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LA MALIENNE - A Comparative Study of Two Hand-Pump Projects in Casamance, Senegal

Thesis

Business Administration and Economics,
International Business Programme, French Option

Linköping University, March 1990

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BACKGROUND: AFOTEC, a Senegalese non-governmental organization, implemented two pump projects in Casamance in southern Senegal. In both cases the same type of pump, La Malienne, but divergent organizational approaches were used for the implementation of the projects.
OBJECTIVE: The purpose of the study is to describe and compare the socio-economic impacts of the projects "La Malienne" and to analyze the results on the basis of a theoretical framework defining the fundamental organizational factors that influence the outcome of small-scale development projects.
LIMITATIONS: The study is restricted to Casamance and to Dakar. The focus lies on small-scale projects and their socio-economic implications in a rural environment. Due to time constraints the analysis has to be static.
METHODOLOGY: A field study, based on formal and informal interviews, was carried out in Casamance. The data obtained were completed by and compared with information gathered before and after the field study in Sweden, France and Dakar.
RESULTS: Since the results of the two projects differed considerably despite of largely similar external conditions, the study indicates that there exists a connection between the organizational factors of a development project and its outcome.

Acknowledgements

We would like to thank Manlafy Diédhiou and Ousmane Mary, our indispensable interpreters and guides, without whom this report would never have seen the light. We are likewise grateful to Jan-Olof Drangert for liberally giving his time to read and discuss our work. We also owe a special debt to Jean Aranda and Mats Johansson who provided considerable practical help. Lastly we wish to thank all the contributors to this report for their patience and support.

CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

Even in industrialized countries people are almost daily confronted with problems in the developing world. We are particularly interested in the role of women in a development context. By chance we learned about a Senegalese non-governmental organization called AFOTEC (the International Service for the Support of Training and Technologies in West Africa/Sahel) which concentrates its efforts on helping African women to solve their problems by using appropriate technology.[1]
From our point of view AFOTEC was an interesting organization not only because of their general approach but also because of the fact that they as Africans work for Africans. Consequently we contacted them and asked if they were interested in an economic evaluation of one of their projects. The answer was positive and thanks to the contribution we received by SIDA in order to carry out a Minor Field Study we were able to make a socio-economic evaluation of AFOTEC's pump projects "La Malienne".

1.2 PROBLEM

Water has always been a primordial problem in Africa and innumerable development projects have been implemented to cope with its different aspects. However, most of them have turned out to be failures. Therefore new approaches have been developed during the last few years and instead of large projects directed towards poorly defined target groups, several organizations prefer smaller projects destined to help those who are most concerned with water - women.
One of these organizations is AFOTEC. At the request of two peasant organizations in Casamance, southern Senegal, they trained women to manufacture and maintain a simple hand pump called La Malienne. For the projects, started in 1985 respectively 1986, AFOTEC used two different approaches. In both cases the results seemed to be quite satisfactory and as other organizations in Senegal and several other African countries have shown interest in the pump, AFOTEC considered a project evaluation to be necessary in order to estimate the

[1]According to Marilee Karl (1982), appropriate technology is "sometimes also referred to as alternative, adapted, intermediate, soft-core, self-reliant or people's technology".

programmes' impacts on the target populations before starting to diffuse the pump on a larger scale.
Furthermore it is of interest to compare the two projects' effects by taking into account that they were realized in the same geographical area, with the participation of principally the same ethnic groups, by using the same technology but by employing considerably divergent organizational approaches.

1.3 AIM OF THE STUDY

The objective of this paper is to describe and compare the socio-economic impacts of the projects "La Malienne" and to analyze the results on the basis of a theoretical framework defining the fundamental organizational factors that influence the outcome of small-scale development projects.

1.4 LIMITATIONS

Our study is restricted to a relatively limited area, namely to Casamance in southern Senegal where the field work took place and to Dakar where the organization involved is based.
As the two projects we have studied are rather small, we focus on small-scale projects and their socio-economic implications in a rural environment.
Although we acknowledge that other perspectives could be possible, we have chosen to analyze the projects' outcome from an organizational point of view. We regret that the analysis has to be static, but due to time constraints we have only been able to carry out the study at one point of time.

2 PRESENTATIONS

2.1 SENEGAL

Senegal, situated on the African west coast, covers a surface of 196 192 km^2 (less than half of Sweden's). Bordering countries are Mauritania to the north, Mali to the east, Guinea and Guinea-Bissau to the south. In the southern part of the country The Gambia forms a narrow enclave. The capital, Dakar, is situated on the peninsula of Cape Verde, the most westerly part of the African continent.

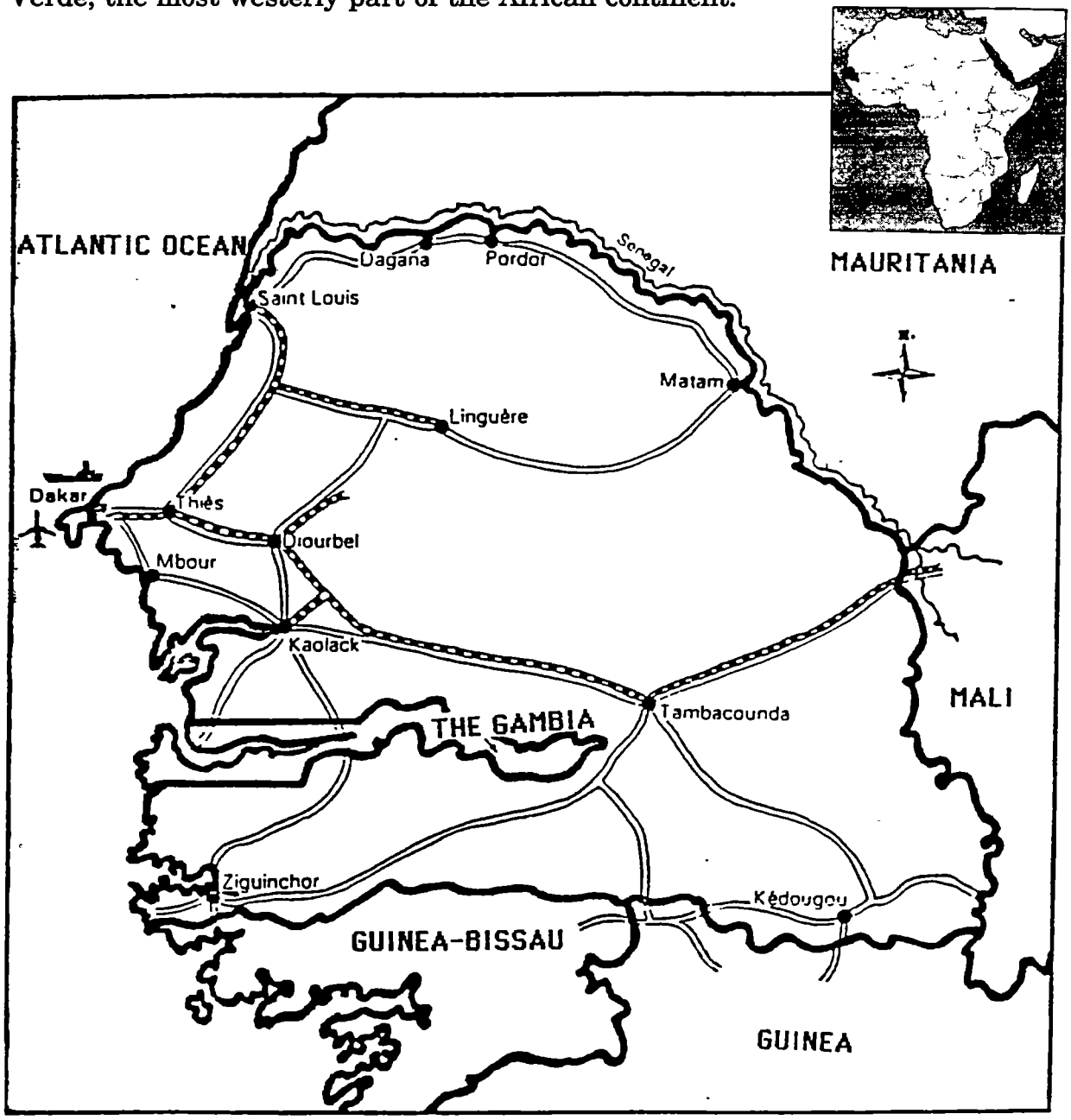

Figure 2.1: Map of Senegal (Source: CIDA, 1988)

2.1.1 Geography and Climate

The shape of the country can generally be described as flat vast plains, rarely higher than 100 metres except in the south-eastern part, where low mountains can reach heights of 500 metres and more. The altitude in this region exceeds, however, seldom 250 metres.
The river Senegal flows through an alluvial valley which, inspite of the torrid climate and the Sahelian landscape, makes rich irrigated cultivation and breeding possible. Temperatures are high and the warm Saharan wind, the Harmattan, blows almost the whole year. The rain period does not last for more than three months, July to September. Precipitations range from 300 to 550 millimetres.
Except for the iron-bound Cape Verde, the littoral from Saint-Louis to the Point of Sangoumar is covered by sand. The rest of the littoral to the Guinea-Bissauian border is swampy. Due to the trade-wind, temperatures are relatively mild. Rainfall is, however, seldom more abundant than in the Sahelian zone - except in Dakar in June because of the Monsoon wind.
The region behind the littoral - the Wolof countries - , between Louga and The Gambia is Senegal's groundnut region. The savannah landscape is characterized by palmyra palms and baobab trees. In the desolated eastern region the pastoral Peul breed their herds. Here, Acacias dominate the vegetation. The humid season lasts three to four months, from July to October. It rains more in the south than in the north (650-900 millimetres) and differences in temperature are considerable. Casamance, with its abundant vegetation, is situated under The Gambia. This region will be treated in more detail in section 2.2.

2.1.2 Population

In 1989 Senegal's total population amounted to an estimated 7 704 000. The population is principally concentrated in the western part of the country. 39 per cent of the population live in the cities, 22 per cent actually live on the peninsula of Cape Verde. The eastern part of the country is sparsely populated.

The official language is French. However, only ten per cent of the Senegalese population are estimated to be perfectly French-speaking. Wolof, spoken by the largest ethnic group (40 per cent of the population are Wolof), is the dominant language, since many other Senegalese speak it in addition to their own language. Thus, Wolof is spoken by

three-quarters of the total population.
The other important ethnics are the Serer (17%), Peul (17%), Toucouleur (9%), Manding (9%) and Diola (9%). The rest of the population is represented by other minorities and by immigrants from the Islands of Cape Verde, France, Lebanon and Syria. The Mauritanians have all left the country due to the outbreak of ethnic violence in April 1989.
About 92 per cent of the Senegalese are Muşlims and roughly 2 per cent Christians. All Wolof, Toucouleur and Manding are Muslims. Christians can be found among the Serer, Diola and more specifically among those originating from the Cape Verde islands and Guinea-Bissau. A small part of the population follows traditional beliefs.

