity.

Anna Edey lives on Martha's Vineyard in Massachusetts. After her house on burned down in 1979, Anna Edey began to investigate ideas from all over the world about sustainable, reliable, cost-effective methods of providing food, heating, cooking, electricity and waste management. She designed and created the "Solviva" solar greenhouse in 1983. The cost of materials would have been $30,000, but 3M Company donated the four layers of Sungain glazing worth $10,000. It was built by one professional carpenter plus several volunteers. Solviva is a two-story, A-Frame, 3,000-square-foot structure containing the equivalent of over 3,000 square feet of growing space in raised groundbeds and hanging growtubes. The four layers of glazing provide as much insulation as four layers of glass. Two interior walls hold 3,600 gallons of water, which stores the solar heat. Six inches of fiberglass insulation in the walls and roof helps maintain a temperature that never goes below 44 degrees F, even in zero degrees F. In addition, a sun-warmed irrigation system with 600 gallons of water storage keeps the temperature of the soil in the planting beds in the high 50s, and a bank of photovoltaic cells powers the pumps, fans and lights which keep the system operating.

Anna Edey keeps 30 Angora rabbits and 100 chickens in spacious, free-ranging enclosures within the greenhouse. They provide important heat and carbon dioxide, as well as manure, low-cholesterol/low-calorie eggs, meat and Angora. She composts the bedding and filters the air through an Earth Lung Filter System to prevent too much ammonia from entering the growing area, which also takes advantage of the exhaled carbon dioxide to promote faster plant growth. No chemicals or pesticides are used, and for pest control, insects such as lady bugs and lacewings are unleashed to get rid of harmful insects. An equally important aspect of Solviva is that it is economically viable. While initially expensive to build, the greenhouse makes up the difference with savings on heating and cooling costs. With help from a state grant from the Food and Agriculture Department, Ms. Edey was able to improve her marketing techniques and now makes a profit selling her high-quality organic produce to restaurants.

Anna Edey works to share her success with solargreen energy and technology, and offers blueprints and training at Solviva for those who wish to learn from her experiences. She envisions such solar greenhouses on homes, schools and restaurants, as commercial enterprises or as community projects. On Martha's Vineyard, Ms. Edey works to help the community adopt more economically and ecologically sound methods for managing wastes, using solar energy in schools and other buildings, and in producing more of its food locally. She has been recognized by Renew America with the 1990 Environmental Achievement Award.

**Postscript:** A non-polluting, sustainable, dependable and economically viable model for producing high yields of food all year long has shown to be effective. This greenhouse can produce food for 200 people daily throughout the coldest winter climate with no use of pesticides/chemicals or fuel-derived heat. Solviva greenhouses are being planned for the U.S., Canada and Europe.

## SUCCESS STORY: Project ROSE (Recycled Oil Saves Energy) Conserves Energy While Recycling Used Motor Oil in Alabama

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**Region:** NORTH AMERICA

**Subject:** Energy

**Problem:** There was a lack of comprehensive recycling programs for used motor oil in Alabama. Improper disposal of motor oil pollutes water supplies and wastes used oil, a valuable non-renewable resource.

**Solution:** Project ROSE (Recycled Oil Saves Energy) was started in 1977 to provide guidance on energy conservation through the recycling of used motor oil.

Project ROSE was organized in 1977 to assist Alabama citizens in energy conservation by recycling used motor oil. The project was organized to educate Alabamians about energy savings and environmental benefits that result from recycling used oil; create awareness among Alabamians about the hazards which result from improper used oil disposal; promote recycling among DIYs (Do-It-Yourselfers) and small businesses generating used oil; organize and promote a convenient used oil recycling program for every county in the state; and document energy savings for the state of Alabama. Program sponsorship is provided by the ADECA (Alabama Department of Economic and Community Affairs) Science, Technology and Energy Division and the University of Alabama College of Engineering. ADECA sponsorship directs Project ROSE to conserve energy for the state by recycling a valuable, non-renewable resource: used oil. Education, public awareness, and recycling promotion are the program's thrust under the University's guidance.

Project ROSE serves citizens who change their own oil or DIYs by providing local collection center/recycling information. The project encourages DIYs and small businesses to practice appropriate recycling management techniques and works to educate the public about the energy savings and environmental benefits that result from recycling used oil. Local community resources and volunteer energy are tapped to support and further Project ROSE. By offering local communities and cities within the state several recycling options, Project ROSE enables the design of individualized programs to meet specific local needs. Hence, Project ROSE mobilizes citizens to participate in one of three types of programs: curbside collection, collection centers and drum/tank siting.

Currently 300 collection centers accept used oil in 45 of Alabama's 67 counties. The success of Project ROSE is attributed to its grassroots approach of communicating the message that each individual can make a difference in the environment. Education and community commitment are the hallmarks of the project. Project ROSE has incorporated these essential elements into a philosophy which has made the program effective in improving local environments, instilling civic pride among DIYs and participating Project ROSE organizations. By unifying civic, government and environmental groups in a cooperative venture, destructive environmental habits have been reversed.

Project ROSE received Renew America's Environmental Achievement Award in 1990.

**Postscript:** The program has reached 45 of Alabama's 67 counties, mainly as a result of Project ROSE's effectiveness in unifying civic, government and environmental groups in support of energy conservation. Project ROSE is now coordinating with Alabama marine shops and marinas in an effort to collect used oil from boat motors. A pilot program was initiated in April, 1992 and has proven to be very successful.

## SUCCESS STORY: "Growing Solutions" Encourages Water and Energy Savings In The Urban Environment

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**Subject:** Energy

**Problem:** The Las Vegas, Nevada metropolitan area suffers from severe air pollution and faces a potential water shortage. Part of the air pollution arises from power generation, and a considerable amount of power is used for cooling.

**Solution:** A new organization, "Growing Solutions," was created to encourage energy and water conservation through planting of water-conserving trees and shrubs in the urban district.

A woman from the U.S. Environmental Protection Agency laboratory in Las Vegas contacted Lois Sagel, Environmental Advisor for Soroptimist International of the Americas, to find out how to get people together to plant trees for Earth Day 1990. Lois arranged a meeting with her and two other Soroptimists and a woman from the Cooperative Extension Service. This organizing group of five women invited representatives of city, county and state agencies, utilities and other organizations to help. The larger group formed committees, set goals and enlisted others, and within two months, a new organization was formed. "Growing Solutions" is affiliated with Global Re-Leaf, and its mission is to organize "a campaign of education and action by the people of southern Nevada aimed at reducing global warming and air pollution while conserving energy and water and improving the environment."

The organization embarked on a number of projects, including the planting of 92 trees by second grade classes at local schools in conjunction with music, poetry and art around the theme "Save the World - Plant a Tree"; the operation of a speakers' bureau; the staffing of information booths at Earth Day Fair; and the publishing of posters, 25,000 booklets and 30,000 tree tags with care instructions for the "Trees of Tomorrow" program. Funding for the organization has been from corporate sponsorships and donations, partnerships and individual and organizational donations.

The project has many significant environmental benefits. Three well-placed trees can reduce home air conditioning costs by 25% and reduce carbon dioxide by 25 pounds per day. With less energy demand, more fossil fuel will be conserved. There has been an overwhelming demand by the public for educational materials and advice. The water utility estimates that nearly 70% of local water use is for landscaping. This campaign is making a difference as the public is planting water-tolerant trees and plants. The plants will reduce the "heat island effect" as an alternative to rock or paving which may increase the "heat island effect." The most beneficial environmental impacts of the "Trees for Tomorrow" project include reduction of air-conditioning use and needs due to increased shading, improved air quality, reduction of water used for landscaping, improved community appearance, and public awareness and education.

**Postscript:** Environmental consciousness in the community has been raised through tree planting projects, posters and booklets.

## SUCCESS STORY: Composting Garbage with Worms

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**Region:** NORTH AMERICA
**Subject:** Waste

**Problem:** There was a general lack of interest in and knowledge about the environmental benefits of composting.

**Solution:** Mary Appelhof started a one-woman campaign to educate people on the benefits and importance of worm composting.

Mary Appelhof has a goal: to change the way the world thinks about waste. Her answer lies in raising worms. Biologist and educator Mary Appelhof is sole-proprietor of Flowerfield Enterprises in Kalamazoo, Michigan. She has spent 19 years researching vermicompost and people's attitudes towards composting with worms at home. With this knowledge, Mary Appelhof wrote *Worms Eat My Garbage* (Flower Press, 1982), an easy-to-read, 100-page manual on how to set up a worm bin.

Her activities focus on demonstrating that composting with worms is an inexpensive and effective way to reduce waste. Individuals place a pound or so of redworms in a wooden box containing properly moistened bedding such as leaf mold or shredded newspaper. Aeration holes are punched into the box. Food waste - lettuce leaves, citrus rinds, apple peels and plate scrapings - is buried in the worm bin. Worms and bacteria consume the waste, converting it in about four months to a dark, crumbly humus which can than be used to fertilize plants. Placement of a worm bin depends on climate and preference. Periodic minimal maintenance is required.

Ms. Appelhof's projects educate and inform people about worms and waste. To get people to think of waste as a resource, she uses such diverse media tools as brochures, articles, radio and TV interviews, speeches and displays. Environmental educators, teachers and program directors have used her book as a resource for teaching this composting technique to others. Over 20,000 people and institutions in every state and three dozen foreign countries have bought the book. Records show that nearly 10% of those who buy *Worms Eat My Garbage* set up their own system. As a result of the example that Mary Appelhof has set, nonprofit organizations, state recycling offices, 4-H programs, and a teacher training institution are now developing additional instructional materials.

For her composting with worms project, Mary Appelhof received Renew America's 1990 Environmental Achievement Award.

**Postscript:** Mary Appelhof's work has changed the attitudes and perceptions of many people toward worm composting. A variety of institutions have incorporated her ideas into their material on waste and composting. She has presented her work at conferences in England, France and the Philippines.

## SUCCESS STORY: Woman Inspires Temple Terrace, Florida to Recycle and Educate the Youth about the Environment

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**Subject:** Waste

**Problem:** A small city in Florida lacked conservation education, waste disposal information and recycling initiative.

**Solution:** The local Woman's Club started its own recycling project and beautification programs, while beginning to educate the public on environmental issues.

In Temple Terrace, Florida, community members showed a general disinterest in the environment in spite of the urgency of many environmental problems. Few of the 15,000 citizens practiced effective recycling, and there was a problem with litter on roadsides and riverbanks as well as in city parks. Recognizing the connection between conservation and waste disposal, Frances Bianco acted to better her community.

As conservation chair of the Temple Terrace Woman's Club since 1985, Ms. Bianco initiated a newspaper recycling program using her contacts through the club and the community. She began by collecting newspapers in her garage. By 1987 the project had grown enough to have curb-side bins for the collection of newspapers, and currently, residents can recycle a variety of materials. Ms. Bianco, at the same time, stressed environmental education, writing a weekly environment article for the local paper. She also targeted the school system for conservation education and recommended projects which covered all grade levels. These projects varied from art and essay contests to the "Great Glass Caper," an elementary school glass recycling drive. The CEPUP (Chemical Education for Public Understanding Program), a hands-on science program which Ms. Bianco was instrumental in acquiring, reached about 1,200 ninth grade students in 1990, and because of her efforts, the "Waste In Place" program was adopted by all Hillsborough County schools for K-6 grades. These school projects are being replicated by other schools in the area and could easily be applied to schools across the country. Ms. Bianco, in conjunction with Public Lands Day, also enlisted the support of other Woman's Club members, Boy Scouts and other community members to clean up the local riverbanks, city streets and city parks.

By following the example of Frances Bianco and learning from Woman's Club sponsored programs, many citizens of Temple Terrace have increased the environmental soundness of their lifestyles. At this time, over 77% of residents participate in the curb-side program. City streets, parks and riverbanks are all noticeably cleaner than before the cleanup efforts led by Ms. Bianco. Recycling saves the city money in dumping costs - city dump trucks hold 15 tons of garbage and each trip they make to the dump costs the city over $750. It also generates revenue to further local environmental causes. For instance, Ms. Bianco directs much of the recycling revenues into a tree-planting program. Most importantly, the city's children are growing up with a sound conservation backgrounds, preparing them for environmentally-conscious living in the future. For her efforts, Ms. Bianco received the Temple Terrace Citizen of the Year Award in 1989.

**Postscript:** The community now has curb-side recycling for newspapers, citizens are more environmentally aware and the level of litter on public lands has dropped substantially.

## SUCCESS STORY: Woman Organizes Grassroots *Campaigns Against* Hazardous Waste

**Presenter:** Linda Wallace Campbell

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**Region:** NORTH AMERICA

**Subject:** Waste

**Problem:** The number of hazardous waste landfills and incinerators in the southern United States is increasing, especially in poor, rural communities. The dumps represent a growing danger to the environment and to the health of area residents.

**Solution:** Activist Linda Campbell, head of Southern Women Against Toxics, mobilizes and empowers communities to protest the siting of hazardous waste facilities and lobbies the government and elected officials to strengthen environmental laws.

Hazardous waste dumps are often sited in poor, rural communities; thus, the South has often been the location of choice for such facilities. If local, state and federal governments approve pending applications, all 13 southern states could have a hazardous waste disposal facility within the next few years. The largest toxic waste dump in the U.S. is located on 2,700 acres in Emelle, Alabama, a poor, rural community in predominantly black Sumter County, which also has one of the highest cancer rates in the state. Toxic waste facilities present numerous environmental threats, including air pollution, the leaching of toxins into soil and water sources, the danger of accidental toxic spills by trucks, etc.

