

YES WE CAN FIELD SCHOOLS FOR WATERSHED RESILIENCE AND HEALTH



AUGUST 2009

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Photo Credit: ESP Jakarta

From learning ecological farming to solid waste management to piping raw water from river to houses, ESP's Field School participating communities are now the environmental champions of their own.

YES WE CAN

FIELD SCHOOLS FOR WATERSHED RESILIENCE AND HEALTH

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The opinions expressed in this volume do not represent the policies or positions of USAID nor DAI, but are the author's own. Likewise, any errors of fact or interpretation are solely the author's.

This report was written by Craig Thorburn from Monash University

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EXECUTIVE SUMMARY

The USAID Environmental Services Program (ESP) promotes better health by improving water resources management and increasing access to clean water supply and sanitation services. ESP takes a 'Ridges to Reefs' approach, to ensure the availability of clean water by protecting fragile upland sources, while working with water providers and users in the lowlands. The ESP program encompasses three distinct components: Watershed Management and Biodiversity Conservation; Environmental Services Delivery; and Environmental Services Finance. Sound management of upland watershed ecosystems is critical to the success of all of ESP's programs; without good watershed management, there can be little improvement of downstream water delivery or environmental sanitation. An approach known as the Farmer Field School (FFS) has been adapted as the primary strategy of this key program component, carried out with communities living in or adjacent to vital watershed catchment areas.

The Farmer Field School (FFS) is an approach to experiential learning first developed in Indonesia during the 1980s and '90s to encourage farmers to practice Integrated Pest Management (IPM) in rice. The FFS model combines adult non-formal education with agro-ecosystem analysis, involving a series of weekly meetings over the course of an entire growing season. Small groups of farmers conduct in-field observation and analysis, and make crop management decisions. The FFS approach represents a radical departure from prior models of agricultural extension. IPM Farmer Field Schools proved to be quite effective, and the model has subsequently been adapted to a broad range of agricultural crops and systems, in at least 78 developing countries in Asia, Africa, Latin America, Eastern Europe and the Middle East, with a total of over four million graduates. This book describes ESP's adaptation and application of the Farmer Field School model to promote sustainable agro-forestry and integrated watershed management in the Indonesian provinces Aceh, North and West Sumatra, and East, Central and West Java.

Whereas in the original IPM Farmer Field Schools, the rice field agro-ecosystem formed the basis for organizing and action, ESP Watershed Management Field Schools (WSM-FS) focus on the hydrological cycle as their primary organizational concept, combined with the Sustainable Livelihoods Framework – a conceptual model that helps participants explore the relationships between social, economic and environmental resources, structures, actions, forces, and impacts. The basic WSM-FS model has been adapted to the particular conditions and contexts faced by communities in each region where ESP operates, and as such, has given rise to a diverse range of follow-up action plans and activities.

Although implementation of ESP's WSM-FS model has only been underway for a relatively short time, results have been extremely encouraging, as alumni groups continue to innovate and disseminate effective agro-forestry and watershed management approaches.

This manuscript is not intended to provide a detailed account of all the different innovations and variations that have developed over the course of the ESP program's implementation of the WSM-FS model, but rather provides a number of examples to illustrate the effectiveness of the approach, and the sorts of sustainable development outcomes that have emerged from this process. The narrative begins with a brief overview of the origins of the FFS model for IPM in rice, followed by descriptions and discussion of ESP experiences implementing WSM-FS in different regions and contexts. The following section discusses issues of 'leveraging' and 'scaling-up' that have evolved as part of this process of continuous learning and innovation. The final chapter examines some of the conceptual issues underpinning the FFS model, and reasons for its success.

GLOSSARY OF TERMS AND ACRONYMS

ADB	Asian Development Bank
AFTA	<i>Yayasan Alumni Fakultas Pertanian</i> – Agriculture Faculty Alumni Association, Andalas University, West Sumatra
AI	Appreciative Inquiry
<i>Apa ini?</i>	What's this?
<i>Apa lagi?</i>	What's next?
BAPPENAS	<i>Badan Perencanaan Pembangunan Nasional</i> – National Development Planning Agency
BAPPEDA	<i>Badan Perencanaan Pembangunan Daerah</i> – Regional Development Planning Boards
BIMAS	<i>Bimbingan Massal</i> – 'Mass Guidance' National Rice Intensification Program
BPH	Brown Rice Planthopper
CBNA	Community-based Needs Assessment
CGIAR	Consultative Group on International Agricultural Research
DAI	Development Alternatives Inc.
DFID	Department for International Development (UK)
ESP	Environmental Services Program
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FIELD	Farmer Initiatives for Ecological Literacy and Democracy
FS	Field School
GAM	<i>Gerakan Aceh Merdeka</i> – Movement for Acehnese Independence
HATF	<i>Hutan Asuh</i> (Forest Care) Trust Fund
HPMPL	<i>Himpunan Petani Minangkabau Peduli Lingkungan</i> – Minangkabau Farmers Environmental Awareness Association
HYV	High-yielding Variety
IDS	Institute for Development Studies
IPM	Integrated Pest Management
IRRI	International Rice Research Institute
IPO	<i>Institut Pertanian Organik</i> – Organic Agriculture Institute, West Sumatra
IPPHTI	<i>Ikatan Petani Pengendalian Hama Terpadu Indonesia</i> – Indonesian IPM Farmers Association
Ir.	<i>Insinyur</i> – Engineer
IRRI	International Rice Research Institute
<i>Kabupaten</i>	District
KDP	<i>Kecamatan</i> Development Program (World Bank)
<i>Kebun</i>	A small area of dry land agro-forestry
<i>Kecamatan</i>	Sub-district
MSF	Multi-stakeholder Forum
<i>Nagari</i>	Traditional Minang community unit, comprised of several hamlets or villages
New Order	Government of ex-President Suharto – 1965-1998
NFE	Non-formal Education
NGO	Non-governmental Organization
NORAD	Norwegian Agency for Development Cooperation

OPEC	Organization of Petroleum Exporting Countries
PAR	Participatory Action Research
PES	Payment for Environmental Services
PDAM	<i>Perusahaan Daerah Air Minum</i> – Regional Water Supply Utility
Perdes	<i>Peraturan Desa</i> – Village Regulation
<i>Pemulung</i>	Scavenger; person who makes living gathering re-usable items from trash
<i>Perum Perhutani</i>	State Forestry Corporation
PHBM	<i>Pengelolaan Hutan Bersama Masyarakat</i> – Managing Forests with the Community
PLA	Participatory Learning and Action
PMDH	<i>Pembangunan Masyarakat Desa Hutan</i> – Forest Village Community Development
<i>PNPM Mandiri</i>	<i>Program Nasional Pemberdayaan Masyarakat Mandiri</i> – National Program for Self-sufficient Community Empowerment
PRA	Participatory Rural Appraisal
PTS	<i>Padi Tanam Sebatang</i> – Single Rice Seedling Planting System
SLA	Sustainable Livelihoods Analysis
SLF	Sustainable Livelihoods Framework
SRI	System of Rice Intensification
ToT	Training of Trainers
T&V	'Training and Visit' Agricultural Extension
UNCED	United Nations Conference on Environment and Development – The Rio Conference
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WCED	World Commission on Environment and Development, also called the Bruntland Commission
<i>Wengkon</i>	System of planting crops in the spaces between young timber trees on state forest land
WSM	Watershed Management
WSM-FS	Watershed Management Field School

I. INTRODUCTION

Ten of us were crammed into the tiny one-room shanty; I was afraid it might collapse under our weight. Two colleagues and I had come from the ESP office, to meet with seven alumni of the urban kampong water and sanitation field school that had been held here a few months before.

About a half hour into our visit, I noticed that all seven of our hostesses were talking at the same time, practically shouting to make themselves heard.

'Now my husband does it too – as soon as we sit down to eat, he asks the kids, 'Have you washed your hands?'

'...When Pak RT saw our graduation on TV, he sure changed his tune. Now he supports us whatever we do...'

'That was the second time I was on TV; the first time was when they bulldozed the old neighborhood to build the mall!'

'...I heard that they're not going to knock down any more houses unless it's to build a school or a clinic...'

'That's good; it would be good to have a clinic!'

'They can't build anything here anyway, where's all the water going to go when it floods?'

'This is Jakarta. They'll build, don't you know it...'

'Well, I don't want to leave. Once we clean up the garbage, this is a good place!'

'I don't see your husband taking out any garbage!'

'What do you mean? Mas helps a lot; he's really proud of us!'

'Proud to have a wife who does all the work!'

'We've been trying to get the neighbors to help with the cleanup. They want water, but they don't seem to understand the connection between a clean neighborhood and clean water. It's hard sometimes...'

'We just have to do it. When people see, they'll understand.'

At one point, there was a pause when everybody seemed out of breath. Ayi, one of our hostesses, giggled and said,

'It's good to have differences of opinion; we can learn a lot from each other...'



Kampong Rawa Kandang, North Jakarta

This was a poor neighborhood, even by Jakarta slum standards. The entire complex, around 300 houses, is built of scraps of wood, sheet iron and plastic. All houses are on stilts, about a meter above a muddy, garbage-filled swamp. There are high-water marks on the walls, from the last time the Cakung River overflowed its banks. At the northern end of the kampong, the land slopes up a bit, and some people have planted gardens. Most of the women's husbands work as construction laborers, though some are 'pemulung' – making their living gleaning bits of plastic, metal and glass from the trash in nearby housing estates. The women were quite forthright about their poverty, their lack of security, and the difficulty of accessing services. But the most striking thing about this group was not their destitution, but rather their optimism, their enthusiasm, and their pride.

Stereotypes about fatalism, or about a 'culture of silence', do not apply here. Here is a group of women who, despite the privation they endure, are committed to improving their lives, their homes, and their community. Their message is simple: We can live in a cleaner, healthier kampong, and our lives will be better. Their tools, and their activities, are simple too: Wash your hands with soap. Put rubbish in receptacles by the road. Clear out the trash from under our houses; separate and recycle. Many of them now use simple water filters to clean the well water they use for washing; they no longer have to purchase all the water they need for household use. A few are sewing purses, wallets and carry-bags from recycled drink and detergent packages, which they market through a local NGO. They are trying to organize neighbors to help clean the area, and plan to start producing compost from domestic waste, to use in the gardens. And, they will tell anyone who will listen!

I.I. HOW DID WE GET HERE?

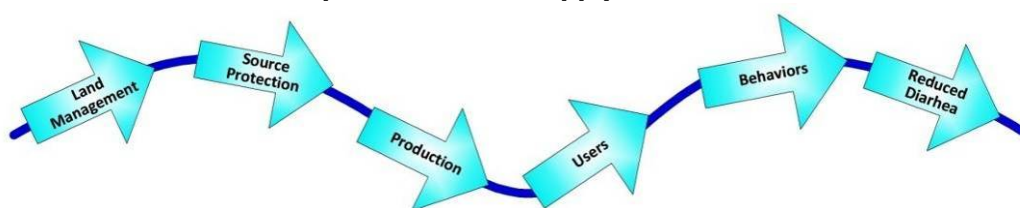
The USAID Environmental Services Program (ESP) aims to promote better health by improving water resources management and increasing access to clean water supply and sanitation services. ESP takes a 'Ridges to Reefs' approach, to ensure the availability of clean water by protecting fragile upland sources, while working with water providers and users in the lowlands. This involves the integration of three distinct components:

- *Watershed Management and Biodiversity Conservation* seeks to stabilize and improve the supply of raw water to urban and peri-urban population centers through the promotion of sustainable land use practices such as reforestation, agro-forestry, land use planning, and improved forest management;
- *Environmental Service Delivery* aims to improve the provision of services – including water supply, sewerage, and solid waste – in the lowland population centers. The program improves municipal water utilities' technical, operational, and financial capacities and works with local governments and communities to improve sanitation services; and

- *Environmental Services Finance* seeks to increase the financing available to local governments to improve and expand water supply and sanitation facilities.

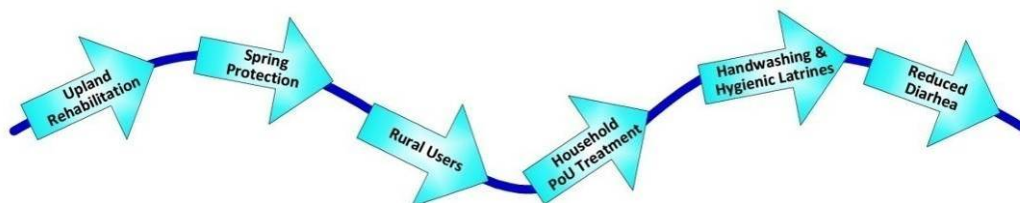
This is a complex program, involving disparate groups of stakeholders, and undertaking a range of activities that, at first glance, might appear unrelated. USAID’s implementing partner, Development Alternatives Inc. (DAI) has developed a conceptual framework called the ‘Blue Thread’, wherein water – in particular drinking water – serves as an entry point for community engagement.

The ‘Blue Thread’ – Linking Watershed Management with Improved Water Supply and Sanitation



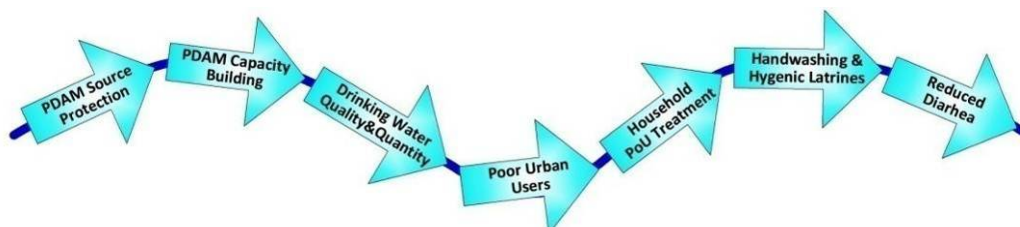
In rural areas, the approach focuses on land management to improve, or sometimes reclaim, drinking water sources. This is then carried through to improved point-of-use water treatment, sanitation, and behavioral change.

The ‘Blue Thread’ for Rural Upland Communities



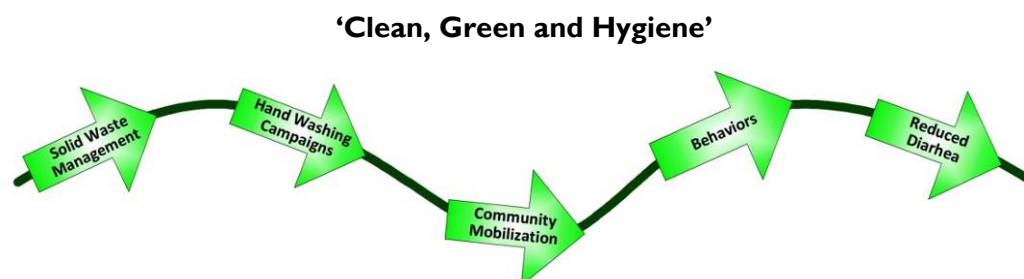
In urban and peri-urban sites, the ‘Blue Thread’ approach focuses more on strengthening poor communities to engage with PDAM,¹ along with improved hygiene and sanitation, and again, behavioral change.

The ‘Blue Thread’ for Urban and Peri-urban Communities



¹ Regional Water Utility (*Perusahaan Daerah Air Minum*)

The 'Blue Thread' is combined with another approach, which they call 'Clean, Green and Hygiene', focusing mainly on solid waste management.



To project managers and policy-makers, this all makes sense. The catchy titles have a bit of 'traction' as well with local government, and with communities. However, it takes more than slogans to mobilize change. Quite simply, community members' commitment – and capacity – to improve water management, and to improve hygiene and sanitation in their own neighborhoods, is absolutely essential to the achievement of the ESP program's objectives. ESP's primary approach to building this commitment and capacity is known as the Field School.