All important ethnics except the Diola know some kind of caste system where certain professions such as goldsmiths, weavers, wood-carvers and potters, are tied to certain families. Professional entertainers, the griots, form castes that are quite low on the social ladder.
Slavery used to be quite common and continued to exist even a long time after the official abolition in 1848. Discrimination of the descendants of the slaves still occurs.
In cities affiliation to tribes tends to be less important than in the rural regions.

Primary education is compulsory between the ages of six and twelve. In reality, total enrolment attains hardly 80 per cent in urban areas and a mere 30 per cent in rural areas.
According to estimates by the UNESCO, the rate of adult illiteracy was, in 1985, 63 per cent among men and 81 per cent among women. Reading and writing of national languages has however been actively promoted since 1981.

2.1.3 Economy

The Senegalese economy is essentially based on agriculture. The agricultural sector, including forestry and fishing, accounts for 22 per cent of the GDP (1987) and employs about three-quarters of the work-force. The economy is dominated by production and processing of groundnuts, which were grown on approximately 40 per cent of the total cultivated land area in 1984. Senegal also produces important quantities of sorghum, millet and to a lesser extent also rice, maize, cotton, sugar and market-garden produce. The commercial fishing industry has grown rapidly. Fish products account for more than one-quarter of total exports. However, the country is not self-sufficient regarding food

production. For instance, although rice is daily consumed all over Senegal, the yearly produce only covers approximately 70 per cent of the quantity needed. Generally speaking, food imports exceed by far food exports.

The industrial sector represents 28.9 per cent of the GDP (1987). Within the mining industry the expanding phosphate production plays an important role. Although significant petroleum deposits have been located off the Casamance coast, exploration has been hindered by disputes with Guinea-Bissau over maritime borders.
Apart from transformation of basic products (groundnuts, phosphates and fish), the industrial sector also includes textiles, petroleum refining, chemicals, building materials and food-processing. The establishment of an industrial zone near Dakar in an attempt to attract foreign companies and to provide employment, has had limited success.
Transport, trade and services account for 37,5 per cent of the GDP (1987). Senegal's most important trading partners are France, India, Italy, Spain and the Ivory Coast concerning exports and France, Nigeria, Spain, Italy and Algeria as to imports.

The economy was structured during the colonial period. It was based on the trade with groundnuts and most of the arable land that was not already occupied for subsistence farming was set aside för groundnuts at the same time as large quantities of rice were imported.
The recycling of the groundnut revenues was the principal engine for the other sectors. Most of the modern non-agricultural activities consisted of administration, commercialization and transformation of groundnuts and of trade and local manufacturing of consumer goods. The dependence on the groundnut production, however, rendered the whole economy very sensitive to seasonal changes.

The independence in 1960 did not significantly alter the primordial role of the groundnut in the economy. Due to the stagnating expansion of cultivated areas (in turn due to deteriorated soils because of demographic pressure, climate changes and lack of sufficient research) and a 25 percent drop in groundnut prices, a favourable trend in Senegal's economy was interrupted in the late 1960s.
Since then no other dynamic power has replaced the groundnut sector as motor for the other sectors. But for a few exceptional years with relatively good harvests, the economic situation has deteriorated, or at least not improved.
Measures taken by the government in attempts to solve the problems

have had few effects.

The economic development is largely financed by foreign aid and investment. France is by far the country's largest aid donor. In 1987 the former colonial power provided $675 million. Other important aid donors are the USA, Italy and Canada. The World Bank's soft loan affiliate, the IDA, is the largest multinational donor followed by the EEC.

2.2 CASAMANCE

Casamance, situated between The Gambia and Guinea-Bissau, extends from the littoral to the river Koulountou. It occupies 28 350 km^2 and represents 14,4 per cent of Senegal's total area.

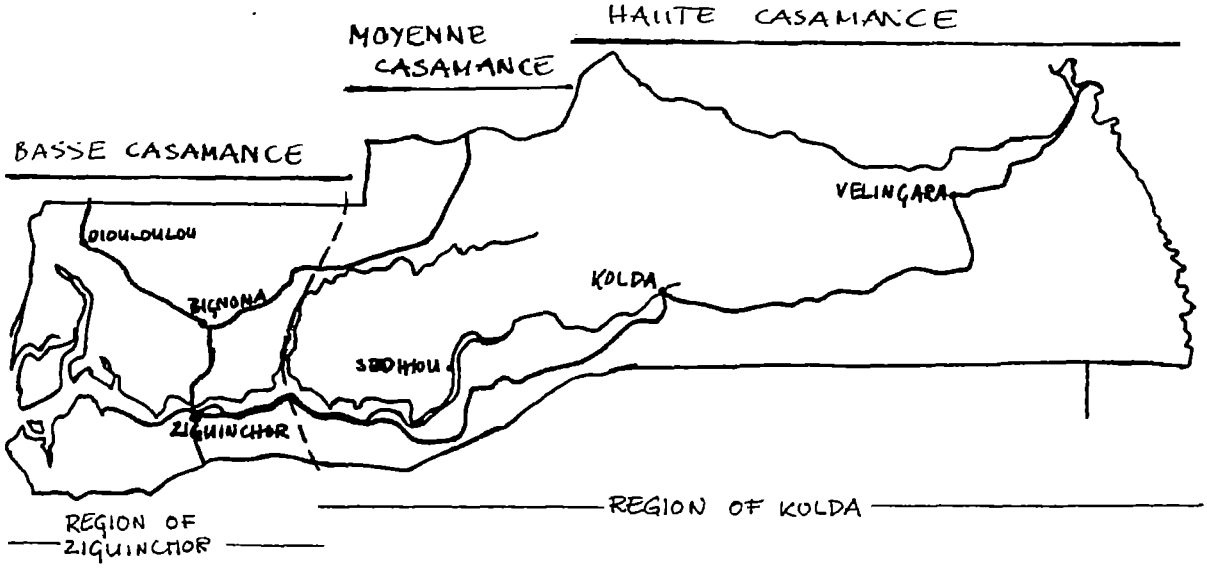

Figure 2.2: Casamance

In 1984 Casamance was divided into two administrative regions:
* the Region of Ziguinchor
  with the Departments of Ziguinchor, Bignona and Oussouye
* the Region of Kolda
  with the Departments of Kolda, Sédhiou and Velingara.

In Casamance three main geographical regions can be distinguished: In the *Haute Casamance*, between Koulountou and Kolda, the plains are drained by the seasonal rains and the vegetation is characterized by decidous forests and habitats of bamboos. Precipitations are on average 1200 mm per year. The Haute Casamance is sparsely and unequally inhabited. The population consists mainly of Peul who live scattered in

small villages. The Peul were traditionally migratory cattle breeders but due to the influence of the Manding as well as the great number and permanence of water supplies and the abundance of pasture lands they now are essentially sedentary. As the Peul have settled down they have also become farmers.

The *Moyenne Casamance* extends from Kolda to the Sougrougrou valley. Here the vegetation is even more abundant than in the Haute Casamance. Between Sédhiou and Marsassoum precipitations are on average 1400 mm a year. The Manding constitute the predominant ethnic group. Most people live in large villages. The Manding influence, especially as regards religion and language, has resulted in the Balant's regrouping their villages, and arranging their lifestyle and activities after the Manding model.

The *Basse Casamance* is the area extending from the Sougrougrou - the old historic border which for a long time separated the Manding from the Diola territories - to the littoral. The Diola region, more densely populated than the rest of Casamance, is characterized by extensive rice cultivations. Diola villages consist of large autonomous and dispersed family farms. The paddy fields are part of a landscape which is otherwise dominated by mangrove swamps, lush estuary vegetation and palm groves. Precipitations on average surpass 1500 mm/year in Ziguinchor and 1700 mm/year in Oussouye.

Like elsewhere in Senegal, agriculture dominates the economic activities. 75 per cent of Casamance's total area is exploited for agriculture.

Even though the Diola are very important rice producers, they are not the only ones. The hydrographic conditions permit rice cultivation all over Casamance, though more in the western than in the eastern part. Of course groundnut cultivation has not escaped the region. Other important food crops are millet, manioc and tropical fruits like mangoes, bananas and citrus fruits as well as vegetables. The palm trees permit extraction of palm-oil and production of palm-wine. Cotton is cultivated principally in the eastern part of Casamance. The region delivers a large part of the national cotton produce. There is an important threshing factory in Velingara. As mentioned above, the Peul are traditionally cattle breeders. Animal husbandry has however also spread to the other ethnics. Among the Diola seasonal fishing has become more frequent.

Although Casamance, due to the favourable climate, stands for an important share of Senegal's food production, also this part of the country has recently suffered from drought periods. There are fears that the increasing clear-cutting of the forests may lead to the same damages as in northern Senegal and the Sahel region and that even Casamance will be menaced by desertification.

2.3 AFOTEC

AFOTEC (International Service for the Support of Training and Technologies in West Africa/Sahel) is a Senegalese non-governmental organization founded in 1983. The headquarters are situated in Dakar. The staff consists of about 15 people, the majority of whom work alternately in Dakar and in the villages where AFOTEC implements its projects.

2.3.1 Objectives

AFOTEC's aim is to strengthen community groups' abilities to organize and complete their own development projects.
By using locally available materials, human resources and creativity, AFOTEC and the community groups try to find technical solutions that the groups can accept from a physical, social and cultural point of view. The ultimate goal is to help them to become self-reliant.
AFOTEC's policy is not to provide people with key-turn projects but with the necessary assistance to find by themselves alternatives for solving their problems. Thereby it is hoped that they may start to appreciate their local resources and knowledge and build their development on these instead of searching for foreign aid.

2.3.2 Target Groups and Areas

AFOTEC focuses its activities on certain groups within the communities, especially women but also children, handicapped and old people.
The solutions offered depend on people's needs and suggestions.

Considering these, the following domains are emphasized:
- food (including water, soil conservation, agriculture, forestry, fishing, animal husbandry, transport and commercialization of products etc.)
- health
- organization and administration
- savings/credits
- literacy training
- culture
- rural employment.

2.3.3 Project Realization

AFOTEC's philosophy is not to approach a community group and to suggest a project. Instead, the community groups are expected to contact AFOTEC themselves and expose their problem.
The next step consists of discussions between AFOTEC and the group which aim at the determination of the project's goals and design. This phase is followed by a training session with delegates from the community group(s) concerned. During this session the trainees are supposed to acquire so much knowledge that they are able to continue and diffuse the project in their village. Depending on the project, the delegate realizes the same session with other members of her (or his) group after his return to the village.
AFOTEC also provides individual education which, however, aims at the benefit of a group. It can e.g. concern the training of a blacksmith in how to manufacture equipments for the extraction of palm-oil.
A third form of education is the organization of study tours within or between community groups. One of the goals is to develop a feeling of solidarity which might be a source of greater force for the group.