Linda Campbell lives a few miles from Emelle. In 1985 she learned of the toxic waste dump by reading an article in *National Geographic* (the dump itself had no sign indicating that it was a toxic waste site). Ms. Campbell wrote a letter to the editor of her local newspaper and in this simple way launched her career as an environmental activist. Since then, she has become well-known for her strong opposition to toxic waste facilities. She organized the Alabama Environmental Coalition and most recently, Southern Women Against Toxics (SWAT), which she formed in August 1991. Regardless of the organization under whose banner she works, Ms. Campbell's approach involves empowering people to fight the health and environmental threats posed to their communities by toxic waste sites. She is a grassroots organizer who uses protest techniques to prevent the siting of toxic waste facilities and to minimize the environmental and health threats posed by toxic waste facilities already in place. Ms. Campbell has worked with citizens throughout the U.S., but especially in the South, giving them the tools that they need to organize and fight toxics pollution. Her office serves as a clearinghouse for information on hazardous waste incinerators and landfills. She also lobbies politicians to enact stronger environmental laws, such as limiting out-of-state toxic waste importation and taxing polluting industries.

The battle against toxic waste facilities is tough, because waste companies are powerful, people underestimate the real risks of chemical product emissions, and toxic waste dumps provide jobs and income to economically-depressed counties. Despite the difficulties, several protests led by Ms. Campbell have been been successful in turning away would-be hazardous waste facilities. In other cases, such as the "Cadillac of landfills" in Emelle, activists can help ensure that the company operating the hazardous waste site is held responsible.

**Postscript:** Several campaigns and protests led by Linda Campbell have been successful enough to turn away would-be hazardous waste facilities. In addition, the protests have brought attention to environmental issues and citizen's rights. The Southern Women Against Toxics won the UNEP's 1992 Global 500 award given at the Earth Summit.

## SUCCESS STORY: Akwesasne Mother's Milk Project

**Presenter:** Katsi Cook

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**Region:** NORTH AMERICA

**Subject:** Waste

**Problem:** Emissions from industries had contaminated waterways, land and air near the Mohawk reservation. There was a particular concern for children's health and the reproductive health of women in the community.

**Solution:** The Akwesasne Mother's Milk project was established to assess human health effects of exposure to industrial pollutants, with a focus on the nursing mother and child.

Where the St. Lawrence River first meets the Canadian border at the 45th parallel, there lies a community of 7,000 Mohawk people who for centuries have drawn their subsistence from the local food chain. Since 1985 the Akwesasne Mother's Milk Project, initiated by Mohawk women, has been concerned with the enormous problem of toxic contamination of their water, air, soil and food chain by local industries (General Motors, Alcoa, Reynolds, among others).

In particular, the women were concerned about reproductive health effects of known contaminants such as PCBs, mirex, DDT, DDE and HCB. One traditional elder woman stated, "We've got to do something about these ABC's!" Katsi Cook, a community midwife and women's health educator, initiated the Akwesasne Mother's Milk Project in 1985 to give momentum to the search for answers about toxic exposures and reproductive and family health. The Project was founded on the idea that Mohawk women themselves would be the organizers, participants and investigators, and not merely research subjects. The project conducts community-based research that focuses on the analysis of organochlorines in mother's milk, fetal cord blood and maternal and infant urine. New York State Department of Health provided chemical analysis of breast milk samples. The project also does community education in the form of its publication *First Environment*, funding for which has been provided by a grant from the Ruth Mott Fund. The newsletter informs the community of the research process and issues and provides practical health information, such as advisories on prenatal and infant nutrition in a toxic environment. The Akwesasne Mother's Milk Project is one of 11 Superfund studies funded by Congress through the NIEHS (National Institute of Environmental Health Sciences) and the only study dealing with human health.

The Akwesasne Mother's Milk Project works in collaboration with the Akwesasne Task Force on the Environment (ATFE) made up of tribal and Mohawk band council officials, the traditional Longhouse and concerned community individuals to strengthen community efforts to respond to its toxic issues on many levels. In sharing skills, research, contacts and resources with the ATFE, the Akwesasne Mother's Milk Project has strengthened community awareness of the link between increased environmental degradation and human health. It has also helped develop a network of environmental and health organizations that work together to clean up the environment and compensate the victims. The project engenders cultural and social self-esteem for women and their families and increases the individual's capacity to respond to critical environmental issues.

**Postscript:** In collaboration with the Akwesasne Environmental Task Force, the project is forcing serious re-evaluation, remediation and compensation for environmental damage and environmental victims. The project has raised community awareness of the link between increased environmental degradation and human health.

## SUCCESS STORY: League of Women Voters Task Force on Recycling, Baton Rouge, Louisiana

**Presenter:** Mildred Feldman

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**Region:** NORTH AMERICA

**Subject:** Waste

**Problem:** Baton Rouge landfills had reached their capacity. Louisiana Department of Environmental Quality issued a closure order on August 2, 1989. As of February 1, 1992, the landfill accepted no more garbage.

**Solution:** The League of Women Voters - Baton Rouge (LWV-BR) initiated a recycling program to divert recyclable material away from the local landfill.

The city of Baton Rouge, Louisiana was straining its landfills. There was no responsible waste disposal plan or recycling program. The Louisiana Department of Environmental Quality issued a closure order on August 2, 1989. The local landfill was to be closed down in three phases, ending in February, 1992.

Due to these circumstances, the League of Women Voters - Baton Rouge (LWV - BR) initiated a recycling program to cut down on the amount of waste that had to be placed in a landfill. The on-site recycling was started on the second Saturday of November, 1989 and continued through the second Saturday of December, 1990. Mildred Feldman's role was to obtain an easily-accessible site on which to collect the recyclable items monthly. She coordinated the whole collection process, a job which included determining the companies who would be responsible for picking up the collection. The project depended on volunteers from the community. The objectives of the program were threefold: 1) to provide the opportunity for the eastern part of the community to participate in recycling; 2) to educate the area about the importance of recycling; and 3) to help lay the groundwork for a successful city-parish curbside recycling effort.

These objectives were attained. Approximately 700 families participated at one time or another by contributing recyclables. The educational effort was aided greatly by television, radio and newspaper coverage. The East Baton Rouge City Parish started curbside collection in January 1991. Three of the four pilot projects started by the city in July 1990 were in the geographic area of the League's collection site. There was 70% participation there as opposed to 25% in similar programs nationwide. Through the recycling program, a fellowship was fostered among the Leaguers themselves and with the teenagers in the community who helped.

The LWV-BR recycling program was effective. It successfully conserved natural resources and reduced waste. Savings in pounds of materials diverted from the landfill amounted to 20,000 of plastic, 2,752 of aluminum and tin and 139,400 of glass. Recycling kept many items out of the local landfill where the groundwater is in danger of becoming contaminated. The project became self-sustaining after a few months. The project fostered cooperation among diverse groups and is easily replicable. Mildred Feldman received Renew America's National Environmental Achievement Award.

**Postscript:** Waste was reduced and managed. Approximately 700 families participated in the program. Environmental awareness increased among the communities of Baton Rouge. The city started four recycling pilot projects in July 1990.

## SUCCESS STORY: Arkansas Environmental Congress Fights Incineration Plant in Jacksonville

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**Region:** North America

**Subject:** Waste

**Problem:** Toxic contamination from three Superfund sites threatens the health and environment of the town of Jacksonville, Arkansas. Operation of an incinerator to burn the thousands of barrels of toxic waste poses a further threat to the community.

**Solution:** Door-to-door canvassing was done to generate local support to shut down the incinerator. Weekly town meetings were held to discuss possible solutions. A legal injunction against the operation of the incinerator is being pursued.

"Dioxinville, U.S.A." is the tragic nickname of Jacksonville, Arkansas, which has one of the most toxic chemical sites in the country - the abandoned plant of the Vertac Chemical Corporation. The Vertac site ranks No. 18 on the EPA's list of 1,218 "Superfund" sites for cleanup. In addition, Jacksonville has two other highly toxic sites: two city-owned landfills that are on the Superfund list. Over the past fifty years, three different chemical companies manufacturing toxic chemicals such as Agent Orange have produced one of most serious uncontrolled hazardous waste sites in the nation. Unsafe levels of dioxin have been found in the air, soil, city sewer system and the sediment of the nearby flood plain. The community suffers numerous ailments and illnesses such as allergies, miscarriages and a high number of cancers and SIDS (Sudden Infant Death Syndrome). The EPA plans to burn the 30,000 drums of chemical waste right on the Vertac site, which borders some residents' backyards. The burning would take place 24 hours a day, seven days a week for up to six months to a year. Early test signs are foreboding: the incinerator failed the first test burn in December 1990, and the incinerator's first operational burn resulted in an explosion.

Patti Frase lived down the street from the Vertac site from the age of nine to her early 20s. Since 1982 Ms. Frase has played an instrumental role in the fight to clean up Jacksonville. Ms. Frase, along with other community members, has worked to shut down Vertac Chemical Company, gain compensation for families contaminated, and prevent the incineration of toxic waste. The Arkansas Environmental Congress (AEC) began in Patti Frase's living room with the goal of preventing the incineration of toxic waste at the site. The AEC, consisting of 2,000 members, is supported by local contributions, the National Toxics Campaign, Greenpeace and the Citizens Clearinghouse for Hazardous Waste. Ms. Frase has faced strong pressure from chemical companies, the EPA's regional office and Jacksonville business groups.

Under the direction of Ms. Frase, the AEC undertook a grassroots effort involving canvassing and meetings in order to mobilize the community against the menace. Advertisements in the local paper called for financial and active support. Weekly town meetings were held to discuss possible solutions. National attention and aid came in due to the precedent that would be set by this environmental battle. The plant is no longer in operation and the fight continues in the courts as a permanent federal injunction against the incinerator is sought. An EPA official has called for an inquiry into the EPA's regional office's handling of the Vertac case, charging the office with an "abuse of power." Ms. Frase and the AEC have succeeded in bringing needed attention to the critical situation involving the country's hazardous waste.

**Postscript:** In January, 1992 the EPA and the Arkansas Department of Pollution Control and Ecology granted Vertac Site Contractors a license to burn the toxic waste in the Jacksonville incinerator. The incinerator has been operating irregularly due to mechanical problems and may be suspended due to funding shortages. The AEC continues its fight to close the incinerator and protect the health and environment of their community.

## SUCCESS STORY: PAHLS - A Grassroots Alliance for Environmental Justice and Waste Management

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**Subject:** Waste

**Problem:** The citizens of Wheeler, Indiana (population 400) discovered that the sanitary landfill at the edge of town was licensed to accept toxic wastes and was doing so.

**Solution:** Residents formed a grassroots group called People Against Hazardous Landfill Sites (PAHLS) and pressured local, state and national officials, as well as the landfill itself.

In June 1981, Susanne Greer, alerted by the noxious fumes drifting past her Wheeler, Indiana farm, began making inquiries to government officials about the sanitary landfill adjacent to her property. She then organized a small group of neighbors who had similar apprehensions about the dump. They learned that Waste Management, Inc. had a permit to operate the landfill as a RCRA interim status facility: the dump was receiving hazardous wastes such as oil refinery sludge and paint-contaminated soil from a Superfund site.

Ms. Greer's group formed "People Against Hazardous Landfill Sites" (PAHLS) to oppose toxic waste dumping in Wheeler. Thirty-five members formed subcommittees, researched the issues and met weekly for the next seven years. PAHLS conducted a door-to-door information campaign, held town meetings and rallies, went to the U.S. Congress, published fact sheets and a quarterly newsletter. They obtained extensive publicity through network television coverage. Residents picketed the landfill, erected signs and tied red bows around trees to protest the toxic waste facility. Eight hundred people from five towns participated in the campaign. In the face of strong local opposition and heavy publicity, the Wheeler landfill withdrew its application for permanent status as a toxic waste dump.

As word spread about Wheeler's victory, grassroots groups tackling environmental problems began to contact PAHLS for advice. Thus PAHLS evolved into a statewide alliance working to develop and support grassroots groups addressing ecological issues in the Midwest. Besides developing the capacities of neophyte environmental groups, PAHLS has been active at the state capital, providing commentary on air and water quality regulations. The group's area of concern has broadened over the years to include a variety of environmental issues. Their newsletter, always a key part of PAHLS's strategy, is now published bimonthly and sent to some 4,000 people in 45 states and five foreign countries. It includes articles on pollution prevention, environmental threats, organizing strategies, pending legislation, etc. The publication has a Midwestern focus, but covers national and international environmental news as well. In recognition of her work with PAHLS, Susanne Greer received Renew America's 1990 Environmental Achievement Award.

**Postscript:** The immediate impact is that the landfill dropped its application to become a permanent hazardous waste facility. The group has become a full-fledged statewide grassroots organization and has moved to an office in the county seat. The group's area of concern has broadened to include a variety of environmental issues.

## SUCCESS STORY: Woman's Club of Vista's Recycling and Hazardous Waste Education Programs

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**Subject:** Waste

**Problem:** The community lacked a recycling program and adequate information on household waste disposal. Landfill space was running out and many natural resources were wasted due to the discarding of potential recyclables.

**Solution:** Ms. Nichols and other members of the Vista Woman's Club organized a recycling program in their community, printed and distributed an information booklet on hazardous household waste and conducted environmental education in the schools.

In Vista, California, household waste disposal contributed to dwindling landfill space, natural resource depletion and potential contamination from hazardous waste. Before 1978, not only were recycling facilities not available, but most community members lacked vital information about hazardous household waste disposal. As Woman's Club of Vista's Recycling Chair, Miriam S. Nichols began to address the problem.