1.2. CALL IT FIELD SCHOOL SPIRIT...

A Farmer Field School (FFS) is a group-based learning approach originally developed by the USAID-supported Integrated Pest Management (IPM) in Rice Program in Indonesia during the late 1980s, to combat indiscriminate pesticide use and improve farmers' livelihoods.

The FFS approach stresses experiential learning – through a series of activities carried out over the entire duration of a growing season. The processes and practices that define the FFS approach are hardly new. The model brings together concepts and methods from agro-ecology, adult non-formal education and community development, to generate a deeper understanding of problems and their causes, and to develop a capability to generate, adapt and extend this knowledge within communities. As such, the Farmer Field School emphasizes principles of experimentation, participation, and holistic approaches to addressing particular circumstances, needs, problems and constraints.

The basis for the training approach . . . is non-formal education, itself a 'learner-centered' discovery process. It seeks to empower people to solve 'living problems' actively by fostering participation, self-confidence, dialogue, joint decision-making and self-determination.²

There are no teachers or students in a Field School. Rather, it consists of a group of people with a common interest, to study the 'how and why' of a particular topic. Primary activities include simple experiments, regular field observations and group analysis. In the original IPM field schools, the rice field itself is the teacher – providing most of the training materials, such as plants, insects, and real problems. The FFS model is based on the premise that farmers already possess a wealth of knowledge and experience.

² Röling and van de Fliert (1998)

Education for children is often like filling a cup with tea, milk and sugar, while adult education is more like stirring an already full cup of tea to blend the ingredients in a new way.³

The process is guided by a facilitator, who is versed in basic techniques of participatory education, group dynamics, and process management. A solid working knowledge of the subject is also required; for example, farmers tend to make the best facilitators for Farmer Field Schools. There are no lectures, and answering questions directly [by the facilitator] is considered a lost opportunity for learning. Participants are encouraged to discuss what they have observed, and come to their own conclusions. Often, this leads to ideas and plans for new experiments, or more in-depth observation and assessment of a particular topic or issue.

The results of this simple process can be astonishing. As participants' understanding of problems and solutions increases, so too does their confidence in their own ability to investigate, experiment, analyze, and to solve problems. There is a contagious 'sense of belonging' within the group, with members encouraging one another, sometimes competing, always spirited. The Field School ends with a 'Field Day', organized by the participants themselves, when they present what they have learned and plans for follow-up activities, to community members, local government, and other stakeholders. Outsiders – particularly government officials – are generally amazed by FFS alumni's grasp of the issues, their insight and ingenuity, and their confidence and outspokenness.

Since its initial development for IPM in rice in Indonesia in the 1980s, the Farmer Field School model has been adopted in at least 78 developing countries in Asia, Africa, Latin America, Eastern Europe and the Middle East, with a total of over four million graduates.⁴ Originally developed for tropical rice cultivation, the model has been adapted for a wide variety of crops and contexts, including vegetables, cotton, maize, potatoes, tree crops, poultry and dairy. Agricultural topics that do not follow a specific crop include land degradation and soil fertility management, agro-forestry, food security, nutrition and fishing. More recently, the FFS model has been adapted to address topics outside the agricultural field, including community forestry, biodiversity, malaria control, HIV/AIDS, literacy and advocacy, as well as 'junior Farmer Field and Life Schools' for school children.⁵

3 Gallagher (1999)
4 Braun et al. (2006)
5 FAO (2007)

2. IT BEGAN IN A RICE FIELD

Rice has fed more people over a longer period than any other crop.⁶ Rice has been cultivated in South and Southeast Asia for the last six to twelve thousand years, and presently occupies one-tenth of the world's arable land – up to a third of total planted area in some Asian countries.

The extensive geographical distribution of wet-land rice cultivation, combined with its long ecological history, has resulted in the creation of a vast man-made ecozone. The arthropod species richness of tropical rice fields surpasses that of most 'natural' temperate systems. The rice ecosystem owes its robustness to this in-field ecological diversity. An early-season abundance of detritus- and plankton-feeding insects provides a well-dispersed food source for a diverse community of natural enemies, allowing predator populations to develop well in advance of rice-pest populations, thus keeping herbivore infestations well below economically damaging levels.

Rice self-sufficiency is perceived as key to ensuring national food security in countries – such as Indonesia – where it is the main staple. Presently Indonesia has over 11 million hectares of irrigated paddy land, and between 15 and 20 million rice farmers – most farming tiny plots ranging from less than 0.2 to 0.5 hectares in size.



Rice Paddies, East Java

Like most other South and Southeast Asian countries, Indonesia undertook an aggressive program of rice intensification beginning in the 1960s. This effort was based on getting rice farmers to employ 'Green Revolution' technologies.⁷ The Green Revolution approach involves a 'package' of technologies for intensive cropping using short-stemmed high-yielding varieties (HYV), synchronized maturation, heightened reliance on mechanization, precise water control, and intensive and precisely timed chemical inputs. Pest control was based on calendar-based prophylactic applications of insecticides.

Indonesia's rice intensification program, known by the acronym BIMAS, meaning 'Mass Guidance', represents one of the major success stories of the Green Revolution in rice. Supported by over \$3 billion in loans from the World Bank combined with windfall profits from the OPEC price increases of the 1970s, Indonesia was able to more than double per-

⁶ Much of this chapter is summarized from Thorburn (2009)

⁷The term 'Green Revolution' was first coined by USAID Administrator William Gaud in 1968. To see the full text of Gaud's prophetic lecture, see <http://www.agbioworld.org/biotech-info/topics/borlaug/borlaug-green.html>

hectare productivity and treble national rice production, transforming from being the world's largest rice importer in 1960, to achieving self-sufficiency in rice by 1984.

The technological basis of the Green Revolution approach carried within it the seeds of its own undoing. Mono-cropping, close spacing, high fertilizer use, and the dense canopy produced by heavy tillering, combine to create a favorable situation for the multiplication of certain kinds of pests. Most importantly, intensive insecticide use kills natural predators as well as herbivorous insects, undermining the ecological stability that makes rice such a successful crop.⁸

The first problems began appearing at the facilities of the International Rice Research Institute (IRRI) in the Philippines just a first few years into the HYV rice breeding program, when test plots began evincing rice brown planthopper (*Nilaparvata lugens* [Stål], abbreviated BPH) infestations, and symptoms known as 'hopperburn'. The BPH is a small brownish, sucking insect, belonging to the order *Hemiptera*. BPH is a vascular feeder, using stylets in its mouth to pierce stems and suck phloem sap from fresh rice plants. In addition to removing photosynthates from the plant, this sucking can block the vascular bundles in the rice leaves, causing toxic build-up of free amino acids, which causes hopperburn. Hopperburn appears initially as a yellowing of older leaves, but in severe cases the whole plant turns brown and dies.

BPH is native to all rice-growing areas of Asia, but was not known to most people until the height of the Green Revolution, when it suddenly became a pest. In unsprayed rice fields, a wide array of natural predators keep BPH populations in check. Ironically, BPH infestations are directly caused by the use of insecticides on rice – a classic example of what is known as an 'insecticide-induced resurgent pest'. BPH embed their eggs in the leaf sheaths of rice, which thereby escape insecticide sprays. A female lays 200 to 400 eggs, and the lifecycle of the BPH is a mere 22 days. In the absence of natural enemies, BPH populations can expand exponentially. In sprayed fields, BPH populations can quickly reach levels that can cause hopperburn damage 'comparable to a locust plague'.⁹

By the mid-1970s, BPH outbreaks were beginning to cause serious crop losses in Indonesia and other Asian countries that had adopted the new varieties. At IRRI, research priorities shifted to developing new BPH-resistant rice varieties – an approach that worked for a while. However, within a few seasons, new BPH biotypes appeared that could feed on the resistant varieties, signaling that new approaches would be needed.

No country was worse affected than Indonesia. Just two years after achieving its long sought-after goal of self-sufficiency in rice in 1984, BPH infestations across the fertile northern plains of Java destroyed tens of thousands of hectares of rice fields, causing a major threat to the nation's food security.

A few agronomists from the national agricultural university in Bogor, together with FAO scientists from the Philippines, seized this opportunity to act. In October 1986, this group actually took several matchboxes of insects and spiders into the office of Indonesian

⁸ While doubling or trebling nitrogen fertilizer application leads to significantly increased production of HYV rice, there is no parallel evidence to show that increasing insecticide use leads to measurable increases in yields – nor, conversely, that reduced use results in reduced rice yields (Pingali and Gerpachio 1997). Despite this, twelve percent of insecticides sold worldwide are applied to rice, more than any other food crop (Matteson 2000).

⁹ Kiritani (1979)

President Suharto to explain predator-herbivore food webs, the concept of insecticide-induced resurgent pests, and the principles of Integrated Pest Management in rice. President Suharto was so impressed, that he immediately drafted a Presidential Decree banning 28 broad-spectrum chemicals contained in 57 formulations for use on rice, introducing a staged elimination of government pesticide subsidies, and mandating that IPM become the national policy for crop and plant protection.¹⁰

The BIMAS rice intensification program included fielding some 14,000 extension agents. Under an agricultural extension system known as 'Training and Visit' (T&V), each extension worker paid fortnightly visits to groups of 16 'contact farmers' who were each in turn responsible to spread the BIMAS message another 10 to 20 other farmers. Initially, the existing T&V extension apparatus already in place was to be mobilized to implement the new national IPM policy. The government diverted US\$ 4.19 million remaining from the ongoing World Bank-supported National Agricultural Extension Project, to train a group of 'IPM Master Trainers', who would then provide six-day crash training courses for agricultural pest observers and extension workers. These individuals were then to pass on the message to 'contact farmers', in the classic T&V manner. Training guides, flip-charts, slide shows, and 150,000 leaflets and pamphlets were hurriedly produced and distributed. The program burned through the entire budget in just seven months, reaching fewer than ten percent of the targeted 10,300 farmers. Less than a quarter of those actually entered a rice field during the course of the training program. In post-training assessments, farmers reported that they had not learned much that they could use. Indonesia's first attempt at implementing Integrated Pest Management in rice was a dismal failure.

2.1. ENTER FARMER FIELD SCHOOLS

In 1989, USAID provided a grant of US\$ 4.7 million to the Indonesian Ministry of Finance and the National Planning Agency (BAPPENAS) to initiate a new two-year National IPM Program, to be piloted in six major rice producing provinces, with technical assistance provided by FAO. The decision to house the project in BAPPENAS rather than the Ministry of Agriculture was strategic – it was considered too difficult to devise radical new strategies in an agency so strongly committed to 'transfer of technology' T&V extension approaches, and so deeply enmeshed with pesticide company interests. The FAO team established an IPM Secretariat in the BAPPENAS complex in Jakarta and a Field Office in Yogyakarta, and worked closely with pest observers and selected extension agents in selected districts.

This set the stage for the development of the Farmer Field School model, a sort of 'school without walls' that combined adult non-formal education with agro-ecosystem analysis. The FFS represented a major departure from previous models of agricultural extension by encouraging farmers to conduct their own investigations and analysis and to make their own crop management decisions; and from existing approaches to pest management, by examining the entire rice paddy agro-ecosystem rather than focusing just on individual pest problems. National IPM Program staff were primarily educators and former activists – the rice field provided the laboratory and classroom, and the farmers themselves provided the knowledge.

¹⁰ Presidential Instruction No. 3 of 1986 on the National IPM Program

The FFS consists of day-long weekly meetings over the course of an entire rice growing season, about ten to twelve weeks. The IPM Farmer Field School uses two plots: a 'non-IPM' plot that is sprayed with insecticides according to Ministry of Agriculture guidelines, and an IPM plot that is managed based on decisions made by the group during their weekly meetings. There are no teachers and students, or trainers and trainees, but rather facilitators and participants. A typical FFS course consists of about 25 members, who are divided into groups of five to conduct field observations and analysis.

Each session begins with a careful examination of conditions in the fields, observing sample rice hills in a random diagonal transect across each field. The groups make notes of insects, spiders, damage symptoms, weeds and diseases observed on each hill, along with the stage of plant growth, weather and water conditions. Interesting insects and other creatures are captured alive, to be kept for observation. Farmers conduct experiments to study the effects of plant spacing, water control, varieties, soil characteristics, and fertilizer and insecticide application on plant growth.

After their field work, participants gather in a nearby home or shed, and make drawings of what they observed on large sheets of newsprint. The remainder of the FFS meeting is taken up with a lively discussion of the week's findings. Farmers are encouraged to discuss what they observed, and come to their own conclusions about the status of the crop and possible control measures (or to set up new experiments to find out the answers). Discussion is based on the 'Apa ini?' ('What is this?') principle. Answering a question directly [by the facilitator] is considered a lost opportunity for learning. The purpose of these discussions is to produce a functional definition of the insect: How many are there? Where are they on the plant? What do they do? What is the result? 'Insect zoos', created by placing muslin netting over a rice plant, are used to observe predation and parasitism in action, allowing farmers to learn who are their friends, who are their enemies, and who are their enemies' enemies. 'Ice-breaker' activities are used to enliven the sessions and foster a sense of belonging among the group.

Through participating in FFS and an array of follow-up participatory research activities, farmers learn to make crop management decisions based on their personal circumstances and the ecological balance in each paddy field. The four guiding principles of the Indonesian National IPM Program reflected this holism, and the program's overall goal of making farmers confident managers and decision-makers, eager for new ideas and information but free from dependence on directives from 'above':

1. Grow a healthy crop.
2. Observe fields weekly.
3. Conserve natural enemies.
4. Farmers are IPM experts.

The results were immediate and profound: among FFS farmers, insecticide applications reduced from an average of 2.8 sprays per season to less than one, with most farmers not spraying at all.¹¹ When farmers did apply an insecticide, most could identify a specific pest. Studies showed that IPM farmers had, on average, slightly higher yields, higher overall returns, and lower economic variance than their non-IPM counterparts.¹² But the most

¹¹ FAO (1993)

¹² Settle et al. (1996)

impressive change was not in the rice fields *per se*, but in the character of the IPM rice farmers themselves:

Senior visitors to the field schools marvel at what is happening. Here are farmers and some village officials, the lowliest ranked people on the bureaucratic hierarchy, actively and intelligently discussing their problems, drawing often very accomplished and accurate pictures of various insects, speaking in front of others (including such visitors as the Minister of Agriculture) and making considered decisions about pest control.¹³

The original two-year project was extended for a third year. By the end of the three-year pilot phase in 1992, more than 250,000 farmers in six provinces had participated in FFS courses, leading to a 60 percent reduction in insecticide use in project areas.¹⁴

2.2. COMMUNITY IPM

In 1992, the decision was made to 'go national', with \$32 million loan funding from the World Bank, \$14 million from the GOI, plus another \$7 million from USAID. Program management shifted to the Ministry of Agriculture, and implementation was extended to the 12 major rice-producing provinces in the country. The Indonesian National IPM Program ran from 1993 to 1999, during which over one million farmers participated in FFS and a variety of post field-school participatory research programs.

West Sumatra: The Farmer Field School Province

IPM in rice began in West Sumatra even before the 1986 Presidential Instruction and subsequent initiation of the National IPM Program, after a young Plant Pest and Disease Observer from the province was trained in IPM techniques at IRRI in the Philippines, in 1984. During the early years, Ir. Djoni worked tirelessly to convince farmers to reduce or eliminate pesticide use, often encountering fierce resistance from colleagues and superiors. His efforts received a boost when he was able to convince a Swiss irrigation project to implement IPM across the entire Sepuluh Koto Singkarak sub-district, after the project nearly failed due to insecticide-induced BPH infestation. Later, Ir. Djoni helped train the first group of Farmer Field School facilitators when the National IPM Program got underway in 1989. West Sumatra was one of the 12 major rice-producing provinces included in the 'scaling up' phase of the National IPM Program between 1992 and 1999, achieving substantial success in promoting IPM in rice.