AFOTEC's system of education relies on a network of people, institutions and organizations spread over the countries AFOTEC works in. These frequently work on a more or less voluntary basis.

2.3.4 Long-term Objectives

The organization's intentions are to progressively attain the whole subregion of West Sahel. According to AFOTEC, requests have arrived from all over Africa, but the organization is not large enough to satisfy

all of them. The countries touched by now are Senegal, Mali, Burkina Faso, Mauritania, Guinea-Bissau, The Gambia, Cameroon and The Ivory Coast.
AFOTEC's limits are, despite the relatively low cost of their interventions, of financial nature. The organization has, so far, received financial support mainly from CIDA (The Canadian International Development Authority), the Ford Foundation and the United Nations Development Programme.

2.4 ENTENTE DE DIOULOULOU

The Entente de Diouloulou is an association of seven villages situated in the arrondissement of Diouloulou near the Gambian boarder.
It was founded in 1984 by eleven villages that had decided to promote their own development. When we conducted our study the Entente de Diouloulou (in the following referred to as ED) however only counted seven member villages. Merely five of the original villages remained in the organization because some had been excluded as a result of their inability -or lack of will- to fulfill their financial obligations towards the organization. On the other hand the association had been joined by two new villages.
The structure of the ED is democratic. In every village exists a community group, called sub-committee, which elects a female and a male president as representatives in a general council. This council elects a president who represents the ED in external affaires.
The ED has its headquarters in Kabiline and at present the other member villages are Coulobory, Diounoung, Diounoungué, Katipa, Mahmouda Diola, and Touba. All villages are Diola and no one is situated farther than 25 kilometres from Kabiline.

The ED co-operates among others with AFOTEC and a Belgian non-governmental organization. The projects aim at providing the members of the community group with new skills and knowledge that permit them to improve their situation. Thus they concern so divergent areas as public health education and facilities, training in income-generating activities like animal husbandry, horticulture and sewing, literacy courses and education in economic administration.

2.5 ASSOCIATION DES JEUNES AGRICULTEURS DE LA CASAMANCE (AJAC)

The "Young Farmers' Organization of Casamance" (AJAC) was founded in 1974. In the beginning it consisted of only a few villages that concentrated on the same aim as the ED, namely on promoting their own development. The criterion for the admission of a community group to the AJAC was that they pursued at least one activity for instance related to health, technique improvement or education. The AJAC would then attempt to support the achievement of the goal set.
The AJAC thus became attractive for the villages and by 1987 the association numbered 800 community groups.
The association is organized on three levels. The community groups are regrouped in unions and elect delegates who represent them on this level. The unions elect representatives who participate in the yearly general assembly. Among other things, the general assembly determines the members of the executive committee who organize the AJAC's activities.
In connection with the division of Casamance in two administrative zones, the AJAC used the occasion to split itself into two autonomous organisations, the AJAC Kolda and the AJAC Ziguinchor. About 600 of the community groups became members of the AJAC Kolda while more or less 200 adhere to the AJAC Ziguinchor. Each of the two new AJACs has retained the organizational structures described above.
Since the number of the members in both organizations still is extraordinarily high and the villages, who belong to a variety of ethnic groups, are dispersed all over Casamance it is not surprising that communication within the organization proves to be rather slow and, as we were to realize, quite inefficient.

2.6 THE PROJECTS "LA MALIENNE"

When the ED, in search for a means to alleviate the female members' work burden and to increase their monetary income, approached AFOTEC, the latter suggested an integrated programme which among other things included a simple hand pump called La Malienne. When the AJAC expressed the same desire, this pump was also proposed to them.

2.6.1 La Malienne

The design of La Malienne was derived from an industrially manufactured pump and adapted to African rural conditions by the B.P.A.R.[2], an institute for artisanal training in Ségou, Mali.

La Malienne in Mahmouda Diola, Entente de Diouloulou

[2] Base de perfectionnement des artisans ruraux

La Malienne is supposed to be a viable alternative to the motor pumps that have been extensively diffused in African countries. The technique has been simplified to such a degree that peasants easily can learn how to manufacture and maintain it.
The pump consists of materials which can be found in the local environment, such as PVC and/or bamboo, wood, rests of car tyres and iron. Just the strainer has to be purchased. Therefore the pump is comparatively cheap. Furthermore, the maintenance of La Malienne does not require external assistance once the users have learned its technique.
AFOTEC has further improved the pump and a design of the version they diffuse is shown in Appendix A. Depending on the depth of the well, it costs between 15 000 and 30 000 FCFA[3] and can be installed in wells that are up to 22 metres deep.
According to AFOTEC, its capacity in a twelve metre deep well reaches 2000 litres per hour in comparison to 500 litres that can be drawn by the traditional system - a cord and a bucket. Consequently, the utilisation of the pump can be considered to alleviate the women's work burden and to facilitate activities demanding large quantities of water, for instance market gardening. Besides, the fact that the women do not have to let down their buckets into the well reduces the pollution of drinking water which may lead to health improvements.

2.6.2 Aims and Implementation of the Projects

Aims

The aims were the same for both the ED and the AJAC. First of all, the women's work burden was to be alleviated. This was supposed to result in time gains and in improved health. Improved health was also expected to be achieved in the cases where the pump was used for drinking water. Second, the women were expected to increase their income-generating activities, principally market-gardening, because they had gained time, improved their health and augmented their capacity of drawing water due to the new technical device. In the long run, it was supposed that they would be able to use their know-how and manufacture and sell pumps themselves. Third, the fact that women were trained to manufacture and maintain the pumps themselves was assumed to make them independent from their husbands as to the drawing of water, to promote their social position in the community

[3] 100 FCFA ≈ 2 SEK

groups and in the villages as well as to give them incentives and self-confidence for further own development activities.

Implementation in the Entente de Diouloulou

In the ED the implementation of the project started in 1985. AFOTEC's executive secretary had payed a visit to Kabiline and presented the pump whereafter ten of the eleven member villages had decided to implement the project. Each village was supposed to select two women for a three-week training course in Mali, but since two villages only sent one and one village happened to send three women, the total number of trainees amounted to 19. They were accompanied by a male member of the ED who served as an interpreter since the instructors did not speak Diola.
The training session in Mali was carried out in co-operation with A.R.M., a Malian association of rural women. These organized accommodation and shared the task of food preparation with the Senegalese women. Also cultural evenings were organized.
During the course, the ED women learned how to manufacture, repair and assemble a pump and when returning home, each trainee brought one pump with her.
In the community groups, the trainees acted as pump attendants and were responsible for the installation and maintenance of "their" pumps. Furthermore, they were supposed to give an oral account of their experience and to train other women.
In 1986, AFOTEC organized a refresher course in Kabiline during which the women who had been to Mali trained one woman from each member village. However, at the time three villages had already left the ED and one had joined it. Besides, one prospective trainee fell ill and could not participate in the training session. Therefore, only eight additional women were educated. Further refresher courses were organized in 1987 and 1988, but no new women were trained and now AFOTEC's part in the pump project is considered to be terminated.

Implementation in the AJAC

AFOTEC elaborated the training programme together with some of the AJAC's leaders in 1986. As these did not consider themselves to be competent to select the trainees, they delegated this task to several unions which had to determine and inform the villages that were to participate in the project.
As mentioned above, the AJAC was split up only in 1987. Thus, in 1986,

25 community groups from all over Casamance chose one woman each and sent them to a two-week training course which was jointly organized by AFOTEC and the AJAC in a Casamance village. The schedule was the same as for the ED training session, i.e. the trainees were taught to manufacture, assemble and repair La Malienne. According to the AJAC's wishes, also two male members were trained. Later on, they should act as advisors and be able to help the women in case of difficulties. After the training session they participated in the installation of the pumps in the different villages.
Even in the AJAC, the women were expected to report on the training session and to diffuse their newly acquired knowledge to other female members of the group.
In May 1988, one of AFOTEC's technicians and one of the male advisors made a tour through the villages for a refresher course during which they even exchanged the pumps' valve-pistons that in the meantime had been improved by AFOTEC. Since then, the project has been the entire responsibility of the AJAC.

3 THEORETICAL FRAMEWORK

3.1 INTRODUCTION

In order to be able to analyze the two projects and to compare their results from an organizational point of view, it is necessary to develop an idea concerning the prerequisites that determine the outcome of small-scale projects.
In this chapter, we will first discuss some broader aspects regarding development projects, namely the role of women and the choice of technology, and then, starting from contemporary literature and our own experience, proceed to quite a detailed outline of the design, implementation and follow-up procedures of small-scale development projects.
Finally, we are going to present the effects usually ascribed to domestic water supply projects.

3.2 WOMEN AND DEVELOPMENT PROJECTS

The vast majority of the people in the Third World live in rural societies and base their living on agriculture. Therefore a large number of development projects are implemented in the agricultural sector. Contrary to what is common in industrialized countries most of the farmers in developing countries are women.

> "Women make up the majority of subsistence farmers. In most rural cultures, it is their work which provides a family with its basic diet and with any supplementary food that may be obtained from barter or from selling surplus goods." (Dankelman/Davidson, 1988)

In Africa women stand for 70 per cent of the food production, 90 per cent of water collection, 100 per cent of domestic duties and 70 per cent of self-help activities in their communities (Hannan-Andersson, 1982).
As these facts are quite well known, one would expect that development projects automatically are directed towards women. However, this is not the case. Already in 1980 a United Nations study pointed out that "At this stage, development planning projects with women's components are few and far between." (Evaluation Study No.3, 1980)
And, almost ten years later, Marie Monimart, when examining the approaches of 42 projects realized in different countries in West Africa,

came to the conclusion that only seven per cent of the projects were specifically women-orientated and another seven per cent applied an integrated approach for both men and women although the aim of the projects was to fight desertification, a phenomenon that daily affects and aggravates women's lives (Monimart, 1989).

These observations confirm the figures published by Dankelman/Davidson (1988) who maintain that

> " Where women remain in subsistence agriculture their central position is usually ignored, even by development professionals. Thus training and agricultural extension programmes often fail to reach women. Of a study of 46 African countries it became clear that less than four per cent of extension workers who advise women are themselves women."