Ms. Nichols first organized a recycling project with other club members in 1978. They started small with members bringing their newspapers to a drop-off center. Over the years, the recycling program evolved. The women's group broadened it to include glass, aluminum, plastic, phone books, plastic bags and paper bags. They established a large drop-off center in a grocery store parking lot. The group also initiated curbside recycling in three mobile home parks. Initially, the costs of the program were covered by a grant from the California Federation of Women's Clubs. In 1985 they began curbside collection using borrowed vehicles. Three years later, the California Department of Conservation awarded the club a $9,170 grant for the purchase of a pick-up truck to perform litter abatement and recycling projects. As the recycling program progressed, it became self-sustaining and even revenue generating. The monthly cost of the curbside recycling is only $33, since it relies mainly on volunteer labor. With monies earned from recycling, the group has carried out other environmental projects such as tree planting, holding an environmental fair for the public and establishing a scholarship fund for high school seniors interested in environmental careers. Ms. Nichols incorporated other important community issues in her program, for example, hiring boys from an abused children's home for curbside pick-up of recyclables from elderly people. She took her efforts a step further in 1988 when she and other club members prepared a comprehensive pamphlet on hazardous household wastes. By the end of 1990, over 25,000 copies had been distributed to private homes, schools, fire stations, the Chamber of Commerce and "Welcome Wagon." In addition, the Woman's Club carried out educational programs for 2,000 schoolchildren in cooperation with the USDA Forest Service.

Community residents now have an extensive recycling program in place and access to hazardous household waste information. In 1990 over 300 tons of newspapers, 5.5 tons of plastic, 660 pounds of aluminum, 410 phone books, 1,200 plastic bags, 1,000 paper bags and 100 tons of glass were collected. By initiating recycling programs in Vista, Ms. Nichols demonstrated to community leaders that recycling programs could work and should be expanded. Her program ultimately led to the adoption of a city-wide recycling program in Vista that serves over 14,000 households.

**Postscript:** Ms. Nichol's community now has recycling opportunities available and access to important information on waste disposal. She has filled speaking engagements, urging citizens to write President Bush, resulting in over 150 letters requesting his presence at the Earth Summit. Ms. Nichols has continued to write an environmental column for a local newspaper and served as chair for the city's Environmental Quality Commission.

## *SUCCESS STORY:* Volunteer-Based Beach Cleanup Campaigns

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**Country:** USA
**Region:** NORTH AMERICA
**Subject:** Waste

**Problem:** Marine wildlife, including fish, birds and mammals, were ingesting plastic and becoming entangled due to the dumping of plastic and other debris into the marine environment.

**Solution:** Beach Cleanups and Beach Cleanup studies were established. Data were recorded on the type and amount of debris collected in all U.S. coastal states and an environmental awareness program in coastal states was instituted.

Beaches closed due to dangerous trash levels, plastic bags consumed by sea turtles, and seals and sea birds strangled by unbreakable six-pack holders: these are a few examples of the major effects of the dumping of debris into the marine environment. The rapid increase in the production and use of plastics in the last fifty years has significantly affected the amount of non-biodegradable wastes in the marine environment.

In 1986 Kathy O'Hara and Linda Maraniss initiated a beach cleanup by volunteers for the Texas coast. Kathy O'Hara designed a data card and a database that were used to classify and keep track of the quantity of debris retrieved. Kathy O'Hara is now the director of the Center for Marine Conservation's Pollution Prevention Program, of which the International Coastal Cleanup is a part. Under her direction, the beach cleanup has grown from the Texas Coastal Cleanup into an International Coastal Cleanup with 108,749 volunteers. The Center for Marine Conservation coordinates the efforts of 25 state coordinators, who in turn coordinate local zone captains. The captains coordinate the volunteers. Wherever possible, the debris collected in the campaigns is recycled. Education of the public is a key part of the CMC program. Slide shows, videos, presentations to organizations and educational brochures are all used to promote environmental awareness. Perhaps the most effective education comes from participation in the beach cleanups. The program costs $300,000 a year and is supported by CMC's membership and special contributions from federal agencies, foundations, corporations, etc. Women have been the program's core: Kathy O'Hara initiated and developed the program and now supervises it, Lisa Younger is the 1991 International Coastal Cleanup Coordinator, and Betsy Schrader directs the Marine Debris Information Office.

The volunteer efforts mobilized by CMC's Pollution Prevention Program on behalf of the marine environment have been massive: if all 1990 beach cleanup volunteers were paid a minimum wage of $4.25 for their work, the cost would total at least $1.3 million. In addition to the value of the cleanup itself, data collection during cleanup to identify specific sources of debris, determine dumping trends and design long-term solutions has made an important contribution to the environment. For example, MARPOL Annex V, which took effect in December 1988, is an international ban on dumping plastics at sea. It also regulates other ocean dumping. Data collected by CMC during beach cleanups was used to persuade the U.S. to ratify this treaty. In addition, data obtained during CMC beach cleanups in the fall of 1988 serves as a baseline to monitor the effectiveness of MARPOL Annex V.

**Postscript:** Removal of marine debris from the beaches reduces the hazard to wildlife. Debris information was cataloged enables the development of long-term solutions and in many cases is traced to a source. Data collected during cleanups bolsters the case for restrictions on ocean dumping.

## SUCCESS STORY: Collection Service For Recyclables in St. Joseph, Missouri

**Presenter:** Kip Oschwald

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**Region:** NORTH AMERICA

**Subject:** Waste

**Problem:** The city of St. Joseph lacked a waste recycling program, and as a result, the indiscriminate dumping of recyclables into the city landfill was occurring.

**Solution:** In cooperation with three other organizations, the League of Women Voters established a recycling program for community members.

The city of St. Joseph, Missouri had no system for recycling solid waste material, and as a result, there was indiscriminate disposal of recyclables in its landfill. Attempting to alleviate the problem, the local League of Women Voters (LWV), led by Kip Oschwald, set up a neighborhood drop-off site to collect recyclables.

The neighborhood storefront site was donated by the owner. Cardboard boxes for the collection were donated by local businesses. Kip Oschwald, chairman of the LWV recycling committee, organized volunteers from the League of Women Voters, Audubon Society, Cub Scout Pack and Senior Girl Scout Troop to collect glass and aluminum and tin cans. Volunteers transported the recyclables to in-town markets. The only outlay of money was to advertise the hours of operation of the site in local newspapers at a cost of approximately $5 per week. Community residents responded by bringing in their recyclables each week to the designated drop-off site.

The project was successful for 15 months until their was no longer a market for the recyclable goods and they ran out of storage space. However, Ms. Oschwald didn't give up so easily. She initiated a speaker's bureau where she informed the people of the community about the waste problem and educated them on the importance of recycling for the conservation and management of the environment. As a result of her talks, local church and neighborhood groups adopted the idea and organized drop-off sites all over town. Eventually, a private recycling company called ABC Recycling was established. The firm is equipped to recycle glass, aluminum and tin cans, newspaper and plastic. Through the inspiration of of Ms. Oschwald's pilot project, St. Joseph now has a market for recyclable goods and a more environmentally conscious community.

**Postscript:** Recyclable materials were kept out of the landfill and local organizations earned income from the program. Now neighborhood and church groups have set up similar sites and a private recycling firm has opened up in town.

## SUCCESS STORY: The Wilmington Junior Women's Club Educates Community on Waste Reduction through its "Model Community" Program

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**Region:** NORTH AMERICA
**Subject:** Waste

**Problem:** Disposal of solid waste has become a major problem in the U.S. Within two years, the landfills of half of all U.S. cities will either run out of room or close down due to environmental hazards.

**Solution:** The Wilmington Junior Women's Club set up a recycling drop-off site and initiated a "Model Community" program which educated and encouraged homes, businesses and organizations to set examples of waste prevention and maximum recycling.

The Wilmington, Illinois Junior Women's Club, a community service organization, learned of an innovative educational program in Champaign, Illinois called "Model Community." Developed by the nonprofit Central States Education Center, the program's ultimate goal is to transform average communities into model communities of waste prevention and maximum recycling. The Model Community program establishes waste prevention and recycling opportunities in businesses, homes, and civic organizations; designs standards for different sectors of the community based on these opportunities; and encourages community members to meet these standards and become certified as a model home, florist, school, etc.

Waste prevention, recycling, utilization of recycled materials and a miscellaneous category are the four points of standards used to certify a home, business or organization as a model. For example, a model video and photography shop would use glass mugs rather than styrofoam cups, paper bags rather than plastic trash bags and nontoxic chemicals in photo processing. They would also recycle cans, cardboard and office paper; reuse scrap paper; use recycled paper; and promote the "model community" concept.

In February 1990, the Wilmington Junior Women's Club applied for a Will County recycling grant totaling $8,000 for the purpose of establishing a Model Community program in Wilmington. The grant, which paid for training and technical support from the Central States Education Center, was approved in March. After receiving training from Central States, the Women's Club established a drop-off site; its proceeds would be used for advertising and Model Community programs. Brochures explaining the drop-off site and Model Community program were distributed to every household in Wilmington and two surrounding communities through the local newspaper. In June 1990, they opened the monthly drop-off site. Next, Central States held three workshops for the Women's Club on how to establish models. Each member then chose businesses to approach for participation, worked with them to refine and finalize the standards, certified the businesses and advertised the certification ceremony.

Response to both the recycling and the Model Community projects has gone beyond the Club's expectations. For example, from June to December 1990, 95,000 pounds of glass, aluminum, tin, plastic, cardboard, newspapers and computer paper were collected at the recycling drop-off site. The Club's Project Chair, Sheryl Puracchio, was recognized by the Illinois House of Representatives for her outstanding community service through the Model Community program.

**Postscript:** Due to the success of the recycling drop off, the City of Wilmington decided to start the first rural curbside program in the county. In next years, the Club plans on receiving additional funding to develop a more comprehensive program and to build a playground from recycled plastic lumber. Future goals include: developing a volunteer environmental teaching corps for schools and developing more Models.

## SUCCESS STORY: The Richmond Area, Virginia League of Women Voters Produces a Local Recycling Guide and Promotes Recycling

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**Subject:** Waste

**Problem:** The Richmond, Virginia area lacked a comprehensive guide to recycling opportunities to encourage and promote recycling.

**Solution:** The Richmond, Virginia area League of Women Voters obtained funding to publish a recycling guide and promote recycling. The guide described the methods to prepare and separate waste to be recycled and the locations of local recycling centers.

The Richmond, Virginia area lacked an information brochure to explain which types of waste can be recycled, the methods of preparation and separation, and the locations of recycling centers. The area governments mandated recycling goals, but the information was not available to area residents.

In July 1988, the Richmond Area League of Women Voters initiated a three-year project designed to encourage recycling in the Richmond area and raise public awareness about recycling opportunities. The local recycling committee lobbied the local governments to gain funding support and access to the government's media connections. It then produced a recycling guide which explained the types of materials that could be recycled and how to prepare them for recycling. It also listed the locations of recycling centers in the area. The guide, designed in an easy-to-use format, identified the recyclables as resources and thereby encouraged individuals to conserve them through recycling. The women's group printed 20,000 copies of the guide.

Recycling awareness booths were then set up in Richmond area malls during October 1988, Virginia's Recycling Awareness Month. League members and other environmentalists distributed the new recycling guides and other recycling publications from the booths. Additionally, the local League initiated two in-school recycling programs as part of the project. Two Richmond area schools participated in the program by collecting aluminum cans. The program included a prize system structured around class and individual recycling goals. The League developed the prize structure and solicited prizes from the community on behalf of the schools.

The three-year program budget totaled over $16,000. This included the printing of 20,000 recycling guides, 60,000 mail inserts, promotional materials, publications and posters for the recycling booths. It also paid for a few of the larger prizes. Funding sources included local recycling businesses, large corporations in the Richmond area, local governments and the League's membership. As a result of the League's recycling project, citizens were empowered with skills and knowledge needed to recycle effectively. This led to a visible increase in recycling in the Richmond area, which has a recycling rate of 16%, compared to the national average of 10%.

**Postscript:** The availability of information empowered citizens with skills and knowledge needed to recycle effectively. Recycling activities in the area visibly increased. A nearby county imitated their concept and created a recycling guide for their own jurisdiction.

## SUCCESS STORY: Missouri's Household Hazardous Waste Project

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**Subject:** Waste

**Problem:** There was a lack of access to information on hazardous household waste. The public had a poor understanding of the issues involved in disposing of such waste and in minimizing hazardous waste generation in the first place.

**Solution:** Missouri's Household Hazardous Waste Project, a community education program on household hazardous waste, was established in 1987. HHWP emphasizes source reduction and waste minimization and helps develop local programs.

Hazardous materials are commonly found in many households in the United States. Many people lack awareness on the potential dangers of these products or on how to properly dispose of them, or both.

In 1987 Sondra Goodman founded Missouri's Household Hazardous Waste Project (HHWP), a community education program which assists the public in making informed decisions about the safe use, storage and disposal of hazardous products commonly found around the home. HHWP also uses consumer education, recycling and materials exchange to achieve household hazardous waste reduction. HHWP began as a pilot program to educate citizens in one county, but quickly expanded; by 1990 the program was providing statewide education. HHWP provides training, consultation, educational materials and a referral and information service regarding household hazardous materials. HHWP also develops and promotes models for education and action concerning household hazardous product identification, safe use, storage, proper disposal and the selection of safer alternatives. The group has worked with a broad range of communities to establish local hazardous household waste programs and has developed a day-long workshop to train others as speakers and resource people. To date, the workshop has trained 350 people, including 157 participants from other states. From 1987 to 1991, HHWP was an Environmental Improvement and Energy Resources Authority (EIERA) program administered through Southwest Missouri State University. Since April 1991, HHWP has been administered through the University of Missouri Extension System. The program, which costs $165,000-$197,000, still receives technical assistance and most of its funding from EIERA. Sondra Goodman served as director of the program until 1991. Marie Steinwachs, who has also been with HHWP from the beginning, is HHWP's Associate Director.