Ir. Djoni worked his way up the provincial agriculture service bureaucracy, becoming head of Plant Protection in 1996. That year, he began collaborating with agronomists from Clemson University under a USAID-sponsored adjunct to the National IPM Program, to promote organic vegetable farming.

Not content with the pace of change within the bureaucracy, Ir. Djoni mobilized farmers to establish the Minang Farmers Environmental Awareness Association (HPMPL) in 1993. Among other activities, this group held numerous demonstrations during the mid- to late 1990s calling for a provincial ban on pesticide use. In 2003, he established the Agriculture Faculty Alumni Association (AFTA) as a non-governmental forum to provide further support to the development and dissemination of sustainable agriculture in West Sumatra. In 2006 he founded the Institute of Organic Agriculture (IPO) near Padang Panjang, as a training and research center for organic vegetable farming.

¹³ Röling and van de Fliert (1994)

¹⁴ FAO (1988)



Institute of Organic Agriculture, Padang Panjang

In 2003, Ir. Djoni was appointed head of the West Sumatra Agriculture Service, allowing him to push through numerous innovative programs. In 2009, the Provincial Agriculture Service is conducting 2,800 Farmer Field Schools to promote 'Single Rice Plant' (PTS) paddy farming, an adaptation of SRI System of Rice Intensification SRI technology, which achieves significant production gains through soil fertility enhancement using compost and manure, wider spacing of individual seedlings, and greatly reduced irrigation water usage. The province provides incentives of Rp. 200,000 per hectare to farmers to not burn rice straw, but to plough it back into the soil.

West Sumatra province can now certify organic farmers, entitling them to a Rp. 250 per kilogram government subsidy on the sale of certified organic produce. Currently there are nearly 300 hectares of certified organic farms in West Sumatra. Other innovations include distribution of over 2,000 goats to certified organic farmers, with the requirement that they hang a 'Fertilizer Factory' sign on the goats' pen. AFTA has a list of nearly 40 'Farmer Consultants' with expertise in topics ranging from PTS rice cultivation, organic fruit and vegetable farming, nurseries and grafting, to farm enterprise management. The provincial government pays the cost for any group or agency that requests their services.

In 2009, Governor H. Gunawan Fauzi officially declared the municipality of Padang Panjang Indonesia's first 'Organic City'; twelve percent of its 600 hectares of farm land is already certified organic, with a target of achieving 100 percent within the next three to four years. This same year, Ir. Djoni was presented the prestigious *Kalpataru* environmental service award, in recognition of his 25 years' effort to promote environmentally sustainable agriculture in West Sumatra.

Aware that achieving 'bureaucratic sustainability' of the FFS approach within the Ministry of Agriculture would be an uphill battle, the IPM Program in Indonesia adopted a strategy of 'Community IPM', focusing on farmers and farmers groups as the primary agents for 'scaling up' and innovation.¹⁵ From the early phases of the program, Farmer Trainers were recruited and trained in basic FFS facilitation skills, both to supplement the trainers from the Agriculture Ministry, and to carry the message to others in their communities.¹⁶

To create a national network that could support the efforts of local IPM farmer groups, FFS alumni used the opportunity of the final evaluation workshop conducted by FAO in Yogyakarta in 1999 to establish the Indonesian Association of IPM Farmers (IPPHTI, *Ikatan Petani PHT Indonesia*), with the goal of strengthening farmer groups at the local level as the foundation for farmer networking and creation of a strong national association. Ten years

¹⁵ Dilts (2001); Pontius, Dilts and Bartlett (2002)

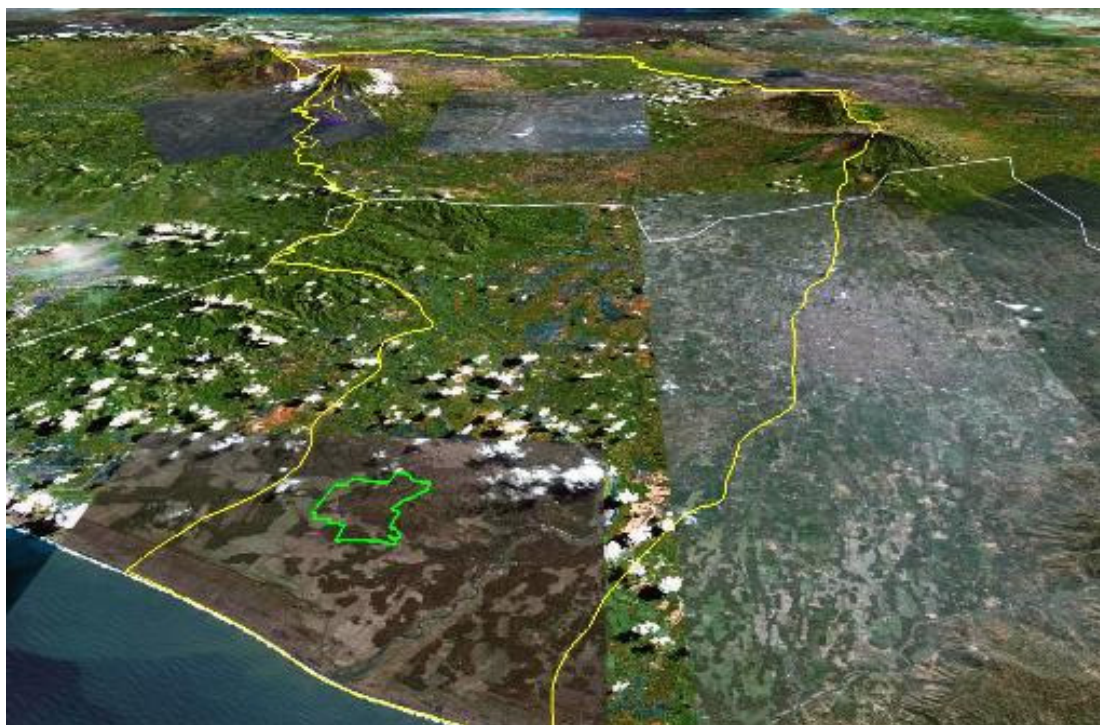
¹⁶ Program leaders found that IPM farmer-trainers were often better facilitators than outside extension staff – they know the community and its members, speak the farmers' language, are recognized by members as colleagues, and know the area well. They can operate independently, outside formal hierarchical structures.

after the termination of the National IPM program, IPPHTI remains active in many parts of the country. Members still conduct Field Schools on a diverse range of topics, along with a widening portfolio of farmer-led science and experimentation, plant breeding and community seed systems, policy-making and advocacy. Veteran IPPHTI activists have even established a 'Farmers' University' in a village on the outskirts of Yogyakarta, combining Field School approaches with formal tertiary agriculture courses. As well, key members of the National IPM Secretariat formed a new foundation, Farmer Initiatives for Ecological Literacy and Democracy, or FIELD Indonesia, part of a region-wide FIELD Alliance. FIELD Indonesia works with a variety of partners in the fields of capacity-building for rural livelihoods planning and action research, farmer training in the management of genetic resources and healthy vegetable production, and advocacy activities relating to local governance and farmers' roles in the global food systems. FIELD Indonesia is one of DAI Inc.'s partners in the implementation of the ESP Program.

3. ESP WATERSHED MANAGEMENT FIELD SCHOOLS

Integrated Pest Management Farmer Field Schools were developed as an innovative means of generating and sharing knowledge about complex agronomic issues. A major key to their success has been their *utility*. Rice cultivation is one of the most important economic activities of millions of rural Indonesian households. Over a million Indonesian rice farmers were willing to devote significant amounts of time and effort to participate in FFS activities, because these provided them with skills and knowledge that directly and immediately impacted their productivity, income, livelihoods, and health.

Experience in Indonesia and elsewhere has shown that the FFS model can be successfully adapted to a wide variety of agricultural crops and activities. How well can it work for activities – such as watershed management – that are not specifically linked to increased production or income? The ESP program, working together with FIELD Indonesia, endeavored to find out, by developing a new FFS program to support improved management of water resources.



The Progo River Basin, Magelang, Central Java. Rain falling on the slopes of the Merapi, Merbabu, Sumbing and Sindoro volcanoes feeds 19 major underground springs and the tributaries of the Progo River. It is easy to see how early civilizations flourished in this region; Borobudur temple, built by the Sailendra dynasty around 800 AD, is located at the heart of this basin. Damage to forests in the Progo catchment can endanger the livelihoods of over 1.5 million people living in the watershed region.

Indonesia is blessed with abundant natural resources, fertile volcanic soil, and ample rainfall in most parts of the country. Rain falls most consistently and plentifully on the high mountains that rise above many of its major islands, feeding the rivers, aquifers and springs that provide the wellspring of its people's livelihoods. It is easy to understand why successive

governments have placed a high priority on preserving the ecosystem health of the forests on the country's high mountain slopes. Over the past several decades, however, the forest ecosystems of Indonesia's highlands have experienced serious degradation, through illegal logging, agricultural encroachment, and poor forest management practices. In addition to serious floods and landslides that claim scores of lives each rainy season, this has led to decreased flow in many important rivers and springs, threatening serious water shortages for agricultural, industrial and urban consumers and water users. This is the problem that the ESP Watershed Management Field Schools seek to address.

In keeping with the basic principles that have imbued the FFS approach since its inception, the new model was strongly orientated toward *meeting farmers' needs*. From the outset, plans included eventually developing field schools for end-users (i.e., poor urban communities); however, the group determined it would be best to begin by focusing on upland agro-forestry management, located within the broader context of integrated watershed management. The design of the Watershed Management Field Schools (WSM-FS) would also need to address knowledge and skills needed to build linkages between agro-forestry management and the ESP program's Health and Hygiene components.

The basic objective of Watershed Management Field Schools is to provide upland farmer families and communities with the knowledge and skills necessary to adopt 'conservation farming' practices for their dry land agriculture (especially agro-forestry, or *kebun*¹⁷), so as to conserve and protect water supplies (both surface and recharge). An obvious starting point was the farm family's need to reliably increase the income gained from their *kebun*, by increasing the productivity of land and labor.

Conceptually, this was not too difficult; as with rice farming, ecologically sound agro-forestry is more stable – and more profitable – than unsustainable farming practices. Good soil management practice, including erosion control, use of organic fertilizers, and intercropping that combines medium- and long-term crop varieties with seasonal crops, enhances the productivity and resilience of dry land agriculture systems. A major limiting factor in agro-forestry and *kebun* agriculture is water. The hydrological cycle became the conceptual 'hook' on which to build the basic agro-forestry and watershed management field school curriculum.

'Projects are like toys; you play with them for awhile, then after they wear out you ask for a new one...'

– Pak Marsilan, Farmer Trainer

'The Field School education is never complete. You keep identifying new things to learn, new things to try. The basic question changes from 'Apa ini?' (What is this?), to 'Apa lagi?' (What next?)'

– Ir. Djoni, Head of the West Sumatra Provincial Agriculture Service

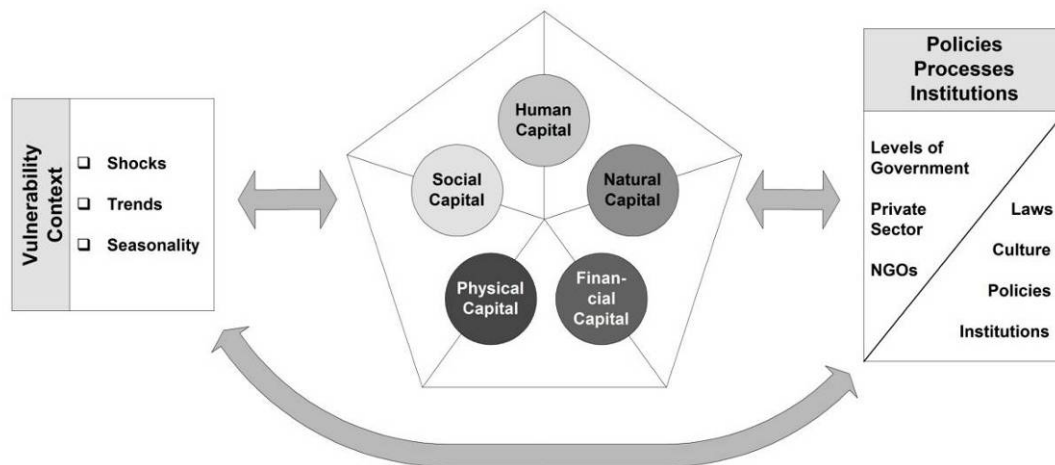
¹⁷ There is no direct English equivalent for the Indonesian word '*kebun*', i.e., a relatively small area (commonly 0.25 to 1 hectare) of dry land agro-forestry, generally located some distance from the farmer's house. In Indonesian, it is distinct from '*perkebunan*' (a commercial plantation) or a '*pekarangan*' (house garden). Neither of the words 'plantation' or 'orchard' in English come close to capturing the local meaning. Hence, the Indonesian term will be used in this text.

3.1. THE SUSTAINABLE LIVELIHOODS FRAMEWORK¹⁸

Twenty years experience with IPM Farmer Field Schools had clearly demonstrated that as farmers’ understanding of the ecological dynamics of their rice fields increased, so too did their awareness of the broader socio-economic context in which this was embedded. This, in turn, increased their desire and capacity to undertake collective actions to address some of these underlying issues and problems. The focus and scope of FFS and post-FFS activities ‘naturally’ shifts upward and outward, and the initial focus on rice agro-ecosystems gradually morphs into a broader social analysis. Beginning in the late 1990s, the Community IPM Program began utilizing the **Sustainable Livelihoods Framework (SLF)** as a handy conceptual tool that encompasses the interdependence of different aspects of development, placing people’s livelihoods at the center of the development process.

The Sustainable Livelihoods approach is a way of thinking about the objectives, scope and priorities for human development that has been developed over the past two decades by a variety of scholars, practitioners and activists, involving many agencies including the Institute for Development Studies (IDS), DFID, UNDP, the World Bank, and NGOs in several countries.

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.¹⁹



Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework is centered on people. Its aim is to help stakeholders with different perspectives to engage in structured and coherent debate about the many factors that affect livelihoods, their relative importance and the way in which they interact. This, in turn, can help in the identification of appropriate entry points for support of livelihoods.

¹⁸ Adapted from DFID (1999)

¹⁹ Chambers and Conway (1992)

The framework comprises three different realms, or domains of analysis: the Vulnerability Context, a set of Livelihoods Assets, and Policies, Processes and Institutions. It does not work in a linear manner, and does not try to present a model of reality. Rather, it is a reasonably simple means of ordering issues, influences, processes and interactions, which can assist in setting objectives and devising strategies to increase sustainability and improve livelihoods. It is a flexible tool, to be adapted to meet the needs of particular situations.

3.1.1. LIVELIHOOD ASSETS

The *asset pentagon* lies at the core of the livelihoods framework, *within* the vulnerability context. The pentagon visually presents information about people's assets, enhancing understanding of the interrelationships between the various assets that individuals, families and communities command.

Human Capital comprises the skills, knowledge, ability to labor and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives.

Social Capital is the social resources upon which people draw in pursuit of their livelihood objectives. These are developed through:

- networks and connectedness, either vertical (patron/client) or horizontal (between individuals with shared interests) that increase people's trust and ability to work together and expand their access to wider institutions, such as political or civic bodies;
- membership in formalized groups which often entails adherence to mutually-agreed or commonly accepted rules, norms and sanctions; and
- relationships of trust, reciprocity and exchanges that facilitate cooperation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor.

Natural capital is the term used for the natural resource stocks harvested or utilized directly (e.g., farming, fishing) or from which resource flows and services (e.g., nutrient cycling, erosion protection) useful for livelihoods are derived. The relationship between natural capital and the *Vulnerability Context* is particularly close.

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. These include essential components such as:

- dependable, affordable transport;
- secure shelter and buildings;
- adequate water supply and sanitation;
- affordable energy; and
- access to information (communications).

Financial capital denotes the financial resources that people use to achieve their livelihood objectives, including flows as well as stocks and contributing to consumption as well as production. Access to financial capital – e.g., credit – is often equally as important as capital stocks.