The women in Diatock (AJAC) on their way home from the paddy fields

Thus, notwithstanding the evidence that women should be the main target group of development projects, that is not the case. Women have traditionally been neglected and there are several reasons for this. First of all, most decision-makers, project designers and extension workers from industrial countries are men. Consequently, they attach

more importance to domains that, in their cultural environment, are associated with men, i.e. industrial development, high-tech agriculture and so on. Household improvements or ameliorated subsistence farming do not seem to be so urgent topics.
Secondly, when these people meet decision-makers in developing countries, they will in most cases encounter men and automatically suppose that these fully represent the interests of their community or country. Therefore they will be provided with the male version of development problems and if they are not extraordinarily interested, they will never get to know a woman's point of view. This is illuminated by the United Nations study previously mentioned which emphasizes that

> "...there is a consistent tendency to allocate resources to the advantage of men, leaving women behind in all aspects of development. Rural women must in the vast majority of cases continue to do their work without the assistance of education, training, and improved technolgy, the only significant change being that, with more surviving children, the workload becomes heavier and output tends to fall as competition for land and other scarce resources intensifies..." (Evaluation Study No. 3, 1980, p. 11).

Only during the last two decades have women in developing countries been the object of special consideration in the literature. But while most authors agree that women should be taken account of to a much greater extent, there are considerable differences concerning the approaches. Some maintain that there ought to be special programmes designed for women in order to promote their development, others advocate anz integrated approach in order to avoid the creation of social conflicts in the respective communities.
Also regarding the direction that developmental action for women should take, divergent opinions are expressed. On the one hand, financial independence is considered as a prerequisite for women's development and projects are suggested that aim at alleviating women's work burden to give them time to do more productive work than drawing water, collecting firewood and peeling rice or millet . "Productive work" in this context usually means income-generating activities or activities that lead to (more) income in the long run, like the attendance of alphabetization or handicraft courses. On the other hand, some authors stress that women's traditional activities are of great importance to their families and that it is just as productive to take care of the children's and husband's physical and psychological well-being

as to augment the household's or her own monetary income. From the latter point of view, development projects ought to aim at giving women the possibility to take care of their families and thereby provide the base for the development of their community (Hannan-Andersson, 1982).
This little survey shows that there exists widespread knowledge about women's situation in Third World countries, but possible solutions seem to remain in a more theoretical sphere and there is no general strategy for the promotion of women's development.

3.3 DEVELOPMENT PROJECTS AND TECHNOLOGY

Since the second World War development theory has undergone remarkable changes. Initially, a general belief that exporting technology and know-how from industrial to developing countries would accelerate the latters development (which was equal to growth) led to large development projects focusing on extensive infrastructure, industry and agriculture programs. However, the situation in many developing countries, especially in rural regions, remained virtually unchanged and in the 1970s development researchers, politicians and even development agencies began to understand that development cannot simply be transplanted. In spite of this, quite a few development projects still simply consist of technology export without know-how transfer and, when the developing agency leaves the country, the projects often deteriorate rapidly. Nevertheless, this kind of development projects is quite beneficial for the involved firms in the industrialized countries as they are able to sell a lot, often with guarantees from their governments to cover possible losses caused by their clients' payment difficulties. Those governments, too, are fond of these projects because they normally generate job opportunities at home and, finally, the governments in the developing countries also appreciate them because of the considerable prestige they bring with them.
Notwithstanding, a new type of development project has emerged since the 1970s.
These projects are often connected with notions like appropriate technology, participation and cultural fit. In the following we are going to illustrate what these concepts stand for and how they are linked.

3.3.1 Appropriate Technology and Cultural Fit

Given that one acknowledges that pure transfer of advanced technologies from industrialized to Third World countries in many cases has negative or no effects at all, appropriate technology seems to represent a viable alternative.
According to Marilyn Carr appropriate technologies

> "will not be as complex as those which have so far been transferred from the West. Nor will they be as unsophisticated as the traditional techniques which are currently employed by millions of people in Africa...
> In essence the technologies we are talking about are small, simple and cheap enough to harmonize with local human and material resources and lend themselves to widespread reproduction with the minimum of outside help." (Marilyn Carr in Marilee Karl, 1982, p. 85).

This definition implies that appropriate technology is technology adapted to the environmental and cultural conditions in a well defined context. A technology that works well in Nicaragua does not necessarily have to work well in Senegal.

Appropriate technology is "the technique most appropriate for a given place at a given time." (Marilee Karl, 1982 p. 85)

The general idea with this kind of technology is to enable its users to understand the technology and to utilize it autonomously, thereby encouraging local initiative and bottom-up development.
Therefore it has to be simple. A peasant farmer in Nigeria may be able to use a motorpump, but when it breaks down, she does not know how to repair it. Consequently, she will be forced to ask - and wait - for help and maybe her crop will already be destroyed when she finally finds somebody who knows how to repair it. If she had a simple hand pump, she could analyze the problem and carry out the necessary repair herself.
The technology must also be cheap. This is a necessary condition if the user's autonomy is an aim. "Cheap" in this context does not only mean that users do not have to pay much money for the technology but also that the material is easily available. Often technologies are introduced that demand long trips to the metropolis in order to buy spare parts and these journey cost money and time. Before introducing a technology one

should therefore take into consideration which materials are available in the nearest environment.
These materials can be natural ones like wood, clay, sand or plants which are to be found in many rural areas, but it can also be a question of materials that can be bought in the village or in the nearest small town.

When the user understands the technology and has the possiblity of maintaining it herself/himself (both financially and practically), it will be easier for her or him to incorporate it in everyday life and make it a part of her or his culture. Something that cannot be understood, cannot be controlled and will consequently remain a foreign object. There will not be any interest or knowledge to improve it and to regard it as a part of the user's know-how.

3.3.2 Indigenous Knowledge Systems

This leads us to the discussion where appropriate technology ought to come from. As pointed out above, the technology should, by definition, be adapted to the environment where it is going to be used. Thus, the most logical thing to do would be to use indigenous knowledge as a base for developing a new technology. As the utilization of the new technology is not an aim in itself, this should ideally be done in co-operation with the future users in order to learn about their needs and their resources, but also in order to encourage them to take their development into their own hands. Besides,

> "ideas borrowed from the people, and then developed and refined in the light of modern knowledge, have a far greater chance of being readily accepted than those imported from outside." (Dissanayake, 1988, p. 273)

However, even the promotion of appropriate technologies has its dark sides. Although

> "the philosophy behind aptech [appropriate technology] is that it should be almost entirely based on indigenous resources and indigenous innovative capability, generated by the developing countries themselves, there are indications that with respect to aptech the same kind of foreign dependency may grow up that is now rule in modtech" (Baghavan, 1978, p. 19).

This development, already recognizable in the 1970s, has continued. Firms in industrial countries have realized that there are large overseas markets for simple technologies and attempt, successfully, to develop and sell them. Unfortunately, the effect may be simple but not appropriate technologies like the solar ovens invented for African women that were never used because they did not function when the women prepared food - before sunrise and after sunset (Cited in Karl, 1982). And, even more important, these technologies are just as imported as the modern ones and accordingly do not encourage local initiative. Therefore, the concept of appropriate technology must be closely linked to the mode of its development and its diffusion. That is the reason why the concept of community participation goes hand in hand with the introduction of appropriate technology.

Moreover, firms that concentrate on exporting technologies, usually do not pay attention to the software aspects. They assume that appropriate technology means machines or tools and neglect the software which "consists of organizational know-how, information network, policies, institutions, management structures, tax structures, marketing structure etc." (Baghavan, 1978, p. 9).

This approach finally leads to the same problem as the diffusion of modern technlogies, namely that the users will not know how the technology they have received really functions and how it can be organizationally incorporated in their environment.

Another critical point, frequently mentioned not only by people in developing countries, is that the industrial countries want to impair development in the Third World by not diffusing their high-tech innovations. Instead they keep them on a level so low that they will never make up the industrial world's advantage and grow out of their dependence. Of course, this is not the original idea with appropriate technology even if the claim cannot be ignored. Appropriate technology is not supposed to be a substitute for existing or future growth of modern technology but a complement to it.

Baghavan (1978) cites in his critique of appropriate technology the case of countries like Brazil, Mexico and Nigeria which have shown themselves to be capable of building up large consumer-oriented modern industries and he claims that they will be able to satisfy their countries' needs in the long run. That was twelve years ago and though it is true that these countries have succeeded in expanding their industrial capacity, it is equally true that the majority of the people, especially in rural regions still do not benefit from these developments concentrated in some parts of the countries. Therefore there is no point in waiting until something happens. If people recognize the chance to improve their situation in

their immediate environment, they should take it.
Finally, it ought to be mentioned that the propagation of appropriate technology suffers from the same disadvantage as traditional development projects. It often is developed and diffused by men, and particularly when the community participation approach is not applied, women may be excluded even from this kind of development.

3.4 THE ORGANIZATIONAL FACTORS INFLUENCING THE OUTCOME OF DEVELOPMENT PROJECTS

The reflections presented in the preceding sections lead us to the conclusion that it is not sufficient to have a technology we judge to be apt for solving a problem which we have identified ourselves and to travel to some poor developing country to implement it, but that there is quite a number of organizational factors that are decisive for the successful implementation of a project.
Our starting point is the active participation by the beneficiaries of the programme. Many authors advocate for example community participation but it is seldom clear how, exactly, it is to be achieved. In this chapter, wé attempt to construct a frame that comprises the elements we consider to be essential if such a project is to succeed.
We strongly emphasize the organizational aspect which we estimate to be crucial for a satisfactory result. The same technology or know-how diffused in the same geographical area and in the same culture may yield completely different results when different organizational approaches are employed.
Per Lindskog explains in his book "Why poor children stay sick" (1989), that there are several reasons why a message conveyed by a development project may not be practised or comprehended. He enumerates the factors felt need, social and cultural norms and the resource situation. We contend that these essentially internal elements ought to be completed by organizational components, namely cultural fit of the project, choice of target group, staff, assessment of expected benefits, financial conditions, information, training and education as well as follow-up procedures. Figure 3.1 illustrates how these factors, in combination with the factors mentioned by Lindskog influence the outcome of a project.