HHWP's efforts have resulted in reduced use and disposal of household hazardous products due to increased consumer awareness and community solutions development, such as recycling and waste exchange. Some of the project's successes include setting standard disposal recommendations for hazardous waste and identifying, creating and distributing information on recycling outlets for waste oil, transmission fluid and automotive batteries in 23 counties throughout Missouri. HHWP's *Guide to Hazardous Products Around the Home* is recognized and used throughout the U.S. and by the United Nations Environment Programme. Additionally, HHWP has answered thousands of citizens' questions on the safe use, storage and disposal of hazardous products in the their homes. For their work, the HHWP received Renew America's 1990 Environmental Achievement Award.

**Postscript:** Public awareness about hazardous materials commonly found in the home has increased significantly. The public has the tools to make informed decisions concerning the handling and proper disposal of household hazardous wastes, the selection of safer alternatives and the use of recycling and materials exchange.

## SUCCESS STORY: The Silsbee Woman's Club Conservation Department Promotes Recycling in Texas

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**Subject:** Waste

**Problem:** Silsbee, Texas lacked an organized environmental education program and effective recycling system.

**Solution:** The Environment Department of the Silsbee Woman's Club promoted recycling. They sponsored poster contests, organized recycling drives, held a panel discussion, published a booklet and used the media effectively to raise local awareness.

In 1990 the Conservation Department of the Silsbee Woman's Club in Silsbee, Texas recognized a major environmental problem: the need for an effective recycling program. It had become obvious that landfills were being overloaded and that a recycling program could retard the landfill's unnecessary growth.

In response to this perceived need, the Silsbee Woman's Club's Conservation Department initiated a recycling program in May 1990. Their goal was to raise local awareness on the issue and promote recycling activities in a variety of ways. They spoke before all of the civic clubs in Silsbee and outlying areas of Hardin County, Texas. They also spoke at public schools and conducted radio interviews. In September 1990 they presented a panel discussion on recycling for an audience of 75 persons invited for their ability to generate action on recycling in Hardin County. The club received good coverage of its recycling program in area newspapers and on radio stations.

Recycling activities targeted youth in hopes of eventually educating their parents as well. The club sponsored a poster contest entitled, "Keeping Our Earth Clean" at a local elementary school The group also conducted three recycling drives at a junior high school for students and the general public, the proceeds of which supported the students' tree-planting project. In addition, the Silsbee Woman's Club published the *Environmental Education Handbook*, which has been distributed throughout the community. They feel that in order to have real success they need to make recycling as painless as possible for the average person. Their campaign, therefore, stresses the ease of implementing the "use to reuse" philosophy. In addition, the club's Recycle Task Force is currently meeting with city and county officials and sanitation services to institute weekly curb-side recycling. The club's recycling promotion program has cost $150 to date.

As a result of the project, people have become more aware of the environmental and landfill problems of their community and have made real efforts to change their "throw-away" lifestyle. The Silsbee Woman's Club estimates that they have been able to reach 45% of Silsbee's population. Their recycling drives have kept a considerable amount of recyclables out of the local landfill. For example, the first school-based drive collected 5,000 pounds of newspapers and 283 pounds of aluminum cans.

**Postscript:** Citizens are more aware of the amount of waste which they produce and the consequences of this. Recycling drives conducted by community members reduce the amount of waste disposed of in landfills. The program reached an estimated 45% of Silsbee's population with information on recycling.

## SUCCESS STORY: Women Fight the Use of Sludge on the Chesapeake and Delaware Canal

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**Region:** NORTH AMERICA

**Subject:** Water

**Problem:** On the banks of the Chesapeake and Delaware Canal, sludge was used as fertilizer. It endangered groundwater supplies for humans, livestock and crops as well as surface waters used for recreation and for finfish and shellfish harvesting.

**Solution:** Women residents organized a grassroots network to end sludge use. Their "Sludge Busters" publicity campaign informed and mobilized area residents in a Canal Environmental Protection League.

The Chesapeake and Delaware Canal, administered by the U.S. Army Corps of Engineers, is a link between two estuaries already polluted with sediments and toxics. In the 1980s, sludge containing toxic heavy metals, organic compounds and pathogens was being used as fertilizer on the canal's banks. This use of sludge was perceived as a threat to health and the cause of irreversible damage to land and water in the region. Residents of Maryland and Delaware who lived near the Canal were threatened with contamination of their groundwater supplies and of surface waters used for recreation and harvesting of finfish and shellfish.

A group of women residents educated and empowered themselves and others in order to prevent further damage and save the region. Millie Ludwig, Nona Abbott and Brenda Ritter founded the "Friends of the Five Rivers" network and spearheaded a "Sludge Busters" publicity campaign, beginning with letters to newspapers in late 1984. From a 30-member core cadre, a telephone pyramid mobilized dozens of neighborhood volunteer committees for the campaign, which included posters, meetings, communiques to officials, tours of the canal, use of the mass media and distribution of newsletters and fact sheets. The incorporation of "pro bono" advice from chemists, lawyers and other experts into the fact sheets proved to be a very effective tactic. The group gathered over 2,800 signatures on a petition, which a group of women and children then delivered to Maryland's governor. In addition, area civic leaders and officials traveled to Philadelphia and Washington, D.C. to confer with the Engineer Corps and U.S. legislators. These strategies culminated in a public confrontation meeting held at a local school in which 1,000 "Sludge Busters," again mostly women and children, voiced their determination to stop this toxic threat.

Three months after the meeting, the Maryland sludge plan was canceled; Delaware's use of sludge ceased a few months later. A Canal Study Group was formed to monitor test wells near already sludged sites. This will ensure that proper acidity levels are maintained to prevent the leaching of toxic metals into water supplies and crop land. This project's success hinged on women galvanizing other women to protect their families' water supply. "Friends of the Five Rivers" continues as an area network and clearinghouse that shares expertise and archives with others seeking environmental justice. In 1991 the same private firm involved in the Canal sludge plans tried to get a permit to spread sludge in a Maryland State Forest. Armed with documents from their archives, members again successfully countered the sludge threat by attending town and county government meetings.

**Postscript:** Friends of the Five Rivers have helped with environmental education requests, loaned their files to groups fighting sludge use, and, with the Coalition for Safe Disposal (COSAD), attended a formal symposium on the proposed incinerator for mustard gas near the Chesapeake Bay in Maryland. Friends of the Five Rivers was recognized in 1992 by Renew America for its community work.

## SUCCESS STORY: Lake Michigan Federation Works to Protect One of the World's Most Important Fresh Water Sources

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**Subject:** Water

**Problem:** Water pollution in Lake Michigan affected drinking water, contaminated fish and threatened the food web, including humans.

**Solution:** The Lake Michigan Federation was organized as a research and advocacy organization.

As part of the interconnected Great Lakes/St. Lawrence system, Lake Michigan provides 90% of North America's fresh surface water and 1/5 of the world's supply. Some 13.9 million people live in the Lake Michigan Basin and depend on the lake for their drinking water. The lake provides 28.8 billion gallons of water daily for power production and industrial, municipal and agricultural uses; inexpensive transportation for both raw materials and finished goods; a sport fishery worth $339.5 million annually; and a tourism business that attracts many thousands of visitors each year to sail, fish, swim, hike or relax. The heavy use of Lake Michigan has taken its toll. Toxic chemicals, often invisible and odorless, threaten the long-term health of the food web, including humans. Fish with tumors, turtles without tails and birds born with crossed beaks that prevent them from eating are our Great Lakes' "miners' canaries," early warning systems that call on us to take corrective action now. Lake Michigan fishermen's children, revealed in studies to have lower birth weights, smaller head sizes and neurological disorders that persist well into childhood, convey a plea for environmental repair that is urgent.

The Lake Michigan Federation was formed in 1970 to protect the lake and increase awareness of its great value through the vigilance of concerned citizens. The Federation works on local as well as lake-wide and regional problems. In the past two decades the Federation has played a major role in pushing for improved sewage treatment; halting the construction of nuclear power plants on the lakefront, especially in densely populated areas; banning the U.S. production and distribution of such toxic chemicals as PCBs and toxaphene; and setting the pattern for a network of active, well-informed Lake Michigan citizens.

Lee Botts, as a founding member, and Glenda Daniel, as executive director, have played critical roles in securing funding, programs and/or legislation to stop the algae growth and bacterial pollution that closed beaches and caused fish die-offs, preventing construction of an airport on the lakefront, and bringing about a formal Great Lakes Water Quality Agreement between the U.S. and Canada. Their vigilance continues today. Programs underway are developing national mandates to work with local industries and government on special demonstration projects showing how pollution prevention can be less expensive and more effective than cleaning up after-the-fact; to test how well current federal and state programs work to protect valuable shorelines and wetlands; and finding a way to dredge and safely dispose of bay and harbor sediments contaminated with such pollutants as heavy metals and PCBs. Programs are also underway to teach problem-solving skills through workshops for schoolchildren and their teachers.

**Postscript:** The Federation has succeeded in influencing public policy by educating the public and stimulating citizen involvement in solving Great Lakes problems. The group has been instrumental on local and regional levels in halting and preventing further pollution of the Great Lakes.

## SUCCESS STORY: Chesapeake Bay Citizen Monitoring Program

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**Region:** NORTH AMERICA

**Subject:** Water

**Problem:** The Chesapeake Bay Program needs accurate data and information in order to make decisions concerning the restoration and protection of the Bay. Government agencies cannot collect the needed data, particularly in times of diminishing budgets.

**Solution:** A volunteer monitoring project was set up to gather the necessary data for the Chesapeake Bay Program.

The Chesapeake Bay Citizen Monitoring Program (CBCMP) began in the summer of 1985. The project was designed by Kathleen Ellett, who is now the director of the regional program. CBCMP has six years of data from sites on the Patuxent, Middle, Choptank and Severn Rivers in Maryland and the James River in Virginia. The volunteers measure five water quality variables weekly: temperature, pH, salinity, water clarity and dissolved oxygen. They also report weather and water surface conditions, weekly accumulation of rainfall and general site conditions year round. Ammonia is measured at selected sites on the James River. Volunteers on the Patuxent River collect and filter samples for nutrient analysis. A similar project operates on the Conestoga River in Pennsylvania.

CBCMP was expanded in 1989 and now has sites in the Rappahannock, York and Piankatank Rivers in Virginia and in the Sawmill, German Branch and Piney/Alooway Creeks in Maryland for the State's Targeted Watershed Program. There is a monitoring coordinator for each of the three Bay states. Particular attention has been paid to quality assurance and quality control in order to report data of known quality. Ms. Ellett prepared the *Citizen's Monitoring Manual*, tested and selected the least expensive equipment available, designed a Data Collection Form, prepared a Quality Assurance Project Plan, and recruited and trained the volunteers. She also produced *Volunteer Water Monitoring: A Guide for State Managers* for the U.S. Environmental Protection Agency's (USEPA) Office of Water.

Comparisons made between water quality data collected by the States and by citizen monitors show consistent differences between shoreline, volunteer-collected measures and State mid-river measures of water conditions. This finding suggests that volunteer-collected data on water conditions could augment studies attempting to relate water quality to the status of living resources. Initial funding for CBCMP was provided by a USEPA grant to the Alliance for the Chesapeake Bay and by corporate donations. Funding is presently provided by federal and state grants and contracts to the Alliance.

The volunteer monitoring project serves as a pollution warning system, provides the citizens with an enhanced awareness of environmental issues, provides public education and promotes stewardship of the environment.

**Postscript:** Useful and quality-assured data is gathered by volunteers and has proved a valuable part of long-term government water quality management. Citizens are enthusiastic about having "hands-on" involvement in the protection of the Bay. Information and advice has been requested from groups in all parts of the U.S. as well as from Mexico, Thailand and European countries.

## SUCCESS STORY: The Lake Erie Basin Committee (LEBC) Helps Clean Up Lake Erie

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**Subject:** Water

**Problem:** Lake Erie Basin was being contaminated by the use of manufactured detergents containing phosphorus. Unregulated industrial dumping and farming practices were also abusing the lake.

**Solution:** The LEBC educated the public and placed pressure on state and local legislators to pass environmental legislation regulating farming practices and industry (e.g. banning soaps containing phosphorus and regulating industrial dumping).

Lake Erie Basin serves as a source of drinking water, food and recreation for 11 million people. Detergents containing phosphorus were being sold in the states contiguous to the Basin: New York, Indiana, Ohio, Pennsylvania and Michigan. As a result, Lake Erie Basin was being contaminated by the use of these detergents. Unregulated industrial dumping and farming practices were also abusing the lake.