3.1.2. THE VULNERABILITY CONTEXT

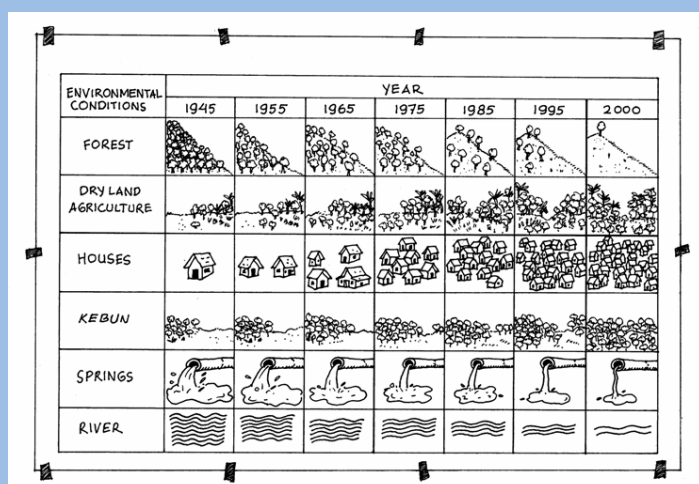
The *Vulnerability Context* frames the external environment in which people exist. People's livelihoods and the wider availability of assets are fundamentally affected by critical trends as well as by shocks and seasonality – over which they have limited or no control. These factors have a direct impact on people's lives and assets, and the options that are open to them to pursue livelihood outcomes.

- *Shocks* can destroy people's assets or force them to leave their homes and sources of livelihood. Shocks include natural disasters, economic shocks, epidemics or crop failure, and conflict.
- *Trends* are more predictable, though not necessarily more benign. These include technological change, national or international economic trends, changes in resource use patterns, and population/demographic shifts.
- *Seasonal* shifts include fluctuations in prices, food availability and employment opportunities.

These factors directly affect people's lives, however there is little that individuals or small communities can do to reduce their vulnerability, other than to become aware of the forces at work in their lives and work to increase their resilience, and to seek remedial measures at the level of *Policies, Processes and Institutions* (e.g., changes in policy, government or NGO assistance).

Trend Analysis

A simple trends chart is an effective participatory tool to help groups and individuals to envision and understand changes taking place in their community over an extended period of time. Participants are asked to list a variety of features that characterize their village and environs; i.e.,



number of households, conditions of forests, fields, rivers, springs, livestock and farming practices, health and illness, etc. They then prepare symbolic visual representations of each of these factors at particular times in the community's history; perhaps ten-year intervals, or sometimes using significant events from the past, such as independence, particular national leaders, wars or conflicts, famines, when a road or bridge were built, or when electricity arrived in the village.

They are then asked to discuss the causes and effects of changes to the various features or factors, and to search for links between changes in one to changes in others. For example, changes in forest cover might lead to reduction of spring water and river flow, or increases in floods. Increased cultivation of dry-land crops can be linked to decreased forest cover; perhaps increased livestock populations could lead to changes in household welfare or health. Once these cause-and-effect linkages have been established, the group is asked to consider any external factors that contributed to changes in the local environment.

3.1.3. POLICIES, PROCESSES AND INSTITUTIONS

Policies, processes and institutions within the livelihoods framework are the institutions, organizations, policies and legislation that shape livelihoods. These include cultural norms, practices and structures. *Policies, processes and institutions* operate at all levels, from the household to the international arena, and in all spheres, from the most private to the most public. They effectively determine:

- access to and availability of various types of capital, livelihood strategies and decision-making bodies and sources of influence;
- the terms of exchange between different types of capital; and
- returns (economic and otherwise) to any given livelihood strategy.

Unlike with the factors comprising the *Vulnerability Context*, individuals and communities (even the poor) can have some influence in determining the *policies, processes and institutions* that affect their livelihoods. Strategies can range from passive resistance to active membership in decision-making bodies.

Policies, processes and institutions are to some extent shaped by the factors comprising the *Vulnerability Context*, as well as by the *assets* possessed by the communities to which they pertain. The relationship is dialectical, in that *policies, processes and institutions* can accentuate or mitigate *shocks, trends and seasonal shifts*. (e.g., the relationship between forest conservation policy and floods, erosion and seasonal drought), also the availability, access to, and exchange value of various *livelihood assets*.

Within Community IPM and other FFS programs, participatory approaches (including farmer-to-farmer training, action research and policy dialogue) are being used to transform a range of assets (including natural, human and social capital) into positive livelihood outcomes, including security of incomes, food supplies and health, and improvements in rural civil society.

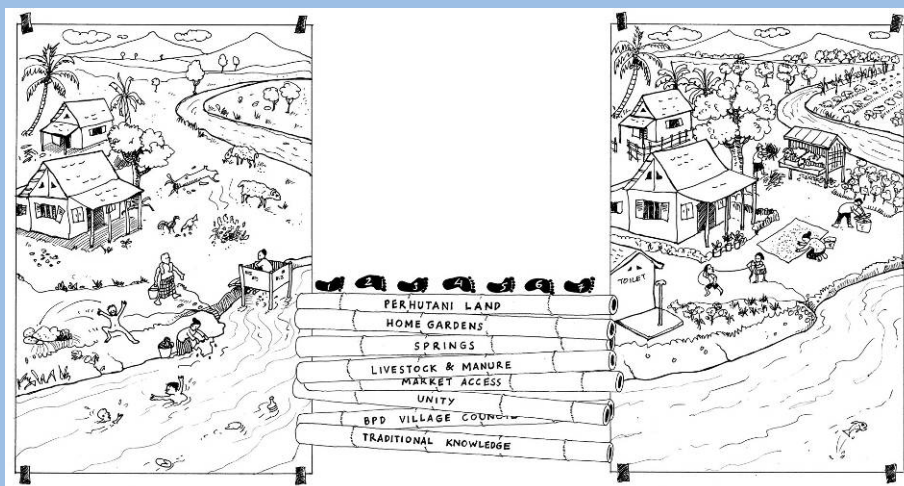
Along with a basic understanding of hydrological cycles, the Sustainable Livelihoods Framework provides a coherent platform for bringing together the various aspects of the Watershed Management Field School, and linking them to the broader concerns of the ESP program's overall objectives. In particular, the *Vulnerability Context*, and *Assets Pentangle*, with its representation of various types of 'capital', are handy tools for tying together diverse aspects of the proposed WSM FS curriculum. Simple planning tools, such as the 'Bamboo Bridge', allowed communities to use this knowledge to develop practical work plans and strategies.

During the early phases of ESP implementation, a relatively brief (usually three-day) Sustainable Livelihoods Assessment (SLA) activity was used as an entry point activity to initiate the process of group formation and identify key entry points for community-based watershed management, livelihood and health and sanitation activities. A participatory Sustainable Livelihoods analysis involves a number of simple Participatory Rural Appraisal (PRA) techniques, such as transect walks, mapping, institutional analysis (Venn Diagrams), seasonal and trends analysis, and household livelihood input-output analysis for problem identification, combined with priority-setting and identification of strategies to address priority issues.

The Bamboo Bridge

The Bamboo Bridge is a simple participatory planning technique developed in the 1970s by Save the Children and a team from the USAID-sponsored Non-formal Education Innovation Utilization Unit (USPI) project, in Aceh, Indonesia. Participants are asked to prepare two visual scenarios – either hand-drawn posters or flannel-board collages of cut-out figures and structures – representing current conditions in their village, and an ‘ideal village’ they would like to inhabit in the future.

They then are encouraged to make a list of resources at their disposal – i.e., various ‘assets’ or types of ‘capital’, to use Sustainable Livelihoods Analysis terminology. These are written on a number of cut-out cardboard bamboo poles, which are used to build a bridge linking the two pictures.



Finally, they set out a series of steps necessary to cross this bridge, making use of the resources they have identified, and then determine both priorities and the logical ordering of these steps. These are represented by numbered footprints walking across the bridge; moving from their present situation toward the better future they envision.

Simple and elegant, the Bamboo Bridge has been used in a variety of contexts with communities in developing countries around the world. It was particularly gratifying to hear an explanation of this technique and its results from a villager in Saree, Aceh, who was not yet born when the idea was first field-tested in her village some 30 years before!

While this process did provide useful information to program managers about local perceptions and problems, and did help build awareness among community members participating in the process, ESP program managers determined that a more intensive and extensive Field School approach would be necessary to build on this foundation, and ‘jump start’ a dynamic of community self-help action. In order to initiate the Field School approach in the various project target areas, a group of ESP field staff and representatives of local partner organizations underwent a Training of Trainers in Field School facilitation methodologies.

3.2. THE SOLOK TOT

The ESP WSM FS Training of Trainers (ToT) was held in Solok, West Sumatra, in July through September 2006. Participants included 29 newly recruited ESP Field Assistants and nine fieldworkers from ESP government and non-government partners. The eleven-week training program developed a broad range of skills and experience necessary for the

facilitation of effective ESP WSM Field Schools. This included principles and concepts of adult non-formal education and facilitation, as well as an array of technical subjects including Watershed Management, Agro-forestry, Biodiversity Conservation, Hydrology, Community Water and Sanitation, and Health and Hygiene. The format of the ToT followed the Farmer Field School model, combining theory in the classroom with extensive field application, review and analysis.

Each week consisted of four full days of combined classroom and field activities, two half-days practicum in the seed nursery at the training facility, and two half-days of hands-on facilitation of WSM Field Schools in nearby villages. Curriculum was divided into four large 'blocks' – although aspects of each component were woven together within individual training activities. The four main themes were:

1. **Training facilitation** – theory, methods and practice of adult non-formal education; stimulating creativity and communication; planning and facilitating group work' organizing and managing training and networking, conflict resolution; farmer studies.
2. **Sustainable Livelihoods Assessment** – tools and techniques to engage communities in participatory research, assessment, analysis, and a deeper understanding of livelihood issues, constraints, and opportunities.
3. **Agro-forestry** – analyzing current land use and *kebun* agro-ecosystems; soil ecology and land use; planning improvements; *kebun* maintenance; managing pests and diseases; preparing and using organic fertilizers.
4. **Agro-ecosystem and Watershed Management** – mapping skills and map making; assessing sub-watershed agro-ecosystems; identifying degraded land and land care options; land use and land tenure issues; water quality and conservation, watershed management laws and policies, economic, ethnic and social issues.

Cross-cutting and linking themes included gender analysis, customary law and natural resource management, conflict resolution and 'norming' good practice in health and hygiene.

In the agro-forestry nurseries, participants gained specific technical skills needed to select, germinate, graft, nurture and plant out seedlings, manage pests and diseases, and prepare and use organic fertilizer and potting media.

A core element of this training program was actual hands-on facilitation of ESP WSM Field Schools. The training participants were divided into groups of six or seven, to facilitate six ESP WSM Field Schools in four neighboring villages (*Nagari*), situated in river watersheds flowing from Mount Talang down through Solok and on to Lake Singkarak. Through these Field Schools, participants were able to hone their new technical skills and build their confidence in community facilitation. The Field School process also ensured that each training participant had fully experienced all aspects of the ESP WSM Field School process prior to completion of the training program. This ensured that ESP Field Assistants and Program Partners could return to their work sites and effectively commence the facilitation of WSM Field Schools in their respective regions.

ESP WSM Field Schools include the setting of follow-up plans, and Solok ToT participants had the opportunity to assist WSM Field School alumni in the six *Nagari* to initiate some of these plans, and to network with various government and non-government agencies and individuals who could continue to support these activities.

Solok ToT Alumni

Most of the 28 alumni of the 2006 Watershed Management Field School Training of Trainers continue to work for or with the ESP program. The title 'Field Assistant' does not do justice to the responsibilities they have taken on, nor the achievements they have accomplished. Following are just a few examples:

Dhina Mustikaningrum works as an ESP Field Assistant in the Welang River catchment area in the Pasuruan district of East Java. After completing the ToT, Dhina first worked with a larger team in the upper Brantas watershed near Malang, but after a year was given the responsibility to initiate WSM Field Schools and programs in a new expansion area in the Welang watershed. Dhina has successfully facilitated nine WSM Field Schools with communities in the two regions, along with a number of 'mini Field Schools' covering such topics as waste management, biogas, beekeeping, and special environmental field schools for school children. Dhina has also acted as trainer for a number of skills training programs for other agencies, including staff training for the Bromo-Tengger-Smeru National Park and Department of Agriculture, on topics such as rehabilitation of critical lands and payment for environmental services. She has played a key role in the establishment of the *Hutan Asuh* (Forest Care) Trust Fund, wherein corporate and government donors donate funds for various follow-up programs of WSM Field School alumni and community groups. Dhina is proudest, however, whenever alumni from the Field Schools she has helped facilitate are asked to train other communities.



Dhina leading a discussion analyzing local institutions



Eli Nova training Acehnese women to create crafts from recycled waste

Agus Elia Nova joined the ESP Program in Aceh a few months before the Solok ToT program. Eli, as she is known, is a native Acehnese, and is devoted to helping Acehnese communities recover from the devastating effects of the December 2004 tsunami and 30 years of civil war. Much of her work since participating in the Solok ToT has been with coastal communities recovering from the tsunami, where the ESP program has been instrumental in providing clean drinking water. Supporting activities in the 29 communities where Eli works include improved sanitation and waste management, and programs to educate school children on good hygiene.

Eli's village waste management and sanitation activities include production of compost from household and agricultural waste; communities are now utilizing this compost in both household gardens and post-tsunami reforestation programs.

Hendriana Dharmawan is a member of a local NGO in the Cikapundung watershed in West Java called *Warga Peduli Lingkungan* (WPL – People Who Care about the Environment), which was engaged with ESP through its small grants program. He attended the Solok ToT as a representative of this NGO, but was later recruited to work as an ESP Field Assistant in the area. Hendri has helped conduct a number of forest conservation and sustainable agriculture Field Schools, and has taken a leading role in facilitating cooperation between WSM Field School alumni groups and forums and local government. Throughout, Hendri has maintained his position with WPL, who now have gained support from ADB for an integrated watershed conservation program. Hendri organized a Training of Trainers program to support the implementation of WSM Field Schools as part of that program.



Hendri Dharmawan facilitating a discussion



Sukirman leading an ice-breaker

Sukirman already had considerable experience with the Farmer Field School model long before joining the ESP program in Central Java. Kirman is a regional coordinator for the Indonesian IPM Farmers Association, having participated in the National IPM Program during the 1990s. The Solok ToT helped Kirman to broaden his own knowledge about integrated watershed management, and to apply the Farmer Field School approach to new and different contexts. Kirman has facilitated WSM Field Schools in 27 villages in the Tangsi and Bolong watersheds on the boundaries of Merapi-Merbabu National Park, and is frequently invited to facilitate Field Schools and specialty training programs in soil conservation, spring protection, agro-forestry and coffee cultivation with community groups throughout the province.

The Solok ToT was initially designed to achieve ESP Watershed Management objectives, but as the process unfolded, participants already began devising strategies to develop Field School modules for other stakeholder communities. The Solok ToT provided the intellectual and human resource foundation for the Field School methodology to be rolled-out across the program, from rural upstream to urban downstream communities.

3.3. REGIONAL FIELD SCHOOLS

Upon their return to their respective programs in Aceh, North and West Sumatra, and West, East and Central Java, alumni of the Solok ToT set about designing and implementing Watershed Management Field Schools that were adapted to the specific contexts in each region. This process is simpler than it might sound: the focus on hydrological cycles and application of the Sustainable Livelihoods Framework mean that Field School curriculum ‘naturally’ adapts to local contexts – the process of identifying issues, problems and potential solutions is built into the participatory assessment and analysis that forms the basis of the Field School process. The Field Schools in each region were an initial step in working with local communities to develop their own vernacular forms of conservation and resource management. As such, these Watershed Management Field Schools set in motion a broader process of establishing the social, institutional and technological basis for sustainable management of upland watersheds. The following section briefly describes some of the Field School models developed in different regions.