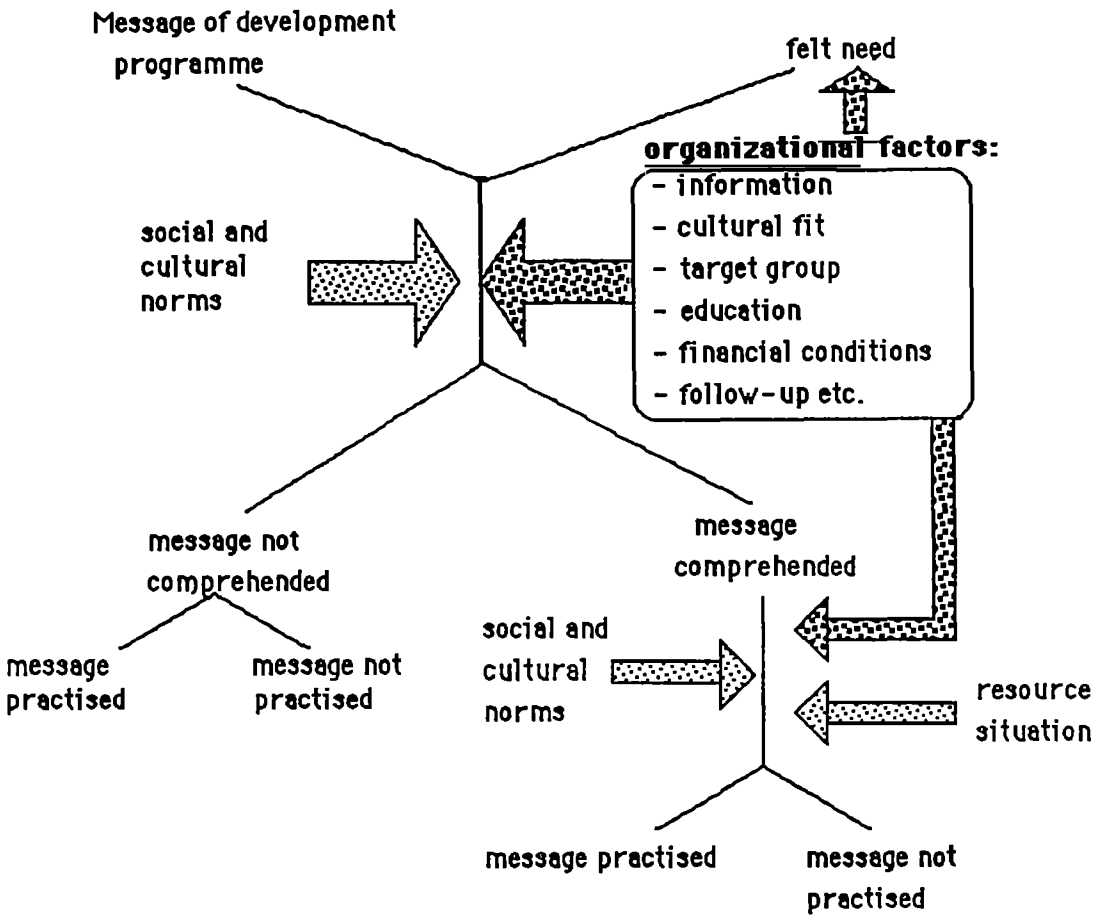

Figure 3.1: Factors influencing the outcome of a development project (Adapted from Per Lindskog, 1989)

The message of the project and the organizational factors are the components that are under the direct control of the designer of the project. The other factors can only be influenced and as will be seen, there exists an interdependence between all the factors mentioned. In the following the organizational factors and the reasons why they play a fundamental role for the outcome of a development project are discussed. However, even the concept of felt needs is dealt with because of its special importance for the design of the project.

3.4.1 Felt Needs

Development projects are designed to satisfy needs. However, there are virtually different perceptions concerning needs. Perceived needs in industrial countries are not necessarily the same as the needs perceived

in developing countries. It is obvious that people are more interested in projects that deal with their felt needs than in projects that may be very good for them but the necessity of which they cannot see.

> "The innovations of aptech groups arise from the desire to meet community needs. However, the needs that the community itself identifies are not often the same as those pinpointed by aptech groups. The latter succeed temporarily in imposing their views on the former because of their relatively strong financial, technical and status resources but once they depart the community rejects or neutralizes the innovation..." (Baghavan, 1978, p. 13).

Therefore it is primordial to design development projects that take into consideration the target groups' felt needs in order to ensure their motivation to participate in them. There are, of course, problems that may never be realized by people because there is no knowledge about them. For example, the link between polluted water and diarrhoeal diseases is not evident for many people since they are not familiar with the concept of bacteriological infections. Consequently, they will never express the need for better hygienic conditions. In such a case, education prior to the introduction of the project is of fundamental importance. It should aim at the sensitization of the target group and the programme ought not to be implemented until the prospective beneficiaries themselves comprehend why there exists a need for certain improvements.

> "The community has to be actively involved in reaching compatibility in the identification of needs. In this, know-why is more important than know-how and know-what." (Baghavan, 1978, p. 13).

Evidently, this procedure can take time but if durable changes are to be realized, it is important to create a thorough base and not to endanger the project's outcome by a precipitated start.

3.4.2 Cultural Fit

Often there are several possible solutions to one problem. The task of drawing water from a shallow well might for example be facilitated by the utilization of a handpump or a motor pump. Here, the decision is to

be made between two levels of technology. If the new device is to be accepted by the beneficiaries, it must be adapted to their culture, i.e. there must be a cultural fit.

In his article "Understanding the Role of the Environment in Knowledge Generation and Use..." Wimal Dissanayake (1988) emphasizes the centrality of culture. He distinguishes three factors which ought to be considered when attempting to diffuse knowledge and utilization of new technologies - the frame of reference, the legitimation of newly introduced knowledge and the networks utilized to diffuse and legitimize knowledge. According to him, every culture has a *frame of reference* on the basis of which new knowledge is interpreted. Both the frame of reference and the new knowledge may change during the interpretation process. Thus, it is necessary to adapt the new knowledge to the frame of reference or to stimulate a change of the latter in order to attain *legitimation*, the second factor evoked by Dissanayake.

Legitimation aims principally at the social acceptance of the new knowledge and not only at a technical explanation. In the view of achieving legitimation the *network* usually involved in the dessimination of information has to be considered and utilized because "knowledge when diffused through culturally accepted opinion leaders is more likely to gain a wider acceptance than when diffused through people who are less culturally esteemed, however educated and knowledgeable they may be in the field of knowledge under consideration".

When applying these reflections to the solution of the problem if a hand pump or a motor pump represents the most appropriate technology for a given community, we come to the conclusion that we first have to get to know that community's frame of reference (that may be altered by the subsequent discussions or not) before the decision can be made and we attempt to legitimize it by involving the existing network.

In this context the usage of indigenous knowledge systems plays a fundamental role. Indigenous knowledge systems are by definition a part of the culture's frame of reference. Therefore it appears to be easier to employ them as a basis for the improvements envisaged than technologies imported from other cultures, since acceptance barriers are probably much lower. If the new knowledge fits into the cultural context, local initiative and skills are promoted, too, and can lead to more autonomous development which ought to be the ultimate aim of development projects.

3.4.3 Staff

With the demand for the cultural fit of a project the question arises who should design and carry out a development programme. Obviously, it is quite unpractical if the project is planned from the desktop in another part of the world and implemented without any alterations which apparently often is the case[4].
In order to cast light on the complexity of just a single person's decision-making process the model employed by White, Bradley and White is of value:

> "The emphasis is on the user's individual perception of the situation, as distinct from its definition by scientist or government officials. The decision is based upon awareness of the range of alternatives and upon the value assigned to the likely outcome of choosing one rather than another. Each valuation is seen as representing a personal preference which is conditioned by the customary behaviour of the culture and encouraged or discouraged by whatever formal social action is taken by the society." (White, Bradley and White, 1972, p. 227).

This model makes clear that only somebody who knows the culture and the environment sufficiently well is able to predict and analyze people's behaviour and action. An adequate staff should therefore consist at least partly of responsible persons who are part of the culture or who know it extremely well. Their ability to comprehend the culture abstracted, they possibly also convey more confidence when dealing with the target group.

3.4.4 Target Groups

As we have already pointed out decision makers often act from an ethnocentric point of view and show a tendency to apply the same decision-making process in foreign cultures as in their own countries. Therefore it is of utmost importance to make special efforts to identify the prospective beneficiaries of a project. It has taken development managers a long time to recognize the crucial role women play for instance in a water context. As previously stated, 90 per cent of all water collection in Africa is carried out by women. Yet, until a few years ago water projects were essentially directed towards men. Since men usually are not involved in water collection for the household they do not

[4] Interview with Pascal Sambou, ENDA, 1990

really care about these projects which consequently do not function. Here again, the concept of felt need is important. Even if the felt need for the whole community has been identified, it is likewise necessary to identify the direct beneficiaries to be involved.
In many villages in Africa men who were asked if they felt a need to alleviate the burden of drawing water would probably give a negative answer because they, personally, do no perceive any need. Women, however, would probably react positively. It is thus necessary to carefully determine the potential target group that has a real interest in improving their situation.
Amit Bhaduri (1985, p. 108) cites an illustrating example from Senegal where technical experts trained men in rice transplanting, an activity that women generally are responsible for. "In the latter instance, instructors from East Asia taught the new techniques only to the men, who paid little attention because their wives were the cultivators. The women therefore continued to use the old techniques."
It should also be examined if the group identified can be the only target of the programme. In some cases, social life in the community might be disturbed if one group was preferred to another. Projects specifically designed for women may be accepted in some societies, but in others an integrated development approach might be more suitable if it shall be made possible for women to participate in the programme.

3.4.5 Information - Sensitization and Influence

If the target group is to participate actively in the project, it is important to take into consideration that the programme concerns the group's own development. Therefore, obviously, it is crucial to inform the group or their representatives about every aspect of the project.
The aim of minute and continuous information is to sensitize the participants prior to the actual implementation of the project and to give them the possibility to influence it.
Sensitization may be necessary if the future project concerns a change they do not perceive as important (see 3.1). If the project is implemented without the participants' embracing the goal, they are hardly going to be motivated. This may result in weak participation and, if it comes to the worst, sabotage of the project. Therefore sensitization cannot be finished before the prospective beneficiaries have understood and accepted the project.
Further, information aims at making it possible for the target group to influence the programme. If people are to take their development into

their own hands, they must have the right to decide themselves how to change their situation. Under the condition that they are involved from the beginning, they can make clear what is acceptable for them and contribute with their own ideas and knowledge. Thus, the project comes to be theirs and not the development organization's. Continuous discussions permit a certain flexibility of the project according to the participants' propositions.

3.4.6 Education and Training

An essential prerequisite for the long-run impact of a programme is the transfer of know-how to its beneficiaries. Otherwise the project will either die when the project staff leaves the community or it will only survive with continuous external help, i.e. never reach autonomy. On that account, education and training programmes are of vital importance for the project's success. On the condition that the technology chosen has been adapted to the local environment and the ben there should not be any major obstacles to diffuse the knowledge. It does not seem very practical to make specifications regarding the design of such training programmes since they depend, to a much higher degree than the other factors hitherto mentioned, on a specific situation, but generally relevant factors seem to be duration, choice of the teaching staff, choice of trainees, creation of the right atmosphere and refresher courses. It can be positive to organize visits to other groups that already have participated in a similar project and let people learn from each other.

3.4.7 Follow-up

It is probably tempting to neglect follow-up procedures, otherwise it is hard to explain why there exist relatively few project evaluations compared to the vast number of development projects. It seems, that once a project is finished, it is abandoned because the next one is waiting. Follow-up procedures are vital, however, because projects cannot simply be expected to run by themselves. Sometimes old traditions are stronger than the knowledge newly acquired and people just return to them when the project staff leaves the place or unforeseen complications arise that the community cannot cope with on their own. Consequently, observation is necessary even after the implementation of the project.