In 1963 the League of Women Voters (LWV) in the Lake Erie Basin formed an inter-League basin committee representing more than 50 local LWV chapters in the five states bordering the Basin. This group, coordinated by Noreen Gebauer, is known as the Lake Erie Basin Committee (LEBC). The LEBC consists of 40 members, who represent some 600 women and a few men belonging to local Leagues. The LEBC has sought the facts about water pollution and management problems in the Lake Erie Basin, sharing this information with the local LWV chapters, educating communities and moving toward agreement on what is needed to clean up Lake Erie and its tributaries. The committee meets regularly and monitors all legislation concerning the lakes. They have printed a series of newsletters, resource materials on pollution and *Lake Erie, Requiem or Reprieve?* Members have also given testimony at regional hearings about Lake Erie and lobbied local and state legislators. News releases in local papers provide the stimulus for other environmental coalitions to aid the cause. These coalitions include the League of Women Voters of Lake Erie County, New York and "Housewives to End Pollution," where the League and Lake Erie Basin Committee also have representatives. This project was financed entirely through local LWV contributions.

Raising public consciousness through education and working within the political system to affect legislation for the betterment of Lake Erie Basin has led to the revival of the Basin. LEBC's knowledge of the political system enabled the group to effectively lobby local and state legislators and deal with big business. This resulted in the passage of legislation to limit phosphorus content. Erie County, NY was the first to pass such legislation. Ohio, where Proctor and Gamble is located, recently passed a similar law. LEBC's efforts also contributed to the passage of a bottle bill in New York in 1982. This was an anti-litter bill, and its passage has reduced litter in the Basin and aesthetically improved the Lake. As a result of these successes, Lake Erie is clearer and cleaner. It no longer contains dead fish and unsightly solid waste. Commercial fishing is on the rebound. The water supply is no longer threatened by detergents. Constant monitoring by LEBC plus careful planning of waterfront development, including industry, have had a positive impact on Lake Erie.

**Postscript:** The Lake Erie Basin has come back to life. Water is visibly clearer and cleaner. Dead fish and unsightly solid waste are no longer seen. Commercial fishing is on the rebound. The threat to the water supply posed by phosphorus has declined dramatically.

## SUCCESS STORY: Concerned Citizens' National Water Center in Eureka Springs, Arkansas

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**Subject:** Water

**Problem:** The town's natural springs were polluted by sewage, and the placement of a new sewage treatment plant threatened wildlife and nearby residents. The public had not been consulted in the planning of the waste management facility.

**Solution:** Concerned citizens formed the National Water Center to address the local water pollution problems.

Eureka Springs, Arkansas, an Ozark village of 2,000 people, was well-known for its natural springs which were reputed to have some of the world's purest water. Stories of the healing power of the water brought thousands before the turn of the century. However, for more than half a century the springs have been polluted. The city's sewer lines have lain in ruins for years. Springs, creeks, lakes, groundwater and wells of the surrounding community carry spreading plumes of raw sewage. Out of every 100,000 gallons of sewage produced in Eureka Springs, more than 50,000 escape before reaching the treatment facility.

In 1979 the city planned to build a new wastewater treatment system in a fragile site which would threaten wildlife and the ecosystem. Community members organized the area's first public eco-political group, "Concerned Citizens." They carried their cause to the media, to state agencies and then to the Environmental Protection Agency (EPA). The City decided to choose another spot for the new treatment facility. Solving the site problem was only the beginning for Eureka's "Concerned Citizens," now renamed the Concerned Citizens' National Water Center. The group became more involved in the wastewater plans, for example; questioning the efficiency of the planned system. After hearing the Center's concerns, the EPA put the entire wastewater improvement project on hold. The city was given federal funds for an Exfiltration Study. The study's goal was to find the sources of pollution in the springs and to make a plan capable of restoring and protecting these springs. Every spring in the city was to be located and its water analyzed.

The city council hired the staff of the National Water Center to coordinate the public participation program and to liaise with the scientists involved in the exfiltration study. The Water Center team coordinated an extensive public participation program. They succeeded in increasing awareness and bringing the public into the decisionmaking process on water issues. The Center produced its own findings and recommendations and struggled to reach an acceptable agreement with the City. The plant was renovated rather than relocated and is now in operation. The groundwork for further improvements has been laid.

The Water Center has grown from a group of people trying to solve local water problems to a familiar voice in the mid-South. Center staff regularly review and comment on state and federal actions that affect water quality. The Center serves as a clearinghouse for information on appropriate on-site treatment for domestic wastes. The Water Center has sponsored conferences, National Water Weeks and retreats, produced and aired three video-documentaries, and written articles as well as a newsletter.

**Postscript:** The National Water Center brought the issue of water to the forefront and increased public participation tremendously. A sewage treatment plant was prevented from being located in an environmentally fragile area. Recent material published by the NWC include We All Live Downstream-A Guide to Waste Treatment that Stops Water Pollution and a journal *AquaTerra Water Concepts for the Ecological Society.*

## SUCCESS STORY: The Adopt-A-Stream and Storm Drain Stenciling Program of the Wildwood Girl Scouts

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**Region:** NORTH AMERICA

**Subject:** Water

**Problem:** As metropolitan areas have grown, more streams have become polluted. They are dumping grounds for everything from fast food containers to kitchen appliances. Storm drains carry a variety of pollutants into streams and ground water.

**Solution:** The Wildwood Girl Scouts cleaned up local creeks and waged a public education campaign. This included door-to-door distribution of booklets and the stenciling of anti-pollution messages on storm drains.

Expansion of metropolitan areas has placed ever more streams at risk of pollution. Many streams have become dumping grounds for all kinds of debris. Storm drains, designed to carry water runoff, now carry pesticides, fertilizers and other pollutants into streams and ground water. Storm drains have become disposal sites for used motor oil, antifreeze, carpet cleaning solutions, etc. Water pollution is increased by an uninformed public.

In 1989 the Wildwood Girl Scouts in Portland, Oregon identified a water pollution problem in their area and formulated a cleanup plan. The first step was to formally "adopt" a local creek and its tributaries. The long-term goal was to return the creek as nearly as possible to its original natural state so that aquatic life and wildlife could once again survive and thrive in and around its waters. The project includes periodic physical cleanups of the banks of the creek; a massive public education program for property and business owners along the creek; general public education through the stenciling of storm drains and the distribution of brochures; stream monitoring; and restoration of stream banks through the planting of native vegetation.

Marcha Hunt, the public relations representative for the Wildwood Girl Scouts, organized and coordinated the project. The girls have conducted six stream cleanups. Local garbage haulers donated equipment for debris disposal and some of the cleanups were conducted with a neighborhood organization. A primary focus of the program has been the stenciling of a message adjacent to storm drains on city streets ("Dump No Waste -- Drains to Stream") and distribution of handouts about water pollution to property owners in the area of the stenciling. They also personally contact property owners along the creek and distribute several booklets to them. The first, a "stream watch" booklet, includes information on stream monitoring and lists native creek-side vegetation that property owners are encouraged to plant. The second booklet describes the magnitude of surface and ground water pollution. Unified Sewerage Agency collaborated with the Scouts in this project by providing the "stream watch" booklets and by helping in the formulation of the stenciling plan.

Since the first cleanup of Fanno Creek in August 1989, the Wildwood Girl Scouts have stenciled more than 300 storm drains, removed tons of debris from the creek and greatly increased local awareness of the water pollution problem. The stenciling program has been adopted as a council-wide project and is now available to 15,000 Girl Scouts in southern Washington and northern Oregon.

**Postscript:** Since 1989 six Wildwood creek cleanups have occurred. Tons of debris have been removed from the creek. Formerly routine dumping sites remain relatively free of debris following cleanups. Property owners along the creek have become watchdogs for pollutants and debris.

## SUCCESS STORY: Nebraska Groundwater Foundation

**Presenter:** Wanda Johnsen
**Address:** Nebraska Groundwater Foundation
P.O. Box 2558
Lincoln NE 68502-0558
Tel: 402 434-2740
Fax: 402 434-2742

**Country:** USA
**Region:** NORTH AMERICA
**Subject:** Water

**Problem:** Nebraska's groundwater is being threatened by non-point source pollution, hazardous waste and landfill problems. In addition, climate changes and increasing urbanization and development pose threats to the water supply.

**Solution:** Nebraska Groundwater Foundation (NGF) was created to serve as an educational resource on the issue of groundwater. NGF provides newsletters, symposia, the Groundwater Festival, a clearinghouse and speakers' bureau as means to teach environmental awareness.

The Nebraska Groundwater Foundation (NGF) was created in the summer of 1985 with little more than a good idea and dedication. Wanda Johnsen serves on the Board of Directors of NGF and Susan Seacrest serves as President and Volunteer Executive Director. Membership dues, grants and donations are the core of NGF's funding. NGF produces *The Aquifer* quarterly. One of their successful programs is the Children's Groundwater Festival which has attracted over 4,000 registrants. The 1989 Festival attracted over 2,000 people and was produced on a budget of less than $4,000. Plans are underway to expand the Festival and to produce a how-to manual for others to use to host similar events.

A touchstone of NGF's philosophy is that facts empower people, and people ignite change. NGF programs have an educational focus and, therefore, divergent points of view. Coalition building is encouraged. Through debates and published articles that reach the general population, citizens are able to understand and respond to the groundwater issues facing their families and communities. NGF provides symposia, a clearinghouse, speakers' bureau and outreach activities as a means to teach environmental awareness and to get the people who are most affected involved in the program. Another feature of the project is its economic feasibility and sustainability. The organization relies on membership dues and grants as the primary source of support. In-kind donations have kept administrative costs low, so that available funds go directly into programs.

The program meets community needs by targeting people of every age and profession. A large number of its members are from rural areas, because it is the small municipalities and private well owners who face the most serious groundwater contamination problems. Program Committee and Board of Trustees members represent geographical and ideological diversity, but are united in their belief that ground water education represents an investment in the collective future of the community.

NGF programs are easily replicable and will be duplicated by such groups as the Orlando, Florida Utilities Commission and the Kalamazoo, Michigan public schools. A key to NGF's success is its ability to work with and within existing organizations. The successful project was awarded with Renew America's 1990 Environmental Achievement Award. Women represent the main core of this foundation, having provided its key leadership roles.

**Postscript:** The program has been effective, is replicable, economically feasible and sustainable in meeting community needs. The Groundwater Foundation is beginning a national membership drive. They have also established a national Groundwater Protection Network to provide information and technical assistance on water and land use issues.

## SUCCESS STORY: Citizens Coordinating for Clean Water in Lebanon, Pennsylvania

**Presenter:** Jo Ellen Litz

**Address:** Citizen's Coordinating for Clean Water
2501 Cumberland St.
Lebanon, PA 17042
Tel: 717 274-1175
Fax: 717 274-1175

**Country:** USA

**Region:** NORTH AMERICA

**Subject:** Water

**Problem:** The Swatara Watershed in Pennsylvania was endangered by pollution. There was a lack of awareness among the public about water issues.

**Solution:** Citizens Coordinating for Clean Water (CCCW) was formed to educate and inform the public about the necessity to preserve the Swatara Watershed.

The Swatara Watershed is an important source of water for the community. It is a source of potable water for four water companies servicing over 100,000 people. The river corridor also includes the forested state game lands and various parks, including the Swatara State Park and open spaces like the Appalachian Trail and the Horse Shoe Trail. Further, the agricultural community uses the Swatara's clean water for livestock, irrigating fields and supplying farm ponds.

In Lebanon, Pennsylvania, Citizens Coordinating for Clean Water (CCCW) was formed in 1988 to protect the area's water resources. CCCW protects the Swatara in a variety of ways. The group performs water quality tests and gathers other information in order to have the creeks named as "recreational rivers" in the Pennsylvania Scenic Rivers Program. The community sponsors yearly educational canoe trips so interested folks can experience the natural beauty of the creeks. In addition, CCCW encourages area schools to educate their students about the importance of preserving our natural resources. The CCCW also protects the waters by actively supporting the Swatara State Park and Reservoir. The CCCW encourages stewardship of our water through testimony at public hearings, letter writing campaigns, circulation of petitions, public speaking, slide shows and preparation of public information packets for organizations and municipalities throughout the Swatara Watershed.

The most beneficial environmental impact of the project is that it has reduced sediment pollution in the Swatara's drinking water and the Chesapeake Bay. The citizen's group has succeeded in having the Swatara Creeks designated as "recreational rivers" in the Pennsylvania Scenic River Program. Moreover, they wrote letters to Governor Casey, the Citizen's Advisory Council and the DER's Secretary Davis with their concerns and suggestions. CCCW's letter of April 29, 1991 was read into the testimony, Senate Bill 1224 contained wording that would prohibit landfill operations within 300 yards of any area that has been deep mined. CCCW has also testified at public hearings in favor of upgrading Mill Creek (a Swatara tributary) to an Exceptional Value Waterway and expanding the Highbridge Reservoir. The group questions the wisdom of excessive landfill siting in a watershed providing over 100,000 residents with potable water. CCCW's program can benefit neighborhoods and townships because there is a good chance that the property value in the Swatara Creek corridor will increase simply by virtue of people's desire to own land near clean water.

**Postscript:** CCCW has raised public awareness about the need to preserve the Swatara Watershed. The citizen's group has succeeded in having the Swatara Creeks designated as "recreational rivers" in the Pennsylvania Scenic River Program. Recently, CCCW has received inquires concerning possible inclusion of the Swatara Creek in the National Scenic Rivers Program.

## SUCCESS STORY: Louisiana Environmental Action Network Empowers the Rural Poor to Protect Louisiana's Waterways and Environment

**Presenter:** Marylee Orr

**Address:** Louisiana Environmental Action Network
P.O. Box 66323
Baton Rouge LA 70896
Tel: 504 928-1315
Fax:

**Country:** USA

**Region:** NORTH AMERICA

**Subject:** Water

**Problem:** Louisiana ranks first in the U.S. in the discharge of toxic pollutants to water and second in the discharge of such pollutants into the air. Louisiana citizens suffer more toxics per square mile and per capita than any other state in the nation.