Village and ecological map making, Magelang District

3.3.1. WENKON FIELD SCHOOLS, EAST JAVA

In the highlands of the Sumber Brantas watershed in East Java, the majority of farm households are engaged in intercropping – i.e., planting crops in the spaces between young timber trees on state forestry corporation lands, called ‘*tumpang sari*’ in Javanese and Indonesian, known locally as ‘*wengkon*’. This system dates back to the late 19th century in Java, used by the colonial system as a labor and land management in commercial teak forests

(and later, for other species as well). In her classic book *Rich Forests, Poor People*,²⁰ Nancy Peluso describes the intricate ‘cat-and-mouse’ dynamic that developed between the state forestry corporation and the mostly landless farmers who planted and looked after the trees while growing crops in the interstices between them. The relationship was one of antagonism, suspicion, force and resistance – in which both farming communities and forest ecosystems suffered greatly. Things took a serious turn for the worse in the wake of the 1997 Asian fiscal crisis and subsequent breakdown of central government authority in Indonesia – a period now referred to as Indonesia’s ‘multi-dimensional crisis’. Between 1998 and 2003, thousands of hectares of state forest land in Java were subjected to intensive illegal logging and land grabs, with dire environmental consequences.

Beginning in 2001, *Perum Perhutani*, the state forestry corporation, developed the concept of ‘Managing Forests with the Community’ (*Pengelolaan Hutan Bersama Masyarakat*, or PHBM), which provides increased – and much more clearly defined – rights and responsibilities for community members of villages located within or adjacent to state forest lands. PHBM was an advance on the ‘Forest Village Community Development’ (*Pembangunan Masyarakat Desa Hutan*, or PMDH) program initiated by *Perum Perhutani* in 1992, in that the design and implementation of the process were decided through a series of multi-stakeholder fora, involving local community, NGOs, local government and *Perum Perhutani*.²¹

Conceptually quite simple, the process depends on the ability – and willingness – of communities to avail themselves of the new opportunities offered by the scheme, their capacity to negotiate with other stakeholders, based on coherent and clearly developed frameworks and work plans.

‘Traditional’ *wengkon* farming involved the planting of seasonal crops – mainly maize and cassava – for subsistence and market purposes. Farmers were not allowed to plant their own medium or long-term crops on the land, due to *Perhutani*’s fear that this could imply some more permanent form of ‘ownership’ on the part of the farmers, and that farmers’ tree crops would compete with the commercial timber trees. The basis of the *tumpang sari* arrangement is that farmers will care for the young trees while growing crops in the spaces between them, until the trees grew large enough to shade out the seasonal crops. At this point, the farmers would be allotted another plot of forest land to be planted with new tree seedlings, and begin the process over again. Having invested considerable labor in preparing and cultivating the soil in their plots, farmers were generally reluctant to abandon plots and move to new ones. Simply put, it was in the interest of farmers to prevent forest trees from growing well – or at all. They would routinely trim branches from the growing trees to prevent them from shading out their crops, and engage in a variety of artful ploys to delay the trees’ growth – including disturbing roots, stripping bark, poisoning, even arson.



Wengkon, Malang District, East Java

The new PHBM framework opens up new opportunities for more sustainable agro-forestry – including providing local farmers with a vested interest in the primary tree crop by promising them a portion of the sale price of the timber when the tree is harvested. More importantly, however, it encourages farmers to incorporate their own medium- and long-term crop plants, including trees and shrubs, into their agricultural portfolio. For all crops, there are now clearly defined profit-sharing agreements.

²⁰ Peluso (1992)

²¹ Djajanti (2006)

As this represents a significant departure from previous patterns, it requires thoughtful analysis and planning to allow farmers to maximize benefits. The *Wengkon* Field School curriculum addresses this through the following steps:

- Comprehending *wengkon*
- Analysis of household consumption needs
- Analysis of forest farming input needs
- Inventory and mapping of *wengkon*
- Canopy analysis
- Harvest analysis – seasonal and long-term crops
- Forest farmer income analysis
- Risk analysis
- Economic and ecological analysis of individual farmers' *wengkon* plots
- Understanding PHBM
- Individual *wengkon* planning to maximize benefit
- Follow-up action plans
- *Wengkon* Field School Field Day



**Wengkon Field School:
Mixed Agro-forestry Planning**

The involvement of women in *Wengkon* Field Schools proved essential to their success, as they brought a detailed understanding of household consumption needs, and helped develop the concept of a *wengkon* agro-forestry system that could better address these needs. Prior to this, women provided much of the labor for *wengkon* farming, but little input as to what should be planted, or how it should be managed.

Initial results have been very encouraging: farmers' communication and cooperation with *Perhutani* has clearly entered a new era. They are planting a much more diverse selection of crops, including coffee and other tree crops, along with an array of seasonal crops where they used to plant almost entirely maize or cassava. This formula can significantly increase both the economic and ecological resilience of the farming system, improve household subsistence and increase income.

Analysis and planning carried out during the course of the Field School, Field Day presentations and follow-up lobbying activities have resulted in a number of follow-up plans and activities, including a variety of topical 'mini-Field Schools' to develop particular skills, such as coffee horticulture, organic farming, compost and biogas production. Village alumni groups have successfully secured support from a variety of stakeholders to pursue many of their follow-up plans.



Wengkon Field School participants planting coffee seedlings, Argosari Village, Malang District

3.3.2. WATER SOURCE PROTECTION FIELD SCHOOLS, CENTRAL JAVA

Many ESP target communities in the Magelang district of Central Java are located high on the slopes of several volcanoes surrounding the Progo River watershed. The highlands of both the Merapi and Merbabu volcanoes are part of Merapi Merbabu National Park, which acts as a catchment for several major springs and rivers. Villages located along the boundaries of the national park play an important role in the ecosystem health of this important conservation area. Various forms of extractive activity, including sand and gravel mining in streambeds, illegal logging and firewood collection, and agricultural encroachment represent serious threats to the catchment for springs and rivers serving the city of Magelang and other downstream communities.



Tree Nursery, Sambak Village, Magelang District

Most of the villages are triangular in shape, with a community forest zone at the apex, widening down the slope to encompass a strip of dry land agriculture and livestock grazing land, with the residential and irrigated rice land forming the base of the triangle. Degradation occurring in the community forest – and in the conservation forest above that, results in decreased water supply for the rice paddies, as well as for all communities and productive activities further downstream. Decreased productivity of rice cultivation causes increased pressure on the upstream agro-ecosystems, as people intensify planting and extractive activities to make up the shortfall.

Sustainable Livelihoods and Agro-ecosystem Analysis undertaken in the WSM Field Schools in these villages helped to starkly illustrate the cause-and-effect patterns underlying this degradation – and to point out the sort of measures necessary to reverse it. Trends analysis in particular, helped underscore the direct correlation between reduced forest cover and reductions in water supply. Working closely with the village government, many of these field schools focused on establishing village zoning and forest conservation plans, which were then officially endorsed through the creation of new village regulations (*Peraturan Desa*, or *Perdes*). Other village regulations included establishment of village water supply management bodies, establishment of ecotourism and nature study villages, restrictions on tree felling and firewood collection, creation of watershed management forums, prohibition of sand and gravel mining, and rules about livestock grazing and feeding. An interesting example is the creation of a ‘livestock village’ in Citrasono Village, where all group members’ cattle and goats are kept in pens located on a plot of village government land, to facilitate government extension and veterinary services, security, feed collection and compost production. Village spatial plans and supporting *Perdes* allowed these villages to become eligible for special District Government funds to support ‘Conservation Villages’ bordering national parks and other conservation zones.



‘Livestock Village’ and Field School meeting hall, Citrasono Village, Magelang District

To further support the village zoning and conservation plans, Field School participants established tree nurseries, used to provide seedlings for members and other community members to undertake enrichment planting in their sections of the community forest. Other follow-up activities included mini-Field Schools in organic farming methods and improved bamboo cultivation and harvesting methods.

3.3.3. LIVELIHOOD FIELD SCHOOLS, NANGGROE ACEH DARUSSALAM

Communities in the province of Nanggroe Aceh Darussalam have suffered tremendously over the past decades, both from the devastating December 2004 earthquake and tsunami, and from 30 years of armed conflict between the Acehese Independence Movement (GAM) and the Indonesian Armed Forces. In addition to causing hundreds of thousands of fatalities, these combined disasters seriously undermined the capacity of millions of Acehese people to pursue productive activities and access basic services. The obvious embarkation point for community mobilization and capacity-building in Aceh would be a focus on livelihoods.

Sustainable Livelihood Assessment (SLA) activities in both tsunami- and conflict-affected villages helped communities to identify a variety of pressing issues, enabling them to initiate self-help activities, including tree planting to anchor soil, restoration of gardens and agricultural fields and water supply projects in tsunami-affected villages, and organic agriculture, mixed horticulture and water supply projects inland areas. Many of these activities were already well underway before ESP began conducting field schools; in many cases, community self-help groups were already formed and functioning before the first field schools were undertaken.

Field school activities were often conducted late at night, after group members had returned from working in the fields. Daytime 'hands-on' sessions were scheduled based on group members' work schedules. These activities were generally quite focused; building on topics and issues determined during the initial SLA activities. Common activities included establishment of tree nurseries, budding and grafting techniques, *kebun* rejuvenation, compost production and organic farming, biological pest control, and community sanitation and hard waste disposal. 'Theory' sessions held at night included in-depth situation analysis building on the original SLA assessments, study of hydrological cycles, in-depth assessment of water supply problems and prospects, agro-ecosystem analysis, discussion of plant and human diseases, principles of sustainable agriculture, and follow-up planning; while the hands-on activities conducted during daylight sessions included additional ecosystem analysis and mapping, compost production, integrated pest management, nursery planting and management, fruit tree pruning and *kebun* sanitation, and designing and carrying out organic agriculture and horticulture experiments and field trials.



Cacao Field School activities: grafting and pruning, Aceh Besar District

Cacao cultivation quickly became one of the most popular programs in Aceh. ESP developed a field school approach to cacao horticulture, including rehabilitation of existing groves, grafting of high-producing varieties onto existing stock, pruning, soil fertility management, and nursery establishment. Many villages supplement these activities with high-volume

production of organic compost, for use both in their own groves, and for sale to government agencies, NGOs and other farmers.

Other field schools focused on water supply, including protection of springs and enrichment planting in spring catchments, village rules and regulations on watershed and forest protection, and installation of gravity-feed water supply systems and village distribution networks.

3.3.4. URBAN KAMPONG FIELD SCHOOLS, JAKARTA

Although the ESP Watershed Management Field School model was developed for upland agricultural communities, the Field School approach has also been adapted for urban slum communities. Urban Kampong Field Schools focus more on environmental sanitation and waste disposal, although water supply still remains a central focus. Often (but not always), these Field Schools are run in conjunction with installation of piped water supply systems for slum residents. The Sustainable Livelihoods Framework provides the basic framework for the Field Schools, while analysis of the hydrological cycle focuses mainly on wastewater disposal, surface water pollution, and prevention of communicable diseases. Many of the activities undertaken during weekly meetings are the same as for Watershed Management Field Schools, including transects and community mapping, trends analysis, institutional analysis, 'visioning' and follow-up planning. Considerable emphasis is placed on the ESP's program of promoting hand washing as a means of preventing diarrhea; in keeping with the Field School approach, this begins with observation and analysis of families' current habits and their health impact. Field School curriculum also emphasizes exploring opportunities to increase household incomes and provide basic needs, including cottage industries using recycled waste, compost production and household of neighborhood gardens.

Participants are mainly women, although they attempt to engage men in many of the follow-up activities, such as drainage system construction, repair and maintenance and neighborhood clean-up campaigns. As described in the opening paragraphs of this booklet, the women who participate in these Field Schools become outspoken advocates of lessons learned and plans produced. As with other types of Field Schools, the Field Day organized by participants at the end of the formal Field School process represents an important opportunity to garner support from community leaders and neighbors and local government, and helps generate momentum and enthusiasm for follow-up programs and activities.

3.3.5. MINI-FIELD SCHOOLS

Typical WSM Field Schools take place over a period of two to three months, including initiation of various pilot and other follow-up activities and group formation and consolidation. In many cases, participants identified a number of topics they wish to study further to allow them to pursue plans and programs developed during the Field School process. Continuing with the experiential learning approach that had become so successful, ESP field staff helped plan and implement a number of 'mini Field Schools' focusing on specific topics and skills.

Perdes Field Schools: One important example of the mini-field school is the preparation of Village Regulations (*Perdes*) to consolidate plans made and activities initiated during the WSM Field School process. In order to have legal authority, Village Regulations must follow a specific format, and be approved by the District Government. The complex format and language used in Indonesian regulations requires special training. The *Perdes* Field Schools, however, were not limited to training in legal drafting. The process included planning and implementation of consultative processes, not just to seek input from village stakeholders, but to publicize and garner support for the various initiatives. Sample *Perdes* include creation of village water supply authorities, watershed and spring protection, village spatial and

conservation plans, livestock grazing guidelines, restrictions on sand and gravel mining, creation of eco- and agro-tourism zones, riverbank protection, and establishment of various village enterprises. Some groups used this opportunity to also draft charters for local farmers' and conservation associations and inter-group networks.

Biogas Field Schools: Several communities – particularly those with large livestock populations – identified biogas production as an important means of both conserving local forest resources (through reducing the need for fuel wood) and waste management and environmental sanitation. Biogas production from animal waste has been promoted by scores of government programs and NGOs in Indonesia since the 1970s, but the technology has made little headway. Most demonstration units lasted only as long as the original project before falling into disuse. Little or no spontaneous replication ever occurred. Most common designs are expensive, impractical, or both. More recently, villagers from Toyomerto village in the Batu sub-district came up with a simple biogas digester design based on pictures from a publication from a South American NGO, using large plastic tubes heat-sealed at both ends, attached to effluent inlet and outlet pipes, with a second outlet for gas fastened onto the top of the tube. The tube is placed in a simple masonry-lined trench. Gas is stored in another plastic pillow, usually in the rafters of the cattle pen or nearby shed. This design is far less expensive than previous designs using metal tanks to capture the accumulating gas, capable of producing usable amounts of gas from the manure of two or three head of cattle, and simple to repair if punctured.

Field school curriculum is not limited to construction of biogas digester and appliances, but also includes research and experiments on firewood consumption, manure and gas production, use of biogas effluent for fertilizer, and setting up revolving 'biogas banks' to



Biogas Field School, Malang District

produce digester units for other group members. Group members have come up with numerous innovations, including simple pressure valves and gas separators and scrubbers, and modification of gasoline engines to use biogas for electricity generation and home industries.

In several villages, field school alumni have established biogas 'arisan' groups, based on a customary fixed lottery system. Each month, members contribute cash and labor to produce a new biogas unit for one member, until all members have been served.

Bamboo Field Schools: Bamboo is a truly multi-purpose plant, with important ecological functions as well. Bamboo produces seven times the biomass of most tree species, providing a versatile building material, food, and massive amounts of mulch. Bamboo is particularly useful in preventing erosion along stream banks and on steep terrain. It is relatively impervious to pests and disease if properly cared for. Bamboo field schools, conducted with technical inputs from Jogjakarta-based CV Sahabat Bambu and



Bamboo Field School, Magelang District

the Environmental Bamboo Foundation from Bali. Field school topics include analysis of the ecological, economic and social potential of bamboo – including inventorying local traditional knowledge, management and usage; bamboo cultivation and propagation; land use mapping to identify sites for expanded bamboo cultivation; soil ecology and enhancement; spacing and harvest techniques to improve quality and increase yields; bamboo pest and disease control, incorporation of bamboo in mixed agro-forestry systems; post-harvest treatment; and various uses of bamboo and its byproducts. In most instances, the Bamboo Field Schools concluded with plans to plant bamboo along streambeds for erosion control and income generation.