There exist different follow-up procedures, for example continuous,

subsequently diminishing or periodical visits[5].
In many cases refresher and/or continuation courses may be recommendable for the participants of the project, especially when the programme integrates different projects that depend on each other. But follow-up may equally imply an evaluation study aiming at the improvement of projects to come.

3.4.8 Financial Conditions

It is rather obvious that a project envisaging to help people cannot reach its objective if the costs linked to its implementation surpass the target group's financial means. Consequently, prospective benefiaries cannot be expected to pay an entire project if this results in making them even poorer than they already are. On the other hand, a contribution to the project has not to be excluded. From a psychological point of view, the beneficiaries may be more motivated to preserve the material and the resulting products when they are able to estimate their value and when they themselves have made a sacrifice for them. People also preserve their self-respect when they do not have to accept gifts.
Yet, it is an open question if financial or non-financial contributions are preferable. In some cultures the active participation in the project, for instance construction of a school building, digging of wells, preparation of food, may be regarded as sufficient while in others only financial contributions convey the value of the programme. This is closely linked to the employment rate, to the season of the year when the project is carried out (e.g. dry season or harvesting time) and to the degree to which barter respectively money economy is prevalent in the region concerned.

3.4.9 Assessment of the Expected Benefits

Sometimes development projects seem to have predominantly positive effects. This depends however on who carries out the (feasibility) study. For instance, economists usually emphasize economic benefits but neglect social, environmental and health impacts. These, in spite of not being completely measurable in monetary terms, may nevertheless be substantial to such an extent that the economic benefits are not perceived as satisfying.
There likewise exist severe difficulties in comparing the opportunity

[5] Pascal Sambou, ENDA, 1990

costs for the beneficiaries in relation to the monetary benefits. Consequently, possible benefits and costs of various kinds must be assessed in advance if problems due to the target group's motivation are to be avoided.

3.4.10 Concluding Remarks

As pointed out in the beginning of this chapter, we maintain that consideration for the organizational factors mentioned above represents an essential prerequisite for a successful project. Of course, even other factors can, according to the particular project, be of importance. Since the factors described are strongly interdependent we contend, however, that neglect of one or several of them certainly exercises a negative influence on the outcome of a development project.

3.5 THE EFFECTS OF RURAL WATER SUPPLY PROJECTS

3.5.1 The Domestic Use of Water

According to White, Bradley and White (1972) the domestic use of water can be divided into three levels. Firstly, the consumption of a certain quantity of water is imperative for a human being's survival. Without the daily amount of between two to four litres a day human life generally is not possible. Secondly, water is essential for hygienic purposes. A person drinking adequately but not having sufficiently clean or enough water to take care of his hygiene will certainly suffer from impaired health. Thirdly, water can be used for "amenities" like bathing, toilet flushing, washing of clothes etc. In agricultural communities even irrigation of vegetable gardens and watering of livestock frequently belong to household activities. Accordingly, we consider the utilization of water for such purposes in the following as domestic use of water.

3.5.2 Domestic Water Supply Projects

There are innumerable types of domestic water supply projects and at the first glance they may seem rather different from each other since technologies and materials used as well as the size and the cost of such projects vary considerably.
In order to facilitate the categorization, White, Bradley and White suggest a division of water supply projects into six classes which is

based on the "quality of service provided and the social organization needed to carry out the enterprise" (1972, p 11).
Figure 3.2 illustrates the different types of water improvements

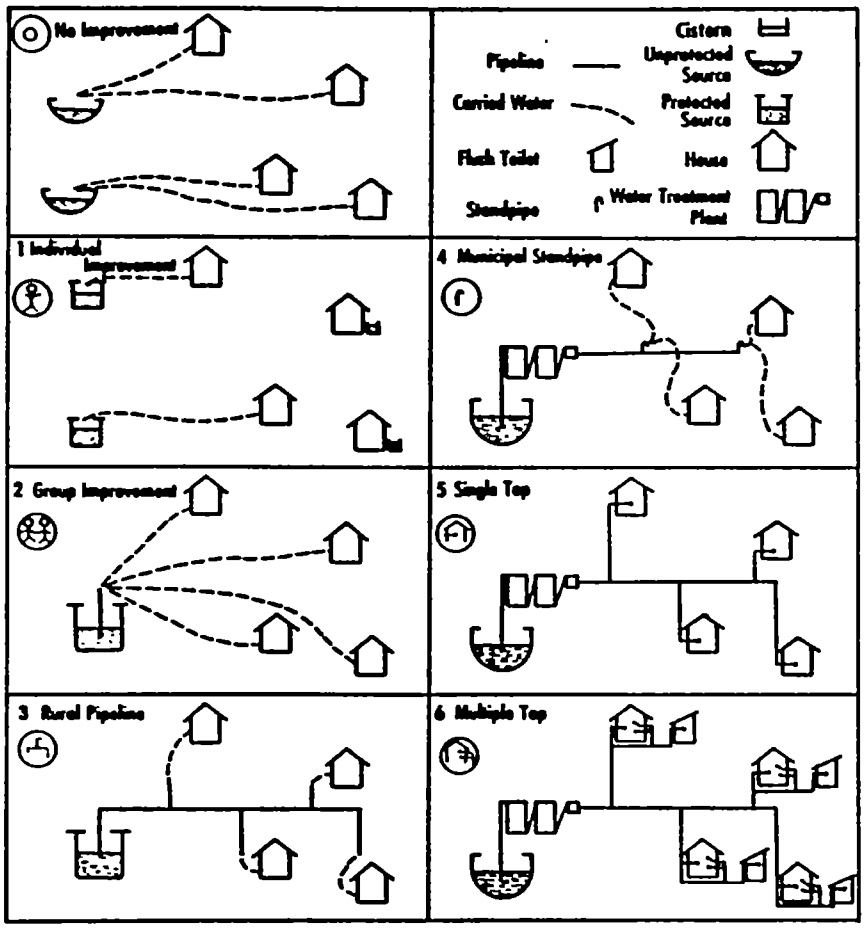

Figure 3.2 Water Improvements (Source: White, Bradley and White, 1972)

Class 1 comprises the most simple improvements that are carried out by a single household for its own utilization as for instance individual rain collection or well protection. Class 2 and 3 also concern individual supplies, but they are jointly managed. While the techniques used in class 2 are simpler (spring, well, rain collection, hand pumps), class 3 improvements provide the beneficiaries with piped distribution to taps and standpipes.
Classes 4 to 6 contain more complex systems making use of water treatment plants before the water is piped to standpipes (class 4), directly to a single tap in the household (class 5) or to multiple taps in the households (class 6). In categories 4 and 5 the systems generally do not offer sewers which is the case for class 6 systems.

Given the variety of water supply systems, it is evident that they present different sets of goals. Notwithstanding, several impacts that, to varying degrees, are common for all water supply projects can be distinguished. These concern health, economic, social, environmental and cultural conditions.

We intend to concentrate on the socio-economic impacts, even though we are conscious of the fact that there exist interdependences between the possible effects mentioned which cannot be entirely ignored. Furthermore, economic changes might be studied from a macroeconomic and a microeconomic point of view. As we deal with small-scale projects we consider the macroeconomic aspects to be of minor importance and accordingly the focus of the study lies on microeconomic consequences, i.e. the projects' social and economic influence on daily life in the local environment.

3.5.3 Economic and Social Effects of Domestic Water Supply Projects

As will be seen in the subsequent discussion, the expectations concerning the number and intensity of possible impacts attributed to water supply projects are enormous.
In the literature, however, critical voices contend that the importance of water projects ought not to be overestimated. Hannan- Andersson maintains that

> "integrated rural development efforts are required which simultaneously tackle the other local problems. Otherwise no dramatic impact on the lifestyle of the people can be expected. The water development programme in isolation from other supportive economic measures can only be regarded as 'development input which should be of minor consequence to the basic structure of the lives of the people' (Kabada,1978)". (Hannan-Andersson, 1982, p.35).

On the other hand, Hannan-Andersson admits "that although water by itself is unlikely to have a significant development effect, 'its absence will prevent, or at least greatly hinder development'(World Bank, 1979)". (Hannan-Andersson, 1982, p. 35).

Positive Effects

Economic Benefits

Increased Productivity due to Improved Health

As a rule, domestic water supply projects aim at the improvement of public health. On the one hand, health benefits are supposed to be achieved by providing people with *water of better quality* and on the other hand by alleviating the task of drawing water.

It is widely known that many diseases are transmitted by polluted water. In order to avoid these waterborne diseases the target of water supply projects is to improve the quality of the water. That may be done by well improvements, introduction of hand pumps or the construction of public standpipes.
However, these measures do not necessarily have to be sufficient. There exists a significant relation not only between the quality of water and health but also between the quantity of water used and health. Even if the water is acceptable from a bacteriological point of view, people's habits related to hygiene are an important factor because only for adequate personal hygiene at least 10 litres of water per day are required (Drangert/Lundquist, 1989). Therefore it is not enough to provide women with technical devices but hygiene education is imperative if any health improvements are to be realized.

The introduction of new and better techniques permits people to save energy when drawing water. It is for instance less strenuous to draw water with the help of a pump than by using a cord and a bucket. That is the reason why the *alleviation of the work burden* is expected to have a possible impact on physical well-being.

In the case that ameliorated water and alleviated work burden lead to improved health, one of the desired indirect effects of the programme is *increased productivity* respectively output. As morbidity and mortality rates fall, it is presumed that people work more and more productively. Except for the difficulties the evaluation of these effects represents, there are some authors who remind of the fact, that, economically speaking, in regions characterized by chronical underemployment, even improved health cannot lead to higher output (Saunders and Warford, 1976). Thus it is not certain that the expected consequences of improved health in an economical context will appear.

Gains in time by the introduction of new techniques

Another commonly cited objective of water supply projects are the gains in time that can be attained. Irrespective of the improved health conditions mentioned above that increase productivity the utilization of new techniques in itself is supposed to help people save time.The time saved shall ideally be employed for more productive activities than drawing water. In this context, we refer to the discussion about women's productive and non-productive activities in Chapter 3.2.
It is not sure, though, that women want to replace one work burden by another. Instead, they may prefer to give themselves a little rest and regain their forces for all the other tasks they have to carry out.
Eventually, of course, even this may have economic implications if the women's health improves due to more spare time and their productivity increases.
Otherwise, the following income-generating activities can be imagined:

INCOME-GENERATING ACTIVITIES

- Market-gardening
  For the cultivation of vegetables and fruits considerable quantities of water are necessary. That is the reason why gardening is not practised if water sources are too far away or if it is very time consuming and strenuous to draw water.