**Solution:** The Louisiana Environmental Action Network (LEAN) was formed to aid organizations and individuals throughout the state in cleaning up the environment.

Louisiana, with its large petrochemical industry, has become one of America's dumping grounds, with 774 million pounds of toxic chemicals passing through its numerous waterways annually. The state ranks first in the U.S. in the discharge of toxic pollutants to the water and second in the discharge of toxic pollutants into the air. Louisiana has 664 abandoned hazardous waste sites, 12,000 identified oil field waste pits, 5,000 identified oil field injection wells and 43 hazardous waste injection wells.

The Louisiana Environmental Action Network (LEAN) was formed in 1986 with the goal of empowering people, particularly the rural poor, to change this situation. The organization serves as a clearinghouse and organizing focus for over 65 grassroots groups statewide. LEAN provides the tools necessary for organized action by bringing workshops and training sessions to the people. The group has a $121,000 budget, which is funded entirely by private foundations and membership contributions.

As Executive Director of LEAN, Marylee Orr has played an instrumental role in the organization's environmental activities. LEAN has found creative ways to bring attention and resources to the state's environmental crises; these include rallies and press conferences, candlelight prayer vigils at the governor's mansion and staging a funeral for a contaminated lake. LEAN has co-sponsored many events, including the Scientific Assembly for Environmental Health, Deep South Network Conferences and the Great Louisiana Toxics March. The Scientific Assembly educated primary care physicians to assist them in caring for their patients with illnesses related to environmental exposure in their communities and workplace. The Deep South Network Conferences have focused on different issues, including deep well injection and oil/gas issues. On the Great Louisiana Toxics March, people walked from Baton Rouge to New Orleans along a stretch of Louisiana known as Cancer Alley. LEAN also holds an Annual Leadership Conference to develop leadership skills and encourage coalition building among environmental activists. LEAN also mobilizes people power on behalf of pending legislation.

LEAN's efforts have helped protect the water and air of Louisiana. LEAN was influential in passing an air bill which requires 50% reductions in toxic emissions by 1990 and water legislation that established, for the first time in 40 years, regulations with which the oil and gas industry must comply. LEAN's scrutiny of permits resulted in one industry reducing its emissions by 30%. LEAN received Renew America's 1990 National Environmental Achievement Award for its local activism.

**Postscript:** Through workshops and training sessions many of the people most affected by the environmental degradation have been reached. A variety of special events have increased environmental awareness. LEAN has successfully mobilized people power to secure passage of legislation to clean up the land and water.

## SUCCESS STORY: The Legal Environmental Assistance Foundation's Groundwater Protection Program

**Presenter:** Suzi Ruhl
**Address:** 115 North Gadsen Street
Tallahassee FL 32303-6327

Tel: 904 681-2591
Fax: 904 224-1275

**Country:** USA
**Region:** NORTH AMERICA
**Subject:** Water

**Problem:** Few avenues of recourse are open for victims of groundwater contamination. Citizens played little or no role in policy development on the issue, and there was little accountability for enforcing anti-pollution laws.

**Solution:** The Legal Environmental Assistance Foundation created the Groundwater Protection Program to protect underground drinking water from contamination by strengthening citizen involvement in resource protection and pollution prevention.

The general public did not have the knowledge or resources to address the problem of groundwater contamination. Victims of pollution were unaware of their legal rights and the laws designed to protect their natural resources. Citizens were not involved in policy development on groundwater issues.

The Legal Environmental Assistance Foundation (LEAF) was founded in 1979 by the current president, Suzi Ruhl, while she was in graduate school. She wanted to provide legal and technical expertise to disenfranchised citizens to help them protect their health and environment. LEAF created the Groundwater Protection Program to help people protect their drinking water. The program addresses both immediate crises and long-term policy development. Technical assistance is provided to victims of groundwater pollution to increase their understanding and use of laws designed to protect them. The program generates broad-based citizen involvement in policy debate on the local, state and national levels. LEAF uses focused legal action to secure immediate relief from pollution and to promote stronger environmental policy.

As part of this program, LEAF has developed a registry of contamination episodes and a network of victims. This network coordinates groundwater protection efforts among national, state and local activists. LEAF has also secured the involvement of historically black colleges and universities to provide additional technical expertise to citizens affected by groundwater pollution.

LEAF's program has produced numerous benefits. For example, citizens have been trained in effective participation in pollution abatement and policy development. Other accomplishments include prevention of pollution; creation of a watchdog presence over agencies responsible for protecting groundwater; and obtaining specific data on groundwater pollution. A growing number of technical experts are willing to assist in LEAF's endeavors. To date, this program has successfully prevented the siting of pollution sources in sensitive environmental areas which threaten water supplies; promoted the cleanup of existing sources of pollution such as leaking underground storage tanks; and improved regulations and standards governing underground drinking water.

The Groundwater Protection Program of LEAF was chosen by Renew America for its 1990 Environmental Achievement Award and received Special Merit Recognition in 1991.

**Postscript:** Citizens have gained valuable skills/tools enabling them to be active in groundwater issues affecting their communities. Existing sources of pollution have been cleaned up, and stricter environmental standards put in place. Legal action has been taken against polluters of groundwater. LEAF provides expertise to citizens and grassroots organizations in Florida, Georgia and Alabama, and LEAF staff serve on national and state committees.

## SUCCESS STORY: Local Residents in Naugatuck, Connecticut Form Pollution Extermination Group (PEG) to Close Landfill Contaminating Water Supply

**Presenter:** Mary Lou Sharon
**Address:** 228 Lewis Street
Naugatuck CT 06770

Tel: 203 729-8274
Fax:

**Country:** USA
**Region:** NORTH AMERICA
**Subject:** Water

**Problem:** Laurel Park Landfill in Naugatuck, Connecticut posed an environmental threat to the community. Chemicals contaminated the aquifers that feed the groundwater supply. Noxious odors from chemicals and fires filled the air in the town.

**Solution:** Local landowners formed the Pollution Extermination Group (PEG) led by Mary Lou Sharon. PEG pressed state government authorities to close the landfill, install monitoring wells and supply potable water for bathing, drinking and cooking.

In October 1981, the U.S. Environmental Protection Agency (USEPA) added Laurel Park Landfill in Naugatuck, Connecticut to a list of 114 hazardous waste sites initially designated for cleanup under the $1.6 billion federal "Superfund" program. The Laurel Park landfill was in the sixth most dangerous group out of 11 groups. The Superfund was established in December 1980 in response to a public outcry over a hazardous waste emergency at the Love Canal site in Niagara Falls, New York. Laurel Park Landfill rises high atop the Andrew Mountain Hillside and can be seen for miles around. It was suspected of causing surface and groundwater contamination. A creek which flowed beneath the landfill was heavily polluted with high levels of toxic chemicals and landfill leachate; this brook traveled downhill through a schoolyard.

The Pollution Extermination Group (PEG) was founded by three women who lived within the vicinity of the 19-acre landfill. Mary Lou Sharon was elected the group's president and was instrumental in PEG becoming incorporated. She urged PEG to intervene in the court system, secured legal representation and lobbied in Washington for the reauthorization of Superfund. The main objectives of the neighborhood organization were to close Laurel Park and to secure potable water for the residents (approximately 50) within a 1/4 mile radius of the site. The major concerns were installations of monitoring wells on site and petitioning the State Department of Environmental Protection (DEP) to test for dioxin. Both were accomplished. PEG also requested monitoring of the leachate line leaving the site, which eventually empties into the Naugatuck Public Works Treatment Plant. This was accomplished as part of the cleanup plan.

USEPA is suing Uniroyal Chemical Co., Inc. and B.F. Goodrich for the cost of the cleanup. Those companies in turn are suing 200 municipalities, business and individuals arguing about the percentages of responsibility. The estimated cost of cleanup for two landfills owned and operated by the Murtha companies (including the Laurel Park landfill) is estimated at $70 million. After three years of litigation with 36 responsible parties, 19 agreed to design and implement a final cleanup plan. This final plan, to cost $20 million, will involve capping the landfill, lowering the water table and eliminating direct human exposure to waste and contamination. PEG Inc. maintains contact with DEP and the EPA concerning the status of the landfill.

**Postscript:** Monitoring wells were installed. A $20 million cleanup plan was initiated by the USEPA. A consent agreement has been signed between the Department of Environmental Protection and Uniroyal (potentially responsible party) to implement a waterline to supply approximately 52 families with potable water.

## SUCCESS STORY: Lahontan Valley Wetlands Coalition Obtains Water Rights For Stillwater Wildlife Refuge in Nevada, U.S.A.

**Presenter:** Rose Strickland
**Address:** 619 Robinson Ct
Reno Nevada 89503

Tel: 702 329-6118
Fax:

**Country:** USA
**Region:** NORTH AMERICA
**Subject:** Water

**Problem:** Stillwater Wildlife Refuge, as well as other wetland areas, did not have water rights and was in danger of becoming a toxic wasteland. Wildlife began to die by the thousands.

**Solution:** Rose Strickland led the Lahontan Valley Wetlands Coalition to obtain water rights for Stillwater.

The Stillwater Wildlife Refuge was an oasis in the vast deserts of Nevada. As a stopover point for migratory birds along the Pacific flyway, Stillwater supported over a quarter-million shorebirds. When Stillwater was in danger of becoming a toxic wasteland, Rose Strickland rescued the refuge with help from some unlikely allies.

Over 85% of western Nevada wetlands have dried up in the last century due to agricultural diversions dating back to 1902, with the nation's first federal reclamation project. Because Stillwater and other Nevada wetlands have no water rights, they depend largely on agricultural drain-water, natural seepage, and rare desert rains. A lack of fresh river water, due to several years of drought, brought an influx of agricultural drain-water containing concentrated amounts of naturally occurring elements, including arsenic and lead. "Stillwater began turning into a toxic death trap," says Strickland. Wildlife began to die by the thousands. In 1989, over 20,000 birds, including pelicans, ducks and gulls, died of disease. Many other birds were born grotesquely deformed.

As chair of the Toiyabe Chapter's Public Lands Committee, Rose Strickland worked to obtain water rights for Stillwater. Realizing that it would take the combined efforts of all concerned conservation and wildlife groups to achieve this goal, Strickland encouraged various groups to join forces in the Lahontan Valley Wetlands Coalition, an unlikely association of over a dozen local and national groups, including bird watching and duck hunting groups. The members of the Lahontan Valley Wetlands Coalition were able to gain national attention to the plight of Stillwater through media, lobbying local community groups and politicians, and an initiative on the state ballot. The membership dues were $100 per organization plus donations, and members actively fund raised through barbecues, auctions and raffles to raise $100,000 in three years. In kind support from wildlife officials was critical.

As a result of all their efforts, the coalition was able to make Stillwater part of the Truckee-Carson River Settlement Act and obtain better water management for the Truckee River. Fresh water is again flowing into the wetlands and the habitat for thousands of waterfowl and other wildlife was saved. The agreement provided a needed cash income for the farmers selling their water rights to sustain the refuge.

**Postscript:** The issue gained national attention and Stillwater was made a part of the Truckee-Carson River Settlement Act. The Coalition proved a powerful force in bringing together diverse groups and finding an agreeable solution.

# APPENDICES

## Appendix I

GLOBAL ASSEMBLY OF WOMEN AND THE ENVIRONMENT
Miami, Florida, USA, November 4-8, 1991

Success Story Nomination Form

Women and their organizations play important roles in advancing environmental awareness, education and management in support of sustainable development. They are key to integrating environmental considerations at the community level, and are increasingly involved at the national and international levels.

Under the auspices of the Senior Women's Advisory Group on Sustainable Development of the United Nations Environment Programme (UNEP), and in cooperation with UNIFEM, UNFPA, UNDP, other UN agencies and sponsoring governments and organizations, the Global Assembly of Women and the Environment--Partners in Life, is being convened as a forum for women to present their activities and success stories in the areas of environmentally friendly systems, products and technologies, water, energy as it relates to climate change, and waste. The Assembly will provide an important opportunity for women to demonstrate their environmental solutions to those interested in achieving sustainable development throughout the world, and the contribution women can and are making.

To assist the Assembly organizers, this nomination form invites you to nominate success stories led by women in the topical areas identified above. We welcome your copying this nomination form to share with others. Nominated success stories must be repeatable, affordable, sustainable and visible, in which women's leadership and/or their participation has been the primary factor. Each success story should demonstrate that environmental degradation was avoided or repaired. Education, training and activities related to changing public environmental practices and policies may also be presented. However, primary interest is in local and community level success stories which feature women as the practitioners. PLEASE FEEL FREE TO USE ADDITIONAL PAPER AND TO INCLUDE YOUR OWN MATERIALS.

Name of Nominee(s)_____
Title if used_____
Address_____
_____
_____
Country_____

1. Which subject does your success story address, if more than one concurrently, please indicate by filling in more than one box, i.e. water and energy, or water and waste.

/_/ Fresh water
/_/ Waste (recycling, avoidance, management, etc.)
/_/ Energy (as it relates to climate change, ozone, acid rain, global warming)
/_/ Environmentally friendly technologies, products and systems

2. Number of people involved: Implementors_____Participants_____

3. What was the environmental problem?_____

4. Was there a constituency that was adversely affected by this problem?_____

5. How did you (or the people involved) mobilize people to become involved in seeking a solution to the problem?_____

6. What were the barriers and constraints, if any?_____

7. How was the program/project/activity organized? _____

8. What was the age range of the people involved in implementing this program/project/activity?_____

9. What were the environmental, health, economic or other effects? _____

10. What policy change or reform would you recommend to avoid similar problem from occurring again in the future or to encourage similar projects?_____

11. What, in your opinion, are the elements that make this a success story or any particular aspect of this project an idea to be considered seriously by communities with similar problems or circumstances?