Household Waste Management Field Schools: Environmental sanitation is one of the core activities of the ESP program, and an important subject addressed in the initial Sustainable Livelihoods Assessment and Watershed Management Field Schools undertaken in communities. Once awareness of trash and environmental pollution problems has emerged, numerous village groups have elected to conduct mini-field schools on household waste management. Beginning with an assessment of current practice and problems, participants discuss ways to reduce, reuse and recycle various types of waste product. Participants are challenged to design practical systems to sort trash, and to process various types. Plastic waste can be cleaned and sorted for sale to processors, some types can be used to create products for sale and use locally. Organic waste can be used to produce compost. Wastewater can be channeled into agricultural fields and gardens, or into simple bio-filtration systems before reentering the streams or water bodies. After trying out various techniques, field school participants prepare campaign and communication strategies to encourage improved environmental sanitation in their own communities.



Household Compost Production, Magelang District



Vetiver Grass Field School, Magelang District

Other ‘mini-Field School’ topics include raising catfish and eels; hedgerow terracing using Vetiver grass (*Vetiveria zizanioides*, also sometimes known as ‘Sunshine Cultivar’; a tall grass rich in nitrogen suitable for livestock feed, with deep dense root systems useful in anchoring soil on erosion-prone hillsides); tree grafting and budding; nursery maintenance; cacao and citrus tree pruning techniques; handicraft production from recycled materials; and production and use of natural plant pest control agents. Often, trainers and facilitators for these ‘mini-Field Schools’ are

sourced by ESP from local institutions with appropriate expertise; however, increasingly Field School alumni are serving as trainers and facilitators for these activities, both in their own communities, also disseminating techniques and know-how to neighboring villages.

4. LEVERAGING AND SCALING UP

ESP's Watershed Management Field Schools succeeded in initiating a broad range of individual and collective activities, but the programs did not stop there. The Field School represents an initial step in a broader and deeper process of community mobilization and action.

Many natural resource management programs and projects – including ESP – promote the establishment of 'Multi-stakeholder Forums' (MSF) as a strategy for bringing together diverse groups of stakeholders and affected communities to devise and implement integrated conservation and development strategies and activities. Experience has shown that many of these Forums last only as long as the project that created them, and quickly dissipate once outside support is no longer forthcoming. The creation of lasting and effective Multi-stakeholder Forums depends on convincing the various member constituencies that there is 'something in it for them', by developing systems that actually deliver outcomes that address key needs. In particular, developing the institutional capacity of community groups and representatives to prepare work plans and advocate for change is instrumental in the creation of lasting and effective MSF structures. Other stakeholders, such as government agencies and private sector interests, will continue to participate in these Forums if they can demonstrate that support to communities delivers clear benefits and leads to positive change. Herein lies one of the most powerful impacts of ESP's WSM-FS approach.

'Scaling Up' and 'Leveraging' are two strategic concepts that distinguish the Farmer Field School approach. Ten years of post-program experience of Community IPM FFS alumni groups clearly demonstrate that a high proportion of FFS groups continue to carry out FFS and related research, community organizing and advocacy activities long after the program that created them has run its course. IPM FFS alumni groups – and the national IPM farmers organization IPPHTI – are presently engaged in a range of activities that extends far beyond the initial purpose of improved rice cultivation. There are even examples of Ministry of Agriculture pest observers and extension agents leaving the civil service to devote themselves fully to IPPHTI programs. Conversely, numerous IPM FFS alumni have taken up roles in village government, or as facilitators of government programs such as the *PNPM Mandiri* National Community Self-Reliance Development Program. Most conceptualizations of 'scaling up' envision developing institutional structures and networks to propagate and disseminate development program outputs and outcomes; the FFS approach focuses on strengthening community groups, who can act independently or successfully seek the support they need for their own initiatives.

'Leveraging' support is a novel concept in Indonesian development politics. The legacy of 32 years of 'top-down' development programs initiated and managed by the former New Order government created a deeply imbued outlook that it is the duty of government to deliver guidance and development to communities, whose job it is to participate in this grand project. Formal procedures for community participation in development planning functioned more to bring communities in line with government plans and priorities, than vice versa. Informed, organized and confident community groups – such as IPM and WS FFS alumni groups – have achieved considerable success in garnering support from a wide variety of sectors.

Inherent in the WSM-FS model is the concept of an exit strategy for ESP, wherein Field School participants themselves are involved in agenda setting and development of follow-up

strategies. Early follow-up activities include numerous ‘mini-Field Schools’ focusing on particular skills and methodologies, group consolidation, linking groups across villages, and networking to identify and mobilize additional sources of support. In keeping with the Farmer Field School approach, ESP field staff’s role is supportive; the Field School alumni groups are responsible for planning and carrying out activities. Following is a discussion of some of the forms of ESP’s ‘scaling up’ and ‘leveraging’ strategies:

4.1. FIELD DAYS

A Watershed Management Field School is the beginning of a process, one which should expand to incorporate other community members and neighboring communities, and lead to a variety of follow-up activities. This process of follow-up and dissemination is officially inaugurated at a Field Day, planned and coordinated by the Field School participants. At the Field Day, group members present their findings, analyses and plans to community members and leaders, plus district government officials and representatives of stakeholder groups, including government and private sector corporations that use surface or ground water originating in upland catchments. For many, this is their first exposure to Field Schools, and represents an excellent opportunity for garnering support and kick-starting many of the plans and campaigns developed during the Field School process.



Field Day: Presenting ecological livelihoods analysis

All Field School participants take part in the Field Day, some more in behind-the-scene organizational capacities, others presenting experiments, demonstrations and analyses. This is where the Field School’s characteristic confidence-building impact plays a key role; it is important to garner the support of communities, local government and other stakeholders to carry out many of the follow-up programs developed by the Field School participants. A contagious ‘yes we can’ spirit suffuses the Field Day agenda, often leading to pledges of support from government and private sector stakeholders.

4.2. FORUMS

An important feature of ESP’s watershed management approach is to work with clusters of communities in important sub-watersheds, in an attempt to develop sufficient ‘critical mass’ to measurably impact ecosystem health, thereby generating appreciable impact on ecosystem health and water retention capacity. WSM Field Schools are carried out at the level of the village, allowing each village community to set their own priorities and determine their own portfolio of follow-up activities. As these programs get underway and begin building momentum, the program encourages village groups across sub-watersheds to form coalitions or forums, to facilitate cross-fertilization and exchange of ideas and experiences, and to marshal resources and political voice to negotiate with local government, buyers and consumers, and potential private sector partners. As well, these forums provide a

convenient locus for ESP to deliver technical and management training and other inputs to community groups, rather than having to repeat activities in each individual community.

It is important that the activities and groups of individual Field Schools attain a sufficient level of maturity and momentum before attempting to establish inter-group forums; doing this too quickly runs the risk of these forums dispersing due to lack of interest or capacity; and of creating an unhealthy dependency on ESP field staff or other outside support.

Examples of inter-village collaboration include efforts by Field School alumni groups in North Sumatra to mobilize all citrus growers in their sub-district to grow their crops organically, thereby creating a reputable and reliable supply of organic fruit known to buyers and consumers; attempts by alumni groups in upland watersheds in West Java to mobilize downstream communities to participate in river clean-up and restoration activities; and establishment of various 'payment for environmental services' schemes in East and Central Java (see below).

4.3. LINKAGES AND PARTNERSHIPS

Farmers and village producers do not operate in a vacuum. Just as external events and forces shape and constrain the options available to local cultivators, their actions – and the impact these have on soil and vegetation, rainwater runoff and absorption, stream and aquifer regeneration – impact neighbors, downstream communities, and end-users of the water falling as rain on hillsides many kilometers upstream. Disparate resource users share an interest – often conflicting interests – in environmental assets and services. They each play different roles in determining how these resources are managed and used, and are differentially impacted by changes to local environments.

Inter-village forums are but one way of broadening the impact of Field School follow-up programs. Often, local government and private sector leaders attending Field Days make commitments of financial, material or other support for follow-up plans presented by participants. However, without persistent follow-through, many of these commitments do not eventuate. Initially, ESP Field Assistants and Regional Coordinators assist groups to secure assistance from government and corporate sources, but always engaging Field School alumni in these negotiations. As group members' confidence increases, the role of ESP personnel in these negotiations diminishes.

Field School alumni groups have successfully negotiated Memorandums of Understanding with various national and local government bodies and government and private corporations, such as clear and binding contracts on the use of *Wengkon* land with *Perum Perhutani*, support for community forest management and ecotourism development plans with the Ministry of Forestry, National Parks and local government, and 'payment for environmental services' arrangements with major water users such as Aqua, Coca-Cola and the Gresik petrochemical complex. Corporations in Indonesia are required to devote a small percentage of profits to 'corporate social responsibility' (CSR) causes. Most often, these funds are used for construction projects such as village mosques and meeting halls, village sports facilities, or occasional small-scale enterprise development programs. These companies lack staff and expertise in community engagement and development, and often welcome good proposals from village communities (particularly when these provide direct benefits to the companies themselves). ESP East Java staff have facilitated the establishment of a new '*Hutan Asuh* (Forest Care) *Trust Fund*', which these companies – and governments – can use to channel their CSR

funds to support watershed and forest conservation activities. A good example of this is *Petrokimia Gresik's* support for construction of biogas digesters by community groups in the upper Brantas River watershed, which help to reduce residents' dependence on firewood extracted from forests in the catchment area of the underground aquifer from which the company draws its water. This is shaping up as one of Indonesia's more successful examples of a workable 'payment for environmental services' scheme.

In another example, Field School alumni groups in villages near the Bukit Lawang Orangutan Reserve in the Gunung Leuser National Park are currently in negotiations with National Park officials to procure 'location permits' allowing them to plant fruit trees inside the park boundaries, intended to reduce the tendency of orangutan to cross the river in search of food from local farmers' *kebun*, at the same time building up food



Fruit and mixed agro-forestry tree nursery, Bukit Lawang

sources near hiking trails, so that tourists visiting the park will be more likely to encounter wild animals foraging in the forest. They propose establishing an 'adopt a tree' scheme to provide visiting tourists, sympathizers from abroad, and local and national companies an opportunity to invest in forest rehabilitation in this important wildlife reserve. This program is further supported by intensification and improvement of local *kebun* horticulture, reducing the need of local farmers to clear new farmland in nearby forests.

In other instances, Field School alumni serve on planning committees for 'National Community Self-Reliance Development Program' (*PNPM Mandiri*, the new name for the former World Bank-funded *Kecamatan* Development Program), allowing them to influence planning of how these funds will be spent. In Aceh, many donors and NGOs intentionally seek out villages where WSM Field Schools have been held, in order to assure a higher success rate for their own programs. Elsewhere, ESP field staff and Field School alumni have been contracted by government agencies and private corporations to conduct Field School or other targeted training programs for communities in their respective catchment areas. For example, in West Java, Indonesia Power has contracted with ESP to conduct additional Watershed Management Field Schools in the Cikapundung watershed, considerably extending the coverage of integrated agro-forestry development activities in that catchment, while in East Java, *Perum Perhutani* has hired a number of WSM and Biogas Field School alumni to train villagers living adjacent to state forest lands in mountainous regions across the province.

BETTER MANAGEMENT OF WATER RESOURCES

The public, Indonesia Power and ESP work hand in hand to guarantee water flows throughout the year in West Java

PT Indonesia Power, a subsidiary of state power company, PLN, provides electricity to consumers through its hydroelectric plants. Effective management of water resources is critical to the continuous production of electricity. For years, Indonesia Power has involved local communities in the vicinity of electrical power plants in various programs for the protection and preservation of water resources primarily as part of their corporate social responsibility strategy. Now, Indonesia Power sees the need to do this to safeguard their business's success.



Since 2006, ESP has been collaborating with the people in the Cikapundung sub-watershed to improve their quality of life and health through Field Schools. “In the Field Schools the people are not only taught to guard the environment, but also to see and understand the benefit and function of environmental preservation for their lives,” said Salman Bahtiar from Indonesia Power while attending the Field Day activity at Wangunharja Village. With a similar vision toward improving the environmental living conditions and welfare of the local people, ESP and Indonesia Power developed a partnership to strengthen and expand the impact of Field Schools in the Citarum watershed, a priority area for Indonesia Power. This partnership fits well with ESP’s strategy for improving the management of water resources in the Cikapundung sub-watershed, part of the Citarum watershed.

This partnership program began with the implementation of Training of Trainers (TOT) for Field School Counselors Training at the Indonesia Power office at Indonesia UBP in Saguling, West Bandung Regency in December 2007. The program was attended by 28 participants from 20 neighboring villages, as well as National Park rangers. Training materials draw exclusively from ESP’s Field School approach.

According to Indonesia Power General Manager Pak Sudibyanto, “This joint program is part of the company’s commitment to empowering the community to preserve the environment. This partnership effort is expected to improve the environment, particularly in relation to water resources in order to generate greater benefit for the welfare of the people. Thus, local communities can have improved access to clean water, as well as having their need for electricity met to help them in their daily lives.”

After the training, five Field Schools were implemented in five villages, and all action plans in neighboring villages have received support. Field Schools have led to improved quality of life for communities and sustainable water supply for Indonesia Power.

In addition to accelerating the dissemination of the WSM Field School model and integrated agro-forestry activities, these partnerships have the effect of consolidating Field School alumni groups and forums, helping to build confidence and technical, negotiating and leadership skills of farmer trainers and group leaders. This, in turn, helps to ensure that the experiential learning and community mobilization processes initiated during the WSM Field Schools can continue to thrive and proliferate, long after the Environmental Services Program comes to an end.

4.4. POLICY SUPPORT

One of the most impressive and important achievements of former IPM Field School alumni in districts and provinces throughout the country has been these groups' ability to influence local government policy. Perhaps the best known example is district regulations on white stemborer control strategy in the Indramayu rice bowl of West Java. IPM farmer experiments produced a simple and effective means to control this pernicious and destructive rice pest, which requires carefully coordinated timing of the preparation and planting of nursery beds, based on rainfall patterns. A district regulation requires all farmers in the region to wait for a command from IPM farmer scientists before planting nurseries. Stemborer damage in the area has declined dramatically. Other districts have declared 'organic rice cultivation zones', or placed restrictions on the sale and use of insecticides. The West Sumatra Agricultural Service provides subsidies on the sale of certified organic produce, and also pays farmers not to burn rice straw, but to plough it back into the soil when preparing their fields.

ESP Watershed Management Field School alumni groups have also succeeded in garnering policy support for their activities. The most spectacular example, perhaps, is in the Magelang district of Central Java, where a new district regulation assesses a ten percent 'environmental service fee' on water purchased by the district water utility (PDAM), which is used to support community forestry activities in 'Forest Conservation Villages' that fulfill specific eligibility criteria (Water Source Protection Field Schools, Chapter 3). The district government is moving to collect this fee from other industrial water users in the district, beginning with a 'symbolic' levy to socialize the concept, before increasing the fee rate to ten percent.

ESP *Wengkon* Field School groups in East Java (Chapter 3) have successfully secured material and institutional support from *Perum Perhutani* to promote mixed agro-forestry development on state forest lands. More significantly, they enter into clear and binding contractual agreements, set out in Memoranda of Understanding, covering the duration and conditions of farmers' utilization of *Perhutani* lands, types of timber trees and food crops planted, and the division of proceeds from the sale of both timber and tree crops (i.e., coffee, fruit). This represents a major paradigm shift, marking the beginning of a new era of cooperation between *Perhutani* and local agricultural producers, after generations of conflict and contestation – in which farmers, forests and state revenues all suffered.

In Indonesia's post-New Order era of democratization and decentralization, new political spaces have been created providing opportunities for communities to exert greater control over the contours and pace of change in their respective homelands. Farmer Field Schools represent a powerful tool enabling communities to actively participate in regional and national development planning and implementation.