Women in Bissine (AJAC) drawing water for market-gardening

An improvement of these conditions allows villagers to earn money by growingvegetables not only for private consumption but also for sale.

- Arboriculture
  Easy access to water also permits the irrigation of tree plantations, the products of which can be sold.

- Local Animal Husbandry
  Furthermore, in arid areas or in regions with at least one very dry season, the access to watering troughs the year round allows local animal husbandry. Both the cattle and the by-products (milk, butter, manure) can be sold.

- Other income generating activities made possible by the facilitated access to larger quantities of water are beer brewing, production of palm oil and dyeing of cloth for commercial purposes.

KNOW-HOW
On the condition that the programme provides the target group with know-how that people can apply actively (for example the manufacturing of simple hand pumps or the improvement of traditional wells), these skills might be used to generate income by diffusing their products to other communities.

Moreover, it should be pointed out that some of the new activities mentioned may have SUBSTITUTE EFFECTS and provide the participants of the project with products that they otherwise would have to buy with the money they earn by their traditional activities. This if often the case for vegetables and cloth.

In the long run, it is usually hoped that the short-run effects lead to generally augmented economic activity in the community.

Social Benefits

Gains in time may not solely offer economic but also social opportunities. As mentioned before, a project may provide the beneficiaries with more time for social life. The women might prefer to spend the time saved with their families and friends.
An imaginable impact relates to the social structure in the community. A programme actively involving and favouring the promotion of women,

may have a direct effect on their status in the village.
Women might benefit as a group or individually. By demonstrating that women, too, are capable of taking decisions, understanding and utilizing new technologies and organizing themselves, the project might influence the power relations between men and women in the community.
In a broader perspective, the creation of infrastructure, as simple as it may be, could possibly inspire people with hope and retain the rural exodus so often experienced in many developing countries.

Negative Effects

Economic Costs

Given that rural environments in developing countries are characterized by their poverty, the implementation of a water project may imply considerable costs for the community .
Supposing that the project demands financial contribution of the participants, the expenses might distinctly exceed the benefits.
Both the costs for education and training and for the maintenance of the system must be taken into account. In an already poor milieu too high costs can have severe consequences. One example is the introduction of motorpumps in rural areas. The cost of a motorpump may several times surpass the yearly amount of money earned by a whole village. Supposing that the villagers have to pay the pump, it is obvious that it will take them years to pay the instalments. Moreover, they will be forced to buy diesel if the pump is to function. In societies where monetary income is very low such obligations overtax people's means and may lead to further impoverishment.

Contributions made by the participants may also be non-financial. Depending on the design, they carry out the project themselves or they provide the work force (digging of wells, construction of basins for water collection...). In this case, the increased work burden, especially for women who often merely do the unskilled work and consequently do not gain any knowledge of future value, is both of economic and social interest. They may have to neglect other economic activities and lose income. Here the concept of opportunity cost is of interest.

Social Costs

If the programme is designed to alleviate women's work burden, it would not reach its aim, if it required supplementary work thereby preventing them from taking care of their families and children. There may also be other social costs in the form of impaired social life. It has been shown that the implementation of piped water was not appreciated by village women because they lost their communication point - the well.

As regards the impact on the social structure in the community, even negative developments might take place. Bhagavan (1979, p. 10) cites the following example:

> "A French team installed a solar water tap in a village in a North African country, to provide clean drinking water free of charge to everyone in the village. [...] But as soon as the French team left, the two richest villagers occupied the pump and began to sell water to the rest of the inhabitants [...]."

Thus, the social hierarchy was even reinforced and those who already had the power ameliorated their position to the detriment of the other villagers although this certainly was not the aim of the project. Social effects are particularly difficult to assert in advance and often neglected although possible implications should be studied carefully before the implementation of the project - even if it takes time.

3.6 SUMMARY

The preceding chapter shows that it cannot be our aim to make a traditional cost-benefit-analysis of the pump projects since it would not give an overall picture of the role the projects play in the communities. In addition to the financial impacts, we have to assess social and health effects before we attempt an aggregation of the results which evidently cannot be restricted to purely monetary terms.

4 METHODOLOGY

4.1 PROCEDURE

This study is based on formal and informal interviews, written sources and on observations.

4.1.1 Preparations

The chief part of the study was conducted during two months in Senegal. After a preparatory phase in Sweden respectively France, which we used to acquire a theoretical base by investigating relevant literature and discussing with people initiated in the subject, we left for Dakar.
There we received an introduction to AFOTEC's actitivities in general and the pump projects "La Malienne" in particular.
Using the information gathered till then, we elaborated the questionnaire that was going to be the guideline for the subsequent field study. It turned out to be well applicable so that merely minor adjustments had to be made after the first interviews. Appendix A shows the questionnaire in its final shape.

4.1.2 Design of the Field Study

AFOTEC had implemented the projects in collaboration with two peasant organizations in Casamance in southern Senegal, the AJAC and the Entente de Diouloulou (ED) (see Chapter 2).
The AJAC had been provided with 34 pumps spread over 25 villages and the ED with 28 pumps dispersed in twelve villages. At the time for the evaluation the ED consisted only of seven villages, so we decided to study all of them as well as the major part of the concerned villages in the AJAC, namely fourteen, six in the region of Kolda and eight in the region of Ziguinchor.
Since we did not know the region (road conditions, distances between the villages) and detailed information was not available, we left the selection of the villages to AFOTEC's responsible for the pump programme. Our demand was an even distribution of the villages regarding size, ethnics, the utilization of the pumps for drinking water and/or for market-gardening, and probability that the pumps functioned.

The villages were visited during a four-week period. Before entering the

respective regions, we met the leaders of the AJAC Kolda and Ziguinchor as well as the President of the ED in order to discuss the purpose of the evaluation and to learn their points of view concerning La Malienne.

4.1.3 Visits

Due to our lacking knowledge of Diola, Manding, Peul etc. we were constrained to employ interpreters who simultaneously assumed the role as our indispensable guides.
We travelled by van and generally spent one night in each village. Most of the time, we arrived in the early afternoon and were introduced to the president of the community group and to the pump attendant.

Our aim was to talk with the women concerned by the project.
Interviews may be realized individually or in groups. We are conscious of the fact that individual interviews may give a more detailed picture but they are very time consuming so that in community groups with e.g. 50 members only a negligible number of women could have been interviewed.
Therefore, we chose to make group interviews with as many female group members as possible. The female president of the group convoked the other members and the women themselves set the time for the interview. We estimated that this procedure would result in a higher participation rate than if we determined the time ourselves.
The interviews were conducted according to the questionnaire. As previously mentioned, they were translated by our interpreters, in four cases by villagers. Just twice a female member of a community group participated in the translation. The interviews took between one to three hours.
Except for the official interviews we tried to have as many informal discussions as possible.

4.1.4 Termination

After the tour in the villages we presented the results for the leaders of the three organizations involved and had summarizing discussions.

Having returned to Dakar, we collected some complementary data, among other things we payed several visits to ENDA, a Senegalese non-governmental organization professing the same aims and methods as AFOTEC.
Back in Sweden, we proceeded to the evaluation of our material.

4.2 CRITIQUE OF THE METHODOLOGY

Without doubt, our method can be questioned on several points.

4.2.1 Selection

As a consequence of our limited time resources and financial means, we determined to base the selection among the villages to be visited on the previously mentioned practical requirements. A random choice was consequently not made and we do not exactly know to which extent this fact has biased our study.
Concerning the ED, special complications arise. As described in the presentation of the ED, the composition of the member villages varied during the implementation of the project. Although we examined 100 per cent of the present member villages, these merely represent 58 per cent of the beneficiaries of the pump project. Since one of the villages studied joined the ED only after the first training session, the organizational framework of the project varies slightly for this village. However, as the results obtained both in the AJAC and in the ED region are largely consistent, we do not suppose the bias to be significant.

4.2.2 Interviews

It is evident that the language barrier was a problem implying far-reaching consequences. Firstly, we could not communicate directly with the women and build up an atmosphere of confidence. Secondly, we were dependent on our male interpreters, which may have affected the results of the interviews. The favourable fact that we as women conducted the study, may have been counterbalanced by their being men. Furthermore, they had both been involved in the women's training sessions - one of them had actually been an instructor during and is still responsible for the AJAC Kolda and the other one had accompanied the ED women to Mali. Although the interpreters certainly did not want to bias the interviews, we cannot be sure that the women answered frankly

in their presence. Another problem was that we, on the one hand, were accompanyied by our interpreters and, on the other hand, were sent by AFOTEC. This made it difficult for us to emphasize our status as independent observers. This and the fact that we were white and foreigners may have impaired the interviewees' openness.

The interview conditions were also adversely affected by the women's fatigue. We arrived during the rice harvest and the women spent all day working in the paddy-fields. In the ED where they had been informed of our arrival well in advance, the women had calculated to take some time off during the day so that the interviews could take place in the afternoons or in the morning. AFOTEC had however failed to inform the AJAC early enough so that our arrival in the villages always was a surprise. Consequently, the women were not able to take time off until late at night. After the long working day in the paddy-fields and the household their fatigue was considerable and often women fell asleep during the interviews.

Some possible misstatements have to be taken into account.

For example the question regarding financial benefits of the projects encountered several obstacles.

First of all, the women's benefits drop in successively and, most of the women being illiterate, they usually do not keep books. As the money often is spent as soon as it is earned, it is difficult for the women to account for their yearly benefits. Moreover, their hesitation to declare their exact earnings may be due to cultural norms. There exists a belief that if one states for example one's income or the number of one's children, these might be lost.

Since the women often presumed that we had links to other development organizations and could find funds for new projects they also had an interest in making their benefits appear lower than they actually were. Some thought that if they were to "rich" they would not get another project.

Furthermore, we were not able to prevent male villagers from being present during the interviews and the women perhaps wanted to keep their income secret in order not to be contrained to leave it to their husbands.

The husbands' presence may also have influenced the women's answers to the question if the project had had an impact on their social position in the village respectively what their husbands' reactions towards the project were.

4.2.3 The Study's Reliability and Validity

The factors mentioned above may cast doubt on the results obtained by our study. However, as we have employed a multimethodological approach, i.e. we conducted both formal and informal interviews, compared these with our own observations and the material collected during the preparatory phase, we are of the opinion that we got an adequate general view over the projects' impacts and sufficient material for the analysis. Therefore, we contend that the study presents an acceptable reliability.
We also consider the study's validity to be satisfying as we conducted prepared interviews and used all opportunities to collect supplementary data during the work in order to be able to augment the evaluation's accuracy.

5 RESULTS OF THE FIELD STUDY

As a rough base for the outline of this chapter we use our questionnaire (see Appendix A). After some prefatory background data we present the results relating to the economic, social and health impacts due to the utilization of La Malienne. That section is followed by the data obtained concerning the training sessions and we conlude the chapter with a presentation of the effects of the projects as a whole.