Women's leadership abilities_____/_/
Community participation_____/_/
Other_____/_/

12. Will you be comfortable discussing your project/activity at the Assembly in English?

Selected success story nominees will be invited to participate in the Assembly. Economy class travel and accommodation cost for the duration of the Assembly will be paid for nominees from developing countries.

PLEASE RETURN THE COMPLETED FORM BY MAIL OR FAX TO:
Waafas Ofosu-Amaah, Project Director
WorldWIDE Network, 1331 H Street NW, Suite 903, Washington, DC 20005

ASAMBLEA MUNDIAL DE MUJURES Y EL MEDIO AMBIENTE
MIAMI, FLORIDA, EE. UU., 4-8 NOVIEMBRE 1991

## FORMULARIO DE NOMINACION DE LA HISTORIA DE TRIUNFO

Las mujeres y sus organizaciones juegan un papel importante en la promoción del conocimiento, educación y control sobre el medio ambiente. Ellas son claves en la integración de asuntos ambientales en la comunidad y están involucradas más y más en la nivel nacional e internacional.

Bajo los auspicios del Senior Women's Advisory Group on Sustainable Development del Program de las Naciones Unidas para el Medio Ambiente (PNUMA) y en cooperación con UNIFEM, UNFPA, UNDP, otras agencias de la ONU, y gobiernos y organizaciones patrocinadores, se está convocando a la Asamblea Mundial de Mujeres y el Medio Ambiente -- Socios in la Vida como un foro para que las mujeres presenten sus actividades e historias de triunfo en las áreas de sistemas, tecnología, y productos que favorecen el medio ambiente, agua y energía y como se relaciona con el cambio climatológico and desperdicio. La Asamblea proporcionará una oportunidad importante para que las mujeres demuestren sus soluciones a favor del medio ambiente a los interesados en lograr un desarrollo sostenible en todas partes del mundo, y la contribución que pueden hacer y están haciendo las mujeres.

Para ayudar a los organizadores de la Asamblea, se le invita por medio de este formulario a nominar historias de triunfo de mujeres relacionadas con los temas identificados anteriormente. Siéntase en la libertad de hacer copias de este formulario para que lo comparta con otros. Las historias nominadas deben poderse repetir, ser económicamente viables, sostenibles, y visibles, donde el factor primordial ha sido el liderato de las mujeres o su participación. Cada historia de triunfo debe demostrar que se evitó o se reparó el deterioro del medio ambiente. Se peude presentar, además, la educación, el adiestramiento, y las actividades relacionadas con el cambio de las prácticas del público y de la política pública sobre el medio ambiente. Sin embargo, el interés primordial es en historias de triunfos en las cuales las mujeres figuran como participantes activas. POR FAVOR SIENTASE EN LA LIBERTAD DE UTILIZAR PAPEL ADICIONAL Y DE INCLUIR SUS PROPIOS MATERIALES.

Nombre la(s) nominadas
Título (si alguno)
Dirección
País

1. Con qué tema se relaciona su historia de triunfo? Si más de uno a la vez, por favor, indíquelo marcando más de una casilla, es decir, aqua y energía, o aqua o desperdicio.

   / / Aqua fresca
   / / Desperdicio (reciclaje, prevención, manejo, etc.)
   / / Energía (como se relaciona al cambio climatológico, al ozono, a la lluvia ácida, al recalentamiento de la tierra)

/ / Tecnología, productos, y sistemas que favorecen el medio ambiente

2. Número de personas involucradas:

   Ejecutores Participantes

3. Cuál era el problema ambiental?

4. Había un grupo de personas afectadas adversamente por este problema?

5. Cómo moblizó usted (o las personas involucradas) a las personas para que se involucraren en la búsqueda de la solución del problema?

6. Cuáles fueron las barreras y los impedimentos, si algunos?

7. Cómo se organizó el programa/el proyecto/la actividad?

8. Cuales eran las edades de las personas involucradas en el programa/el proyecto/la actividad?

9. Qué efectos tuvo en el medio ambiente, en la salud, en la economía?

10. Qué cambio en la política o reforma recomendaría para evitar que ocurra un problema similar en el futuro?

11. En su opinión, cuáles son los elementos que hacen de ésta una historia de triunfo, o cualquier aspecto en particular de este proyecto, una idea que comunidades con problemas o situaciones similares pueden considerar seriamente.

    / / Habilidad de liderato de las mujeres
    / / Participación de la comunidad
    / / Otros

POR FAVOR, DEVUELVA ESTE FORMULARIO COMPLETADO A:

Waafas Ofosu-Amaah
Project Director
WorldWIDE Network
1331 H Street, N.W., Suite 903
Washington, D.C. 20005

FAX: (202) 347-1524

## Appendix II

### Success Story Reference and Release Form

**Success Story:** [ ]

**Please use the following space to provide us with names and addresses of three persons not related to the project implementers who can provide further information about the project and act as references.**

**Three references:**

1. Name:_____

Address:_____

_____

_____

Tel:_____

Fax:_____

2. Name:_____

Address:_____

_____

_____

Tel:_____

Fax:_____

3. Name: _____

Address: _____

_____

_____

Tel:_____

Fax:_____

**I (Name)_____, hereby give permission for the material in my success story nomination to be used in publications related to, or resulting from, the Global Assembly of Women and the Environment.**

## Appendix III


**RECOMMENDATION FORM FOR SUCCESS STORY PRESENTERS**
**GLOBAL ASSEMBLY OF WOMEN AND THE ENVIRONMENT:**
**"PARTNERS IN LIFE"**
**Miami, Florida, November 4-8, 1991**

1. YOUR NAME:_____

2. ADDRESS:_____
_____
_____

3. NOMINEE AND PROJECT NAME:_____

4. I AM FAMILIAR WITH THE ABOVE-MENTIONED PROJECT/ACTIVITY: YES_____NO_____

5. TO THE BEST OF MY KNOWLEDGE, THE WRITE-UP IS AN ACCURATE REPRESENTATION OF THE PROJECT/ACTIVITY: YES:_____ NO:_____

6. I CAN VERIFY THAT THE PROJECT HAS BEEN IN EXISTENCE FOR:_____ (MONTHS) _____(YEARS)

7. I RECOMMEND THE PROJECT FOR PRESENTATION AT THE ASSEMBLY: YES _____ NO_____

8. REASONS:_____
_____
_____
_____
_____

9. THE NOMINEE CAN PRESENT THE PROJECT AT THE ASSEMBLY IN ENGLISH: YES:_____ NO:_____

10. IN MY OPINION, THE PROJECT/ACTIVITY MEETS THE FOLLOWING CRITERIA:

**AFFORDABLE:**_____

**REPEATABLE:**_____

**SUSTAINABLE:**_____

**VISIBLE:**_____

11. OTHER COMMENTS:_____

## Appendix IV

GLOBAL ASSEMBLY OF WOMEN AND THE ENVIRONMENT
"PARTNERS IN LIFE"

RAPPORTEURS' QUESTIONS ON
Success Story Presentations

Each success story presenter has received a set of ten questions to help them to focus their presentations and the group discussion. The answers to these questions provide crucial information for the Assembly drafting committees' recommendations. Thus, we need your important assistance. We ask that you record the presenter's remarks in the space provided. Questions 7-10 form the core of the Working Group discussions and will also provide guidelines on strategies for replication. We have added examples of the types of answers that we anticipate will emerge. PLEASE RECORD ALL ANSWERS THAT ARE PROVIDED.

At the end of each presentation, the assigned NGL will deliver this sheet to the Assembly Secretariat, who will type the answers you have recorded. These answers will become part of the Assembly records and will be delivered to the Drafting Committee. Please use a new form for each presenter and presentation.

NAME OF PRESENTER: _____

TITLE OF SUCCESS STORY: _____

REGION:_____ RAPPORTEURS' NAME:_____

SUBJECT: _____

1. What kinds of problems were people experiencing before the initiation of the project?

2. What potential did those affected see for change?

3. How was this potential translated into action?

4. How did different groups react to your activity?

5. What were the sources of support for this activity - both financial and in-kind support?

6. What are the savings or other quantifiable benefits of the activity?

7. What in your opinion are the most beneficial environmental impacts of this activity?

8. How has the activity improved the quality of life for families in your community (e.g. Health, Education, Livelihood, Access to Resources)?

9. What in your opinion are the elements of success that make the activity worthy of replication (e.g. Leadership, Community Involvement, Organizational Skills, etc.)?

10. What specific strategies would you recommend for the replication of your success story?

## Appendix V

## MENTORS: SELECTION CRITERIA

Selection criteria are based on: the institution's mandates to meet human needs, achieve environmental management and enhance the capacity of communities and individuals to participate effectively in achieving these goals; and the mentors' role and/or capacity within their institutions to address these mandates.

### Institutional Categories

- Academia
- Foundations
- Corporations
- International institutions (global, multinational and regional)
- Government agencies
- Nongovernmental organizations
- Media*

### Institutional Mandates and Capacity

- Meet human needs
- Encourage community and individual participation
- Advance sustainable development
- Promote environmental management
- Deploy resources to encourage and support the replication of successful projects

### Mentors' Roles and/or Capacities Within Their Institutions

- Policy development
- Priority setting
- Environmental, natural resources and/or women's programs
- Program implementation and oversight
- Program monitoring and evaluation
- Training and education
- Recruiting
- Funding priorities

* Added as a seventh mentor Group at the Assembly

## Appendix VI

### New Generation Leaders (NGLs) Mandate

The organizers of the Global Assembly of Women and the Environment invited New Generation Leaders, (NGLS), young people between the ages of 18-25 years old, in recognition of the fact that they have key roles in solving the world's environmental problems. Furthermore, the degradation of environmental systems will increasingly adversely affect the future of young people and their quality of life. The condition of the environment affects many other issues including health, economics, employment, education, and public tax burdens. Environmental issues relate to the need for science, appropriate technology, legislation, and approaches to education.

Far too often good projects remain known only to local communities and a handful of experts and administrators. At the Assembly, NGLs gained useful insights from practitioners who had succeeded in developing and implementing environmentally-sound projects that met community needs. Students of international affairs, development management, public administration, policy analysis, environmental studies, ecology, natural resource management, public health, economics, sociology, journalism, law and the sciences broadened their knowledge of women's involvement in development and environment. This is crucial to achieving sustainable development. Finally, the Assembly provided valuable lessons on action strategies and organizing methods.

The Assembly showcased 218 success stories from approximately 70 countries which were repeatable, affordable, sustainable, and visible in the areas of water, energy, waste, and environmentally-friendly systems, products and technologies. They had been led by women.

New Generation Leaders had four important roles: (1) writing articles about the Assembly and their experience for publication; (2) evaluating the success story presentation process; (3) developing a New Generation Leader Declaration for the Closing Plenary; and (4) working with the UNEP Global Community/Youth Coordinator to explore ways to support the replication of success stories.

Joining the NGLS at the Assembly were 125 representatives from academia, corporations, foundations, governments, international agencies, and non-governmental organizations invited to consider how their respective institutions could advance women in environmental management and the replication of the success stories. The interactions between the NGLS, Success Story Presenters, and Mentors provided the basis for an international network that has its roots in a wide variety of communities and groups.

## Appendix VII

## Glossary of Acronyms

| | |
|---|---|
| CBO | Community-Based Organizations |
| EC | European Community |
| ECOSOC | United Nations Economic and Social Council |
| ESCAP | Economic and Social Council for Asia and the Pacific |
| ESCWA | Economic and Social Council for West Asia |
| ESID | Environmentally-Sustainable Industrial Development |
| FAO | Food and Agriculture Organization of the United Nations |
| G-7 | Group of 7 (Canada, France, Germany, Italy, Japan, U.K. and the U.S.A.) |
| G-77 | Group of 77 (Developing countires from the Third World and Eastern Europe) |
| IFAD | International Fund for Agricultural Development |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| INSTRAW | International Research and Training Institute for the Advancement of Women |
| NGO | Non-governmental Organization |
| OECD | Organization for Economic Cooperation and Development |
| UNCED | United Nations Conference on Environment and Development |
| UNCHS | United Nations Center for Human Settlements (Habitat) |
| UNDP | United Nations Development Programme |
| UN/DPI | United Nations Department of Public Information |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFPA | United Nations Fund for Population Activities |
| UNICEF | United Nations Fund for Children |
| UNIDO | United Nations Industrial Development Organization |
| UNIFEM | United Nations Development Fund for Women |
| UNITAR | United Nations Institute on Training and Research |
| UNRISD | United Nations Research Institute of Social Development |
| UNSO | United Nations Sudano-Sahelian Office |
| WED | Women, Environment and Development |
| WFP | World Food Programme |
| WHO | World Health Organization |
| WID | Women in Development |

## Appendix VIII

# United Nations Conference on Environment and Development (UNCED)

# AGENDA 21, Chapter 24

*The mandate for women in the UNCED process emanated from Decision 3/5 at the August, 1991 PrepCom III meeting in Geneva. After much hard work by many individuals at the PrepComs and during the Earth Summit, the UNCED Conference adopted the Global Action for Women Towards Sustainable and Equitable Development in Chapter 24 of Agenda 21. We reproduce the text in this Appendix to ensure the widespread dissemination of this important text and to assist you in taking action on these issues. We highlight (in bold) those parts of the text dealing specifically with women and environment.*

A/CONF.151/4 (Part III)

Chapter 24

## GLOBAL ACTION FOR WOMEN TOWARDS SUSTAINABLE AND EQUITABLE DEVELOPMENT

PROGRAMME AREA

Basis for action

24.1. The international community has endorsed several plans of action and conventions for the full, equal and beneficial integration of women in all development activities, in particular the Nairobi Forward-looking Strategies for the Advancement of Women, 1/which emphasize women's participation in national and international ecosystem management and control of environment degradation. Several conventions, including the Convention on the Elimination of All Forms of Discrimination against Women (General Assembly resolution 34/180, annex) and conventions of ILO and UNESCO have also been adopted to end gender-based discrimination and ensure women access to land and other resources, education and safe and equal employment. Also relevant are the 1990 World Declaration on the Survival, Protection and Development of Children and its Plan of Action (A/45/625, annex). Effective implementation of these programmes will depend on the active involvement of women in economic and political decision-making and will be critical to the successful implementation of Agenda 21.