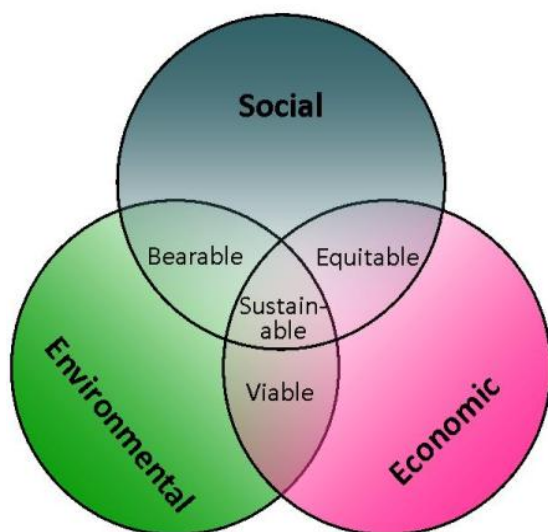
5. FIELD SCHOOLS FOR WATERSHED RESILIENCE AND HEALTH

Farmer Field Schools have proven a remarkably effective means of enabling and mobilizing communities to address ecological, social and economic issues and constraints, mobilize resources, and advocate and negotiate with agencies and other stakeholders who influence their livelihoods and well-being. Yet, the Field School model is grounded in concepts and techniques that have been around for decades. It is not any particular series of techniques or activities that account for the model's success; rather it is the fusion of core concepts suffusing the Field School approach that sets it apart. The following discussion examines some of the underlying conceptual issues that inform the Field School approach, such as sustainable development, natural resource management, participation, adult non-formal education, and empowerment.

The concept of sustainable development was first popularized over 25 years ago, by the World Commission on Environment and Development (WCED, often called the Brundtland Commission) convened in 1983. This was the first major international body to explicitly link deterioration of the human and natural environment with the success or failure of social and

economic development. Since the report of *Our Common Future* in 1987, sustainable development has become a ubiquitous catchphrase; sometimes criticized as having nearly as many definitions as there are practitioners, and of being so vague as to have little or no meaning. Nonetheless, sustainable development has become a primary guiding principle of governments, donors and NGOs around the world.

Nearly all definitions of the term attempt to incorporate social, environmental and economic dimensions, and privilege economic development that conserves or protects natural resources and ecological processes and services.



Dimensions of Sustainability*

The following discussion will examine some of the formative concepts – and problems – suffusing this complex dynamic, before returning to a discussion of how and why Field Schools work.

* Adapted from Adams (2006)

5.1. DEVELOPMENT

During the 1970s and increasingly throughout the 1980s, the concept of *development* came under increased scrutiny. Successive ‘development decades’, promulgated under the auspices of the United Nations, had failed to deliver on the promise of closing the gap between ‘developed’ and ‘underdeveloped’ societies, or bringing about significant improvements to the lives of the world’s poor majority.

It is remarkable that a concept that garnered such widespread international support, and mobilized such vast amounts of resources, did so without much serious attempt to define the term itself. ‘Development’ has the hallmarks of a buzzword: absence of a real definition, combined with a strong belief in the notion of what it is supposed to bring about.²² This allowed it to be embraced by a seemingly incompatible array of actors, including governments on both sides of the Cold War, colonizers and colonized, ruling elite and oppressed poor populations.

Everywhere, development was colonized by economists, promoting the notion that economic growth was the primary motivating force that would solve all other problems. Wherever poverty, illiteracy, unemployment, hunger, disease and other forms of social malaise persisted, the problem was never development itself, but rather flaws in the manner in which it was being carried out. These, in turn, could be addressed through the application of ever greater amounts of development funding and technical assistance.

By the 1970s, it was becoming apparent in developed and developing countries alike that economic growth brought with it a host of social and environmental problems. Producing ever increasing amounts of goods and services led to overexploitation of mineral and non-renewable resources and environmental pollution, and a breakdown of social bonds and norms. Communally managed lands and woods became private or government property, while the natural environment was converted into ‘resources’. Services that were once freely exchanged within the family, clan or among neighbors were progressively converted into paid employment – of which there was often not enough to go around.

5.2. SUSTAINABILITY

With the growth of the contemporary environmental movement in the late 1960s and ‘70s, and debates about the limits to growth, environmental issues came to be linked to mainstream questions of development. These debates culminated in the landmark report of the WCED, which offered the now classic definition of sustainable development:

*...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*²³

Again, development itself was not questioned. Rather, addition of the qualifier ‘sustainable’ allowed its protagonists to reconcile contradictory requirements of protecting the environment from pollution, deforestation, land degradation, and global warming and, at the

²² Rist (2007)

²³ WCED (1987a)

same time, ensuring that the pursuit of economic growth that was still considered a condition for general happiness. Over the past three decades, networks of diverse actors have been formed, alliances forged, institutions and organisations constructed, projects formulated, and money – in increasingly large amounts – has been spent in the name of sustainable development.

Sustainability can be defined as the ability of a system – either social or ecological – to respond to shocks and stresses, and resume a state of *dynamic stability*. In a broad sense, sustainability is the *capacity to endure*. Both ecological and social constructions of the concept increasingly forefront *resilience* as a key attribute of sustainable systems.

Attempting to apply these concepts to concerns of political economy, neo-classical economists attempted to factor environmental factors into models of growth, stressing substitutability of forms of ‘natural capital’, developing such fields as lifecycle analysis, ecological footprint assessment, and alternative national accounting systems. Political scientists delineated political theories that incorporated a ‘green’ politics perspective, placing sustainability concerns at the centre of a normative understanding of social and political change. Others offered integrative syntheses, linking the economic, environmental, and socio-political dimensions of sustainability into a new field dubbed ‘sustainability science’.

Different technical meanings were constructed alongside different visions of how the wider project of sustainable development should be conceived. Each competed with the others in a vibrant, if confusing, debate...

Scientific concerns, drawing from ecology, economics, and politics, merged with specific political and bureaucratic agendas in a process of mutual construction of both science and policy. Alliances were formed, spanning government, NGOs, private consultants, and academia, linking often unlike organisations and individuals, both North and South. It seemed that a word (or in this case two) had created a whole network, loosely affiliated around a set of vague and poorly defined understandings of a complex and rather ambiguous concept.²⁴

Sustainability reached the top of the global political agenda at the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro ten years after the convening of the Brundtland Commission. The UNCED conference launched a number of high-level conventions – on climate change, biodiversity, desertification – with the aim of realizing sustainable development ideals on key global environmental problems. At the same time, a more local-level, community-led process was conceived, which envisaged sustainability being built up from the bottom through local initiatives by local governments, community groups, and citizens. Environment and development had, it seemed, finally come of age.

Commercial interests in some countries – the USA foremost among these – lobbied hard to dilute the conventions, and in the end, the USA did not sign up. In most signatory countries, newly created Environment Ministries faced a difficult task seeking budgets and creating a political space for environment and development issues. Where they did succeed in doing so, the default bureaucratic mode of managerialism – with its focus on action plans, projects, and indicators – often led to a dilution and loss of dynamism in a previously energetic debate.

²⁴ Scoones (2007)

At about the same time, among some donor and development agencies, the term 'Sustainable Livelihoods' became a signifier of 'good' development. This term had its origins in a follow-up report of the WCED that followed closely on the heels of the original *Our Common Future* report that popularized the term Sustainable Development.²⁵ As noted in a previous chapter, the concept of Sustainable Livelihoods was given definitional flesh by Chambers and Conway and others from the Institute of Development Studies (IDS) at the University of Sussex. With the publication of the UK government's *White Paper on International Development* in 1997,²⁶ the Sustainable Livelihoods concept was elevated to center stage, seen as a critical element of new development thinking.

While DFID's Sustainable Livelihoods policy initiative eventually suffered the same bureaucratic fate of its 'parent' concept Sustainable Development, the Sustainable Livelihoods Framework nonetheless continues to provide a convenient and practical means for local communities and groups to organize concepts to envision local change in a manner that balances their own social and environment concerns.

Sustainable Livelihoods Analysis is an integral component of ESP's Watershed Management Field Schools. The Sustainable Livelihoods Framework provides a simple tool for communities to inventory assets, identify harmful practices, threats and constraints, and envision needed changes in policy, institutions and behaviors. In particular, the assets pentagon, especially the concept of natural capital, has proven an important analytical lens assisting participants to conduct holistic assessment of current practice, constraints and opportunities, and to develop plans for more balanced change into the future.

5.3. DEGRADATION, CONSERVATION AND LAND MANAGEMENT

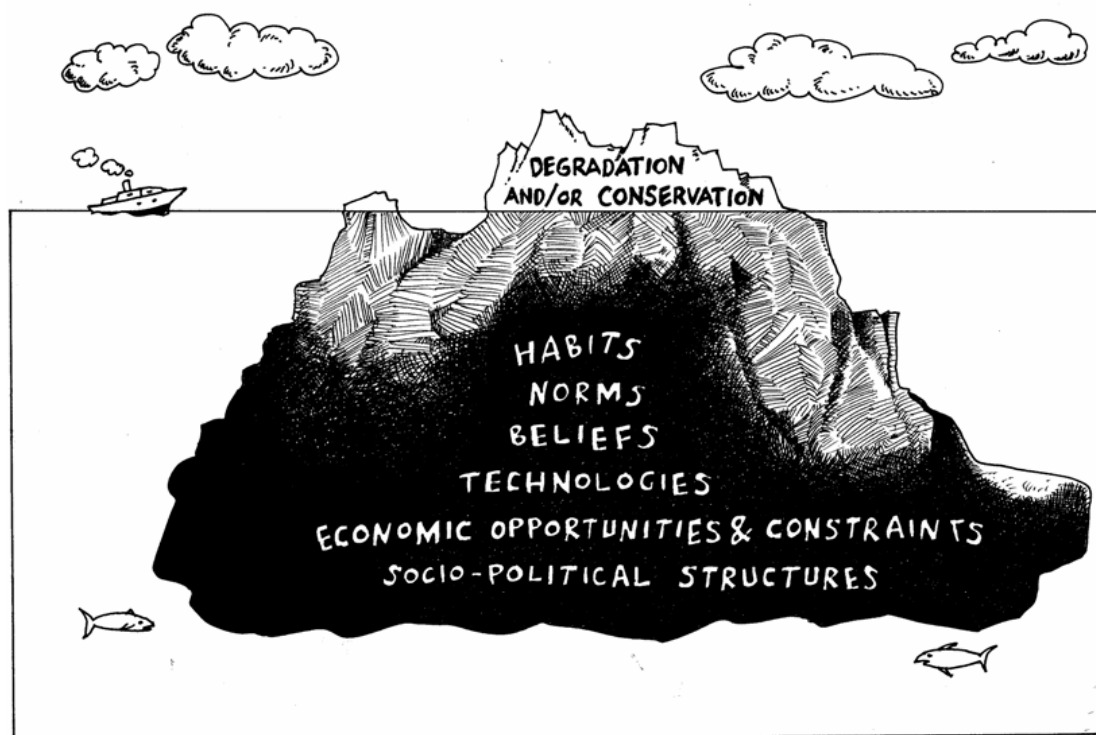
Environmental degradation and its corollary nature conservation are central to all conceptualizations of Sustainable Development. Many types of conservation measures have been undertaken; these can be broadly grouped into two categories. First are initiatives that seek to protect important tracts of forest or water bodies for biodiversity protection and/or research, sometimes combined with recreation and tourism development. Governments and environmental organizations claim that there can be numerous benefits for resident and surrounding populations. The second type is those which aim at reclaiming or improving environmental resources in or adjacent to settlement areas, to ameliorate living conditions of such groups as farmers, pastoralists, the landless and women. These initiatives include activities such as soil conservation, water retention, afforestation, agro-forestry and regeneration of forests and grasslands. Many of the ESP program's target communities live adjacent to national parks or other protected areas, but the majority of ESP watershed management activities fall into the second category of *in-situ* conservation in farmers' fields and villages.

Conservation and natural resource management are *social* processes. Land degradation, resource conservation, or ecosystem rehabilitation are but the 'tip of the iceberg'; the tangible result of activities that are undertaken by individuals and groups; grounded in norms,

²⁵ WCED (1987b)

²⁶ DFID (1997)

values, habits and traditions; often driven by changes in markets, technologies and regulatory frameworks; constrained or enabled by social and political structures and forces, and economic opportunities (or the lack thereof). Altering or enforcing natural resource management practices require addressing the underlying causes of degradation.



Environmental change is just the 'tip of the iceberg'

Ecosystems are constantly undergoing change. Degradation occurs when the productivity of land or resources declines, most often caused by human intervention. The role of the 'land manager' is central to an understanding of these processes.

Land managers often find themselves responding to changes in their social, political and economic circumstances, quite independent of the intrinsic properties of the land which they employ. They may be denied access to common resources, or be forced to grow crops by landlords, market or social demand, or by the state. They have to find a strategy with which to meet such pressures, and do this on land which itself changes in nature.²⁷

In ESP WSM-FS activities, Sustainable Livelihoods Analysis, through examination of changes to households' and communities' natural, physical, human, social and financial capital, and trends and shocks to local systems (the 'Vulnerability Context'), helps identify the factors and forces driving environmental change in a particular context; information which is used in the formulation of collaborative action plans. Done well, it also has the important effect of unifying people's understanding of issues and challenges, and forging alliances of like-minded individuals committed to common goals.

²⁷ Blaikie and Brookfield (1987)

5.4. PARTICIPATION

Awareness that participation is a ‘crucial ingredient in successful development’ is growing. So too, is the awareness that at all levels of development, sustainability is very closely linked to the full and genuine participation of the beneficiaries, or subjects, of the development process.

Early participatory approaches emerged in the 1960s and ‘70s as a counter-narrative to the technocratic, top-down development models that predominated at that time. The underlying objective of the participatory paradigm was not development – or ‘poverty alleviation’ – but rather a transformation of the cultural, political, and economic structures that reproduce poverty and marginalisation.²⁸ By the mid-1980s, however, participation joined the pantheon of development



catch phrases, alongside such giants as ‘sustainable development’, ‘basic needs’ and ‘capacity building’. Participation’s adoption (some say co-optation) by governments and mainstream development organizations signifies the approach’s effectiveness in mobilizing communities and societies to challenge the reigning paradigm. Development experts scrambled to attend workshops on how to employ a multiplicity of methodological packages such as Participatory Rural Appraisal (PRA), Participatory Learning and Action (PLA), Appreciative Inquiry (AI), Community Based Needs Assessment (CBNA), and Stakeholder Analysis. This emphasis on techniques and formulas took place at the expense of a more holistic conceptualization of participation within the broader sociopolitical context in which it must take place, perhaps best characterized by the following equation, developed to assist in conducting cost-benefit analysis of participatory approaches:

$$P = (B \times Pr) - C$$

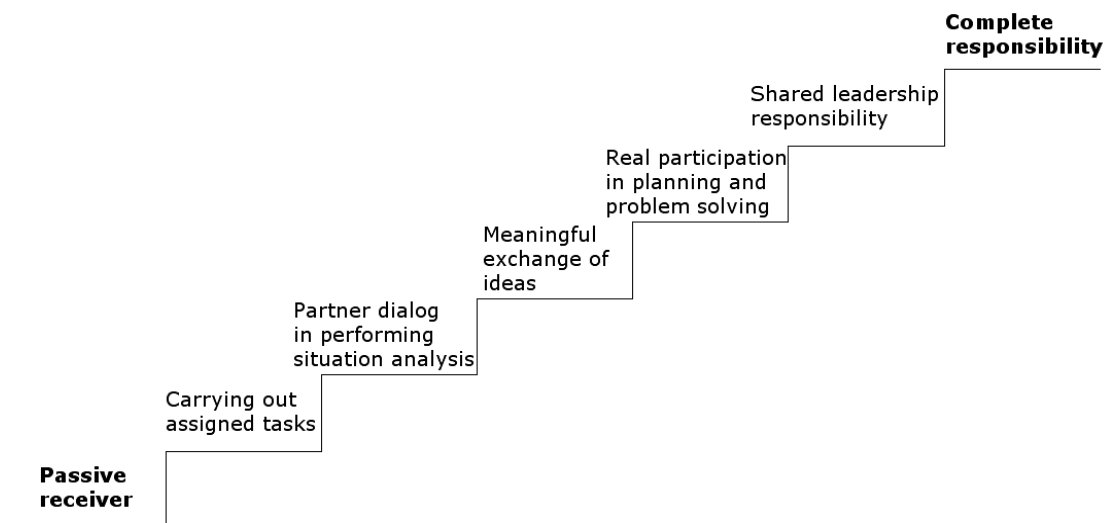
wherein participation (P) equals the benefits (B) one hopes to gain times the probability (Pr) that they will actually be achieved, less the cost of achieving them (C).²⁹

Numerous sources propose various typologies of participation, ranging from ‘passive’ to ‘self-mobilization’. Although there are subtle variations between the typologies offered, they agree on most fundamental aspects. The following example depicts a progression of ‘levels of participation’:

²⁸ Leal (2007)

²⁹ Bryant and White (1980)

Levels of Participation³⁰



Another example, from a Concern Worldwide project proposal guideline document,³¹ identifies the following types of participation:

Typology of Participation

Typology	Characteristics of each type
Passive participation	Unilateral information sharing in which people are informed of what is to happen.
Consultation	Although people are consulted problems are still defined and analyzed by outsiders who make all the decisions.
Participation for Material Incentives	People contribute resources, such as labor and materials, in return for food, cash or other incentives, but have no ownership of the project and no stake in continuing when the incentives end.
Functional Participation	Participation is encouraged as a means to achieve ends which are often predetermined.
Interactive Participation	People participate jointly in analysis, development and implementation of action plans, and monitoring of impact. Participation is interactive and structured to allow groups to take over decision-making and control of the resources, such that they have a stake in maintaining structures and practices.
Self-mobilization	People take initiatives independently of outside assistance and have control of resources. Agencies may provide support to enable the formation and spread of such groups.