5.1 BACKGROUND DATA

5.1.1 Number of Villages Visited[6]

Table 5.1 Participating villages

	Number of villages participating in the project	Villages visited	
		number	in %
ED	12*	7	58
AJAC	25	14	56

* At the time of the study only seven villages remained in the ED. Therefore the percentage of ED villages covered actually amounted to 100 per cent.

5.1.2 Ethnic Groups[6]

All community groups visited in the ED were Diola. Even ten of the community groups in the AJAC were Diola, two were Peul and one was Manding. One group consisted of Manding and Balant.

[6] For more detailed information see Appendix C

5.1.3 Female Participation[7]

Table 5.2 Female participation in the community groups and in the interviews

	Average number of female group members in per cent	Average number of female group members present at the interviews in per cent
ED	59	34
AJAC	58	46

Women obviously are more engaged in the community groups than men. However, we do not have any data concerning the number of women living in each village compared to the number of men. Due to traditions and the muslim religion prevailing in the region, men are allowed to have several wives. We had the impression that the number of women in the villages considerably exceeded the number of men.

The *participation rate* during the interviews was satisfactory although quite irregular. Some women arrived late, others left earlier. This behaviour occured more frequently in the ED than in the AJAC. Therefore, and since the participation rate oscillated between 7 and 92 per cent, the average participation rate presented in Table 5.2 is actually a very weak measure.
Besides, there were seldom more than five women participating actively in the discussion. This was due to an internal hierarchy among the women which entitled principally the president of the community group, elder women and the pump attendant to represent the group's opinions in public. Consequently, even a high percentage of women present normally did not lead to more active participation.

As regards *the trained women* in the ED, all of them still exercised their function as pump attendants and in each village at least one was present and could be interviewed.
In all but five AJAC villages the pump attendants were present and participated in the interviews. One pump attendant had deceased a few months earlier and two others had left for trips and never returned. None of these pump attendants had been replaced. The other two pump

[7] For more detailed information see Appendix C

attendants could not participate because they had travelled to other villages at the time. In the four AJAC villages where the pump still functioned, the pump attendants still lived in the village.

5.1.4 Age of the Pump Attendants

As the training session in the two associations took place at different points of time, we compare the average *age of the pump attendants* at the time for their education. Normally the women did not know their age but they often sent someone to fetch their identity cards. In other cases group members estimated their age.
At the time for the training session the pump attendants in the ED were on average 32 years old, compared to an average age of 35 in the AJAC. It is worth observing that in five of the six ED villages that participated in the first training session in Mali at least one trainee was under 27. The reason why older women may be preferred to younger ones is that their age traditionally implies the privilege to represent the group and to travel. Accordingly, a woman aged about 40 years who is considered to be quite old and respectable has more chances to be sent to a training session than a 20-year-old who, however, might be more susceptible to new things.
In this context it is interesting to note that in Diafilon (AJAC) the woman who because of her age had been assigned the responsibility for the pump had sent a younger woman to the training session as her delegate.

5.1.5 Number of Pumps in the Villages

In the AJAC, each village had been provided with one pump. The ED villages, however, generally own at least two pumps, as described in Chapter 2.[8]

[8] For more detailed information see Appendix C

5.1.6 Condition of the Pumps

Table 5.3 Condition of the pumps

	number of pumps			
	ED		AJAC	
	number	%	number	%
in working order	14	74	4	29
broken	5	26	10	71
total	19	100	14	100

Table 5.3 clearly demonstrates the difference between the ED and the AJAC. Compared to the ED where 14 out of 19 pumps were in working order, in the AJAC only 4 pumps out of 14 were in good condition. It has also to be taken into account that all pumps had been checked respectively repaired during the refresher course organised by AFOTEC and the AJAC in May 1988. Thus, they must have been in good condition just one and a half years earlier, i.e. some of the pumps had not even worked for more than a few months.

In the ED, at least one pump functioned in each village. However, since most of the pumps are used for market-gardening and the season had not yet started when we arrived, not all pumps had been installed. Accordingly, we were not able to verify the statements made by the villagers in all cases.

The probability that the broken pumps were going to be repaired in time for the market-gardening season varied from village to village. In the ED, three pumps had fallen into the wells where they had been installed when these caved in. In Diounoungué, one pump had been broken for a year but as the community group's well was too small for four pumps, they had not bothered to repair it. In Kabiline, one pump was used in the village and constantly broke down due to a special construction of the pump necessary because of the depth of the well. The women planned to repair it as soon as the rice harvest was finished and they had time. Consequently, it can be estimated that 15 out of 19 ED pumps were regularly utilized.

As to the AJAC, three of the ten broken pumps could not be repaired because the pump attendant no longer lived in the village. Furthermore, in Kataba the women had decided not to repair the pump anymore, as will be explained in more detail later on. In Médina Koundié, the pump attendant did not know where to find the material for the repair and in Kongoly, she did not know how to repair the current damage.

Thus, for four of the ten damaged pumps a repair could be imaginable

prior to the approaching market-gardening season, but if taking into consideration the general attitude towards the project, we strongly doubt that this came true in all the four villages.

5.1.7 Relation between Ethnic Groups and Condition of the Pumps

In the ED, all the villages were Diola and 74 per cent of the pumps functioned. In the ten Diola community groups in the AJAC two pumps (=20 %) were in working order. The other pumps in good condition were found in a Peul respectively in a Manding group.

5.1.8 Range of Uses

Table 5.4 shows what the pumps are used for. One pump may be utilized for several purposes. Hence the numbers stated exceed the actual numbers of pumps.

Table 5.4 Range of uses

Use for:	Number of pumps	
	ED	AJAC
market-gardening	18	13
drinking water	2	7
other	1	5

It is evident that the prevailing use is for market-gardening. Only in the ED one pump was exclusively meant for drinking water, otherwise the intended use in both the AJAC and the ED either was restricted to market-gardening (AJAC 5, ED 16 pumps) or a combination of several activities.[9]

[9] An exception is the village of Mangacounda (AJAC) where the purpose of use shifted repeatedly. In this village the pump had been intended for market-gardening. However, the garden did not belong to the community group and after some time they were not allowed to use it anymore. Not knowing what to do with the pump, they installed it in the well belonging to the pump attendant's husband where it was employed for the neighbourhood's drinking water. Yet, the woman travelled to another village for the funeral of her divorced husband. As she did not return, the villagers assume that she was forced to stay there with the son of her first marriage. - After a

These could be, in order of frequency, drinking water, washing clothes, production of palm-oil, preparation of food, animal husbandry and construction of houses.
As regards the AJAC, the range of uses indicated must be described as largely theoretical since just such a small number of the pumps functioned.

5.1.9 Users

In the villages where the pump has been installed exclusively for market-gardening, non-members of the community group generally do not have access to it. As soon as other purposes are involved, the whole village, the neighbourhood or as in one case even another village are allowed to draw water. Table 5.5 shows to which extent such spill-over effects could be observed.

Table 5.5 The users of the pumps

	Number of pumps	
Users:	ED	AJAC
only group members	15	7
village	4	4
other constel-lations	0	3
total	19	14

Since the range of uses in the AJAC varied more than in the ED it is not surprising that more people have access to the pump than in the ED villages.

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while, the pump in Mangacounda broke and nobody was capable of repairing it. When we arrived, it had been dismantled and was inhabited by frogs.

5.2 IMPACTS DUE TO THE PUMP

5.2.1 Drawing Water

In a world where people live without watches, it is difficult to obtain exact answers regarding how long time an activity takes. Because of our restricted time schedule and the static nature of this study we have to content ourselves with the estimates made by the villagers.
Without the pump, the women in the ED generally spend between 2 and 5 hours a day on market-gardening. The usage of the pump reduces the time demanded to between 1,5 and 3,5 hours[10]. On average they need about 30 per cent less time when making use of La Malienne. In the AJAC, the corresponding figures are between 1 to 8 hours without the pump and 1 to 6 hours with the pump respectively a gain between 0 and 200 per cent.

The pump attendant in Sédhiou (AJAC) demonstrating La Malienne

[10] For more details see Appendix C

These figures may seem astonishing but there are some plausible explications. First of all, some women merely counted the time effectively spent by drawing the water out of the well once it was their turn. In this case, of course, it is probable that they fill their container four times faster by means of a technical device than if they are forced to use a cord and a bucket. Other women, however, pointed out that when the pump is installed only one women at a time can pump. The others have to queue or draw water in the traditional way. They counted therefore the time spent on market-gardening as a whole. Hence, the factors to be taken into account when assessing the time gains made possible due to the utilization of the pump are the size of the community group - the fewer (female) members there are, the shorter the queue - and, of course, the number of pumps installed.
Second, the time employed obviously depends on the size and the amount of the garden plots. If the garden is very big the irrigation may take quite a long time. We agree however that eight hours a day seem to be very much for market gardening, especially if one considers all the other chores the women have to cope with.
The data obtained permit us to establish that the gain of time which might be possible if just taking into account the physical data of La Malienne have not been achieved. As mentioned in Chapter 2, the pump allows to draw water eight times faster than the traditional system. Of course, since the installation of the pump generally went hand in hand with an augmentation of the market-gardening activities, thereby increasing the work load in the gardens, it is difficult to assess the actual gain of time.
But one reason why the performance of the pump does not meet the expectations presented in Chapter 2 is that, as pointed out above, the women have to queue before they can use the pump and consequently lose some of the time spared by being able to draw the water faster when their turn finally arrives. Besides, especially some older women perceive La Malienne as heavy as the traditional way of drawing water and do not notice any gains of time at all. Consequently, the gains made by using the pump do not appear to be as significant as claimed by AFOTEC even if they are not negligible.

5.2.2 Health

Although not all the women (Sédhiou and Kongoly, AJAC) experienced a reduced burden when using La Malienne instead of a bucket, the vast majority reported that their health had ameliorated when the pump

functioned.
The table below illustrates in how many villages the following improvements were mentioned.

Table 5.6 Health improvements

Improvements mentioned	Number of villages ED	AJAC
"the whole body" (including muscles, exhaustion)	6 (41%)	6 (21%)
breast (cough)	3 (18%)	9 (32%)
shoulders	4 (24%)	3 (11%)
back	2 (12%)	4 (14%)
diarrhoea (no health projects involved)	-	4 (14%)
diarrhoea (health projects involved)	1 (6%)	1 (4%)
feet (cord)	-	1 (4%)

This table makes clear that certain health benefits can be attributed to the utilization of the pump. The picture is largely the same in both associations. But in both the AJAC and the ED the women remarked that one of their major problemes remained the transportation of the water which they still had to carry on their heads.

5.2.3 Activities