Objectives

24.2. The following objectives are proposed for national Governments:

**(a) To implement the Nairobi Forward-looking Strategies for the Advancement of Women, particularly with regard to women's participation in national ecosystem management and control of environment degradation;**

**(b) To increase the proportion of women decision-makers, planners, technical advisers, managers and extension workers in environment and development fields;**

(c) To consider developing and issuing by the year 2000 a strategy of changes necessary to eliminate constitutional, legal, administrative, cultural, behavioral, social and economic obstacles to women's full participation in sustainable development and in public life;

**(d) To establish by the year 1995 mechanisms at the national, regional and international levels to assess the implementation and impact of development and environment policies and programmes on women and to ensure their contributions and benefits;**

(e) To assess, review, revise and implement, where appropriate, curricula and other educational material, with a view to promoting the dissemination to both men and women of gender-relevant knowledge and valuation of women's roles through formal and non-formal education, as well as through training institutions, in collaboration with non-governmental organizations;

**(f) To formulate and implement clear governmental policies and national guidelines, strategies and plans for the achievement of equality in all aspects of society, including the promotion of women's literacy, education, training, nutrition and health and their participation in key decision-making positions and in management of the environment, particularly as it pertains to their access to resources, by facilitating better access to all forms of credit, particularly in the informal sector, taking measures towards ensuring women's access to property rights as well as agricultural inputs and implements;**

(g) To implement, as a matter of urgency, in accordance with country-specific conditions, measures to ensure that women and men have the same right to decide freely and responsibly the number and spacing of their children and have access to information, education and means, as appropriate, to enable them to exercise this right in keeping with their freedom, dignity and personally held values;

(h) To consider adopting, strengthening and enforcing legislation prohibiting violence against women and to take all necessary administrative, social and educational measures to eliminate violence against women in all its forms.

Activities

24.3 Governments should take active steps to implement the following:

(a) Measures to review policies and establish plans to increase the proportion of women involved as decision makers, planners, managers, scientists and technical advisers in the

design, development and implementation of policies and programmes for sustainable development;

(b) Measures to strengthen and empower women's bureaux, women's non-governmental organizations and women's groups in enhancing capacity-building for sustainable development;

(c) Measures to eliminate illiteracy among females and to expand the enrollment of women and girls in educational institutions, to promote the goal of universal access to primary and secondary education for girl children and for women, and to **increase educational and training opportunities for women and girls in sciences and technology**, particularly at the post-secondary level;

(d) Programmes to promote the reduction of the heavy workload of women and girl children at home and outside through the establishment of more and affordable nurseries and kindergartens by Governments, local authorities, employers and other relevant organizations and the sharing of household tasks by men and women on an equal basis, **and to promote the provision of environmentally sound technologies which have been designed, developed and improved in consultation with women, accessible and clean water, an efficient fuel supply and adequate sanitation facilities;**

(e) Programmes to establish and strengthen preventive and curative health facilities, which include women-centered, women-managed, safe and effective reproductive health care and affordable, accessible, responsible planning of family size and services, as appropriate, in keeping with freedom, dignity and personally held values. Programmes should focus on providing comprehensive health care, including pre-natal care, education and information on health and responsible parenthood, and should provide the opportunity for all women to fully breastfeed at least during the first four months *post-partum*. Programmes should fully support women's productive and reproductive roles and well-being and should pay special attention to the need to provide equal and improved health care for all children and to reduce the risk of maternal and child mortality and sickness;

(f) Programmes to support and strengthen equal employment opportunities and equitable renumeration for women in the formal and informal sectors with adequate economic, political and social support systems and services, including child care, particularly day-care facilities and parental leave, and equal access to credit, land and other natural resources;

(g) Programmes to establish rural banking systems with a view to facilitating and increasing rural women's access to credit and to agricultural inputs and implements;

**(h) Programmes to develop consumer awareness and the active participation of women, emphasizing their crucial role in achieving changes necessary to reduce or eliminate unsustainable patterns of consumption and production, particularly in industrialized countries in order to encourage investment in environmentally sound productive activities and induce environmentally and socially friendly industrial development;**

(i) Programmes to eliminate persistent negative images, stereotypes, attitudes and prejudices against women through changes in socialization patterns, the media, advertising, and formal and non-formal education;

(j) Measures to review progress made in these areas, including the preparation of a review and appraisal report which includes recommendations to be submitted to the 1995 World Conference on Women.

24.4 Governments are urged to ratify all relevant conventions pertaining to women if they have not already done so. Those that have ratified conventions should enforce and establish legal, constitutional and administrative procedures to transform agreed rights into domestic legislation and should adopt measures to implement them in order to strengthen the legal capacity of women for full and equal participation in issues and decisions on sustainable development.

**24.5 States parties to the Convention on the Elimination of All Forms of Discrimination against Women should review and suggest amendments to it by the year 2000, with a view to strengthening those elements of the Convention related to environment and development, giving special attention to the issue of access and entitlements to natural resources, technology, creative banking facilities and low-cost housing, and the control of pollution and toxicity in the home and workplace. States parties should also clarify the extent of the Convention's scope with respect to the issues of environment and development and request the Committee on the Elimination of Discrimination against Women to develop guidelines regarding the nature of reporting such issues, required under particular articles of the Convention.**

(a) Areas requiring urgent action

**24.6 Countries should take urgent measures to avert the ongoing rapid environmental and economic degradation in developing countries that generally affects the lives of women and children in rural areas suffering drought, desertification and deforestation, armed conflicts, natural disasters, toxic waste and the aftermath of the use of unsuitable agro-chemical products.**

**24.7 In order to reach these goals, women should be fully involved in decision-making and in the implementation of sustainable development activities.**

(b) Research, data collection and dissemination of information

24.8 Countries should develop gender-sensitive databases, information systems and participatory action-oriented research and policy analyses with the collaboration of academic institutions and local women researchers on the following:

**(a) Knowledge and experience on the part of women of the management and conservation of natural resources for incorporation in the databases and information systems for sustainable development;**

(b) The impact of structural adjustment programmes on women. In research done on structural adjustment programmes, special attention should be given to the differential impact of those programmes on women, especially in terms of cut-backs in social services, education and health and in the removal of subsidies on food and fuel;

**(c) The impact on women of environmental degradation, particularly drought, desertification, toxic chemicals and armed conflicts;**

**(d) Analysis of the structural linkages between gender relations, environment and development;**

(e) The integration of the value of unpaid work, including work that is currently designated "domestic", in resource accounting mechanisms in order to better represent the true value of the contribution of women to the economy, using revised guidelines for the United Nations System of National Accounts, to be issued in 1993;

**(f) Measures to develop and include environmental, social and gender impact analyses as an essential step in the development and monitoring of programmes and policies;**

**(g) Programmes to create rural and urban training, research and resource centres in developing countries that will serve to disseminate environmentally sound technologies to women.**

(c) International and Regional Cooperation and Coordination

**24.9 The Secretary-General of the United Nations should review the adequacy of all United Nations institutions, including those with a special focus on the role of women, in meeting development and environment objectives, and make recommendations for strengthening their capacities. Institutions that require special attention in this area include the Division for the Advancement of Women (Centre for Social Development and Humanitarian Affairs, United Nations Office at Vienna), the United Nations Development Fund for Women (UNIFEM), the International Research and Training Institute for the Advancement of Women (INSTRAW) and the women's programmes of regional commissions. The review should consider how the environment and development programmes of each body of the United Nations system could be strengthened to implement Agenda 21 and how to incorporate the role of women in programmes and decisions related to sustainable development.**

24.10 Each body of the United Nations system should review the number of women in senior policy-level and decision-making posts and, where appropriate, adopt programmes to increase that number, in accordance with Economic and Social Council resolution 1991/17 on the improvement of the status of women in the Secretariat.

**24.11 UNIFEM should establish regular consultations with donors in collaboration with UNICEF, with a view to promoting operational programmes and projects on sustainable development that will strengthen the participation of women, especially low-income women, in sustainable development and in decision-making. UNDP should establish a women's focal point on development and environment in each of its resident representative offices to provide information and promote exchange of experience and information in these fields. Bodies of the United Nations**

**system, governments and non-governmental organizations involved in the follow-up to the Conference and the implementation of Agenda 21 should ensure that gender considerations are fully integrated into all the policies, programmes and activities.**

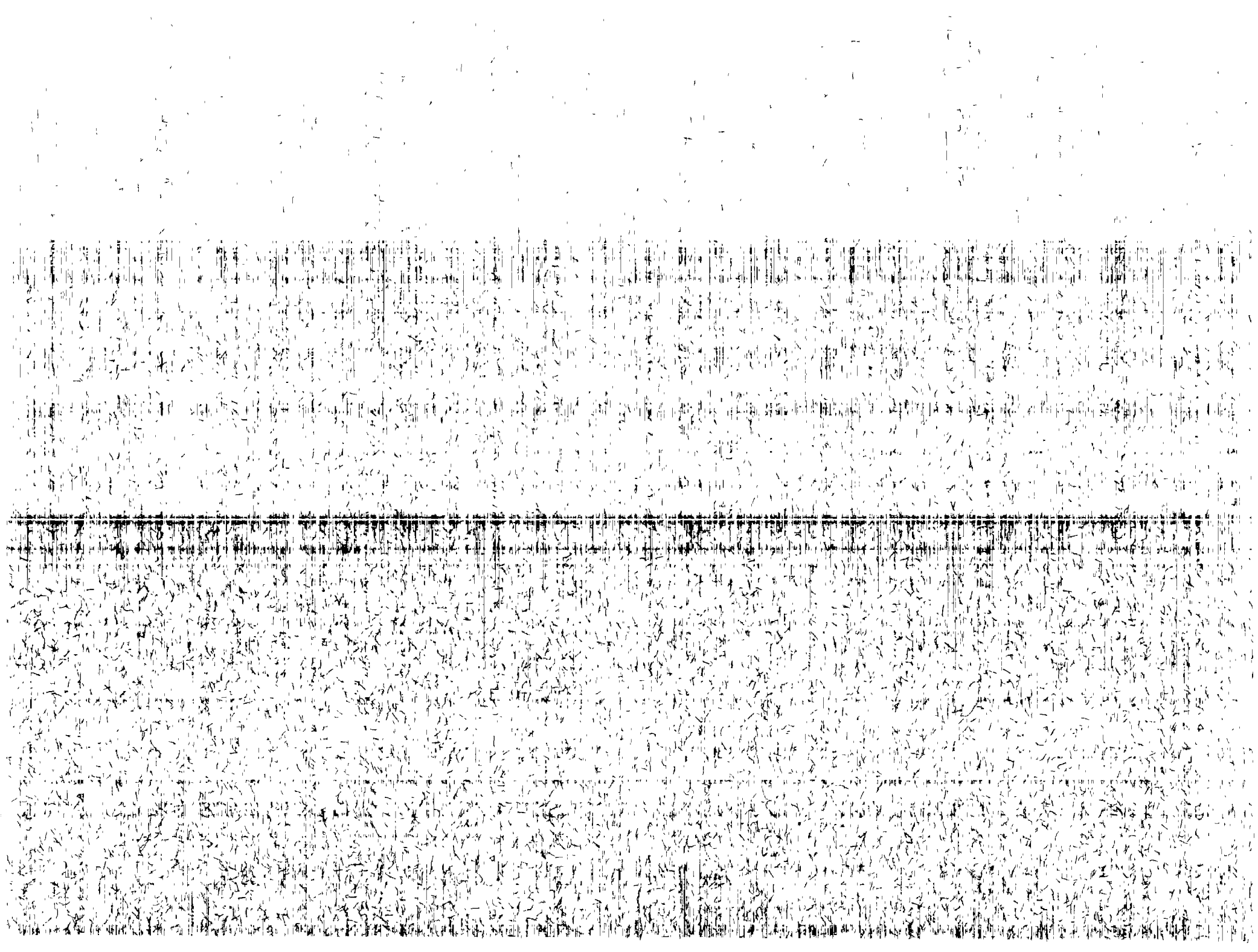
[ Means of Implementation

Finance and cost evaluation

24.12. The UNCED Secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this chapter to be about $40 million from the international community on grant and concessional terms. These are indicative and order of magnitude estimates only and have not been reviewed by governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes governments decide upon for implementation.

Notes

1/ Report of the World Conference to Review and Appraise the Achievements of the United Nations Decade for Women: Equality, Development and Peace, Nairobi, 15-26 July 1985 (United Nations publication, Sales No. E.85.IV.10), chap. I, sect. A.



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