³⁰ Adapted from NORAD (1999)

³¹ Concern Worldwide (1995)

Clearly, more 'advanced' forms of participation, i.e. 'interactive participation' and 'self-mobilization', should produce more sustainable outcomes, particularly when a broad spectrum of community members are engaged in agenda setting and decision-making processes, thereby becoming true stakeholders in a process and its outcomes.

Hierarchical typologies such as those presented above appear to imply a sequential process, wherein levels of participation advance through a series of stages. However, this is not often the case. Each typology, or level, of participation embodies – and reinforces – a particular set of structures and social relations. (The same can be said of development more generally.)

There is widespread agreement that participation is a core value of sustainable community development; while the concept of 'putting people at the center of development' has been a major theme of development literature for decades.³² There is far less consensus on how best to achieve this.

Participatory development practice is sometimes criticized for unintentionally (perhaps intentionally) perpetuating existing inequalities, by bringing people's views and expectations into line with the plans devised, with or without their participation, by their 'superiors'.³³ Whether we like it or not, 'participation' and 'consensus' may result in 'forms of control that are more difficult to challenge, as they reduce spaces of conflict and are relatively benign and liberal'.³⁴ The majority of what has been written about participation emphasizes the individual and the community, often at the expense of analysis of and challenge to the power structures that suffuse both the local and the wider context in which these are embedded. It is important to recognize that participatory approaches themselves become part of these power structures.

Simplistic dichotomies of 'top-down' versus 'bottom-up' development overlook the complexities of social relations and inequalities of wealth and power *within* communities. The challenge is to design and manage participatory development processes in a way that is truly inclusive, giving voice to the less advantaged members of communities from their inception. Such processes acknowledge conflicting interests between different community groups, and allow that conflict is an inherent attribute of truly participatory processes. Effective participation involves getting all members of a community to talk across existing (often invisible) social boundaries.

DAI Deputy Chief of Party and Watershed Management Advisor Reed Merrill maintains that the creation of new community leaders is one of the most powerful impacts of the Field School approach. 'People crave the opportunity to become leaders. They have a strong desire to contribute to their communities' welfare and well being'. The Field School model gives everybody a chance to contribute, and the confidence to become leaders. In small group work, it invariably works out that someone in each group can contribute the organizing, research, drawing, writing, speaking, or other key skills needed to carry out the observation, experimentation, analysis and presentation activities that characterize the Field School approach. The confidence-building aspect of this experience cannot be understated.

³² E.g., Chambers (1983, 1997), UNDP (1994)

³³ Cooke and Kothari (2001)

³⁴ Kothari (2001)

5.5. ADULT NON-FORMAL EDUCATION

The aphorism that ‘Knowledge is Power’ comes to the fore when addressing participatory processes. Adult Non-formal Education embodies numerous approaches to valorizing and mobilizing people’s existing knowledge, practice, experience, and networks, giving voice to members and sectors of the community who previously did (or could) not participate in setting the terms, scope and direction of development in their localities.

Adult Non-formal Education (NFE) shares its anti-establishment roots with the discourse of participation. Progressive educators have long stressed that students learn by doing rather than by passively absorbing information. In the 1960s and early ‘70s, a number of prominent educators, activists and theorists, the best known being Brazilian Paulo Freire, proposed an emancipatory pedagogy of ‘conscientization’ (*conscientização* in Portuguese, also sometimes translated as ‘consciousness raising’ or ‘critical consciousness’) centered around a process of ‘Participatory Action Research’ (PAR). PAR was developed as a methodology, or approach, to learning that would enable the poor and oppressed to transform their environment (and themselves) through their own praxis.³⁵ Freire criticized the oppressive attitudes and practices of what he termed ‘banking education’ wherein the educator was the depositor of knowledge, and students the depositories. Instead, learning processes should assist individuals to perceive social, political and economic contradictions, thereby enabling them to take action to overcome oppressive elements of reality. Critical awareness, he claimed, would allow humans to become ‘beings for themselves’.

Despite its radical roots, Adult Non-formal Education attained considerable worldwide popularity, soon becoming a *de rigueur* component of national and donor development strategies. As with participation, this uptake was accompanied by a transformation of the parameters and purpose of the discourse and practice of NFE; emphasis shifted from developing critical consciousness to providing literacy, numeracy and vocational skills that would allow poor and illiterate members of society to more actively and effectively participate in national development – not to challenge it. NFE came to increasingly resemble ‘traditional’ primary or secondary education, with the primary difference being the age and circumstances of its subjects, and the format and content of delivery modules. Even where NFE retained some of its broader goals of encountering and challenging sociopolitical structures and practices, this was characterized by an over-emphasis on formulas and techniques, and concomitant neglect of the unacknowledged dynamics of participation and exclusion, and of *power*.

Nonetheless, the core values of the original conceptions of Adult Non-formal Education have been kept alive and further developed by groups of activists and educators in countries around the world. Farmer Field Schools, while focusing on practical skills to address mainly technical problems, owe their success to the fact that this process is embedded within broader frameworks of ecosystem analysis (including human/social elements), further enhanced through the application of the Sustainable Livelihoods Framework as a conceptual lens to help develop a critical and holistic understanding of the factors that contribute to or impede the achievement of individual and collective goals. The theoretical underpinnings of the FFS approach draw from the work of Jürgen Habermas, particularly his concept of ‘*learning domains*’.³⁶

³⁵ Freire (1970)

³⁶ Habermas (1971)

5.5.1. LEARNING DOMAINS³⁷

Following Habermas, the basic framework for the FFS educational approach stresses three fundamental learning domains. First is the **technical domain of work**. In the FFS approach, farmers do not learn a specific set of messages or instructions; rather they master a *process of learning* that can be applied continuously to a dynamic situation: the ecology of their field. This forms the basis for the entire '*farmers as experts*' approach underlying the Farmer Field School.

A key concept in developing competency within the technical domain of work is simply 'giving farmers something to do'. If they encounter pest problems in their rice field, for example, or crops wilting from lack of soil moisture, rather than waiting for extension experts to instruct them in what pesticides or fertilizers to apply, Field School participants and alumni are encouraged to investigate and experiment: e.g., count insects; assess damage levels; carry out experiments; observe which crops are faring better under different conditions in their *kebun*; analyze organic content in the soil around healthy and wilted plants; try out different soil management and plant husbandry techniques; consult with neighbors; etc. The primary issue is allowing farmers to reassert a measure of control over their own crops and fields. In Field Schools, farmers learn to conduct experiments independently, record and analyze observations, create learning materials on their own, and manage 'field laboratories'.

This is further deepened and broadened within the **practical domain of interaction and communicative action**, wherein farmers work together in groups to collect data, generate analysis, conduct experiments, and make group decisions for field management. Farmers do not work in a vacuum. Their attitudes, decisions, perspectives, and practices are greatly influenced through their interaction with their peers and community. The Farmer Field School includes processes and methods that recognize and promote such interaction. This process begins even before the Field School begins, through participatory methods of problem analysis and participant selection such as labor analysis, mapping, and joint 'learning contract' formation. For many farmers, unaccustomed to speaking in front of groups, this confidence building and process mastery is the most important outcome of their Field School experience. It extends beyond the Field School experience itself, as farmers begin to plan and carry out special activities such as Field Days or Popular Theatre.

After gaining control of their own fields, farmers soon run into forces and systems outside their immediate control that must be addressed through other kinds of action, i.e., Habermas's third **domain of emancipatory action for empowerment**. Emancipatory learning takes place as farmers examine their internal or group constraints and options as they relate to a larger social, political, economic, and ecological environment. The initial Farmer Field School and follow-up activities such as farmer-to-farmer training, farmer action research and field studies, and IPM Field Days are just 'starters' for further empowerment and local institution building. With minimal support, this can further evolve into farmer-led strategic planning and organizing, and farmer policy-making. In practical terms, this is supported through the formation of Field School networks, linkages and leveraging support or policy changes from local government, and Field School alumni's participation in other programs and agencies to influence development outcomes in their community.

This is how Field Schools endeavor to ensure 'life beyond the project', entraining a process of continuous learning that enables participants to address new challenges and opportunities

³⁷ Adapted from Dilts (2001)

as they arise, and building the capacity of these individuals and the groups they form to articulate their needs, desires, plans and objections – and to take collective action to assure that these are addressed. The continued viability of the IPPHTI Association of IPM Farmers more than a decade after the cessation of the National IPM in Rice Program, and its broadening agenda that has grown to encompass such diverse issues as water policy, farmer plant breeding and seed certification, climate change mitigation and adaptation, and local governance reform, bears witness to the effectiveness of this approach.

The first ESP Watershed Management Field Schools were conducted in the months following the Training of Trainers course held in Solok in September 2006. Less than three years on, the program is already showing prodigious results. ESP has met or exceeded all of its watershed management and agro-forestry development targets. Village groups have initiated a number of innovative activities that were not included in the original project documents. Many of these groups have succeeded in garnering and mobilizing significant support from local and national government and private sector sources; for example, as previously mentioned, many donors and NGOs operating in Aceh explicitly seek out ESP community groups, in order to assure greater success of their own programs. Some Field School alumni are serving as trainers and advisors for other government and NGO programs in their regions. More still are engaged in disseminating innovations to neighboring villages, using their own resources and those of the communities that invited them. Forests are recovering, hillside farms are producing a greater variety of crops, rivers are running cleaner and fuller, rural households have gained improved access to water, and household incomes are increasing. And this is only the beginning...

Nobel Prize-winning economist Amartya Sen defines development as freedom: i.e., freedom of choice, and freedom to act on these choices.³⁸ In the Field School experience, this freedom begins in the farmer's field, as he/she (re-)develops the observational and analytical skills that had been disregarded and devalued over decades of centrally managed agricultural extension and national economic development schemes, to regain control of his or her own fields. From there, this dynamic builds upward and outward, as farmers' analysis and actions begin to address issues of common concern in progressively broader and denser contexts.

Whilst not claiming that Farmer Field Schools represent the culmination of a logical or chronological progression of participatory development approaches, they do successfully integrate many of the core ideals of sustainable development, participation, and adult non-formal education. None of the techniques or activities comprising the Farmer Field School are new; some of them date back half a century or more. It is the Field School's thorough and systematic – yet ultimately quite flexible – application of these techniques that sets it apart.

5.5.2. ...OR, HOW (AND WHY) FARMER FIELD SCHOOLS WORK

One only has to look at the face of a farmer who cannot comprehend why he has just lost his crop, despite all his hard work, to begin to understand the *empowerment* that comes from regaining control in his field, based upon direct understanding. This is the source of the '**Farmers as experts**' approach that underpins Farmer Field Schools' remarkable success. Agro-ecosystem analysis, Sustainable Livelihoods analysis, the '*Apa Ini?*' principle, Field Days... all of these are components of a whole, that merge together in a dynamic and self-sustaining process of discovery, confidence building and process mastery that can transform farmers' perceptions, attitudes and approaches to the day-to-day concerns of making a living.

³⁸ Sen (2001)

This is not ‘rocket science’, nor is it ‘reinventing the wheel’. It is experiential learning, and the valorization of farmers’ own knowledge, abilities, and creativity. While not claiming that Farmer Field Schools represent the culmination of a logical or chronological progression of participatory development approaches, they do successfully integrate many of the core ideals of sustainable development, participation, and adult non-formal education. None of the techniques or activities comprising the Farmer Field School are new; some of them date back half a century or more. It is the Field School’s thorough and systematic – yet ultimately quite flexible – application of these techniques that sets it apart.

The Environmental Services Program took an approach that had already proven successful in allowing farmers to improve rice cultivation while reducing their dependency on expensive (and dangerous) external inputs, and applied it to an entirely different set of circumstances: watershed management and mixed agro-forestry. The possibilities for future adaptation and application of the Farmer Field School approach are limited only by our imagination. But not, surely, by that of the farmers.

6. EPILOGUE: A SPIGOT MONUMENT IN SUKAMULYA

Although located only four kilometers from a major spring, women in the villages of Sukadamai and Sukamulya, near Saree in Aceh Nanggroe Darussalam, used to spend hours queuing for water from a small tap in the village mosque. This region was an epicenter of armed clashes between GAM and Indonesian soldiers throughout much of the 30-year Aceh conflict; it was unsafe for villagers to travel the short distance to the spring in the nearby Alur Mancang forest.

In 2006, ESP joined forces with the World Bank-funded Kecamatan Development Program (KDP) to install a gravity-feed water system serving the two villages, including shoring up dike walls at the spring, a two-inch pipe from the spring to the villages, a large cistern, and four communal spigots distributed across the two villages. ESP combined this activity with a water catchment and spring conservation Field School, attended by villagers from the two communities. Outcomes include the promulgation of local regulations on forest protection and regeneration in the spring catchment zone; initiation of routine patrols; establishment of the Alur Mancang Community Forum (FAMS) to oversee watershed management and integrated conservation and development programs in their communities; and a tree nursery to support enrichment planting and reforestation in the catchment area, and mixed agro-forestry on village lands.

Village women have been able to start up a number of cottage industries, such as tofu and *tape* (fermented cassava) production, making use of the hours they used to spend queuing for water. Children's health is showing improvement, directly due to the availability of sufficient water for bathing, washing and cooking. More recently, ESP provided additional assistance to help fulfill villagers' desire to pipe the water directly into individual households.

Rather than dismantle the original community spigots, villagers in Sukamulya have elected to turn one of them into a monument commemorating this momentous event, complete with a marble plaque engraved with the following words:

'Keran ini dulunya digunakan oleh masyarakat secara bergantian oleh masyarakat untuk mendapatkan air bersih. 2006'

'This spigot was once used by community members, who took turns to get fresh water. 2006'



Constructing the Water Spigot Monument, Sukamulya Village, Aceh

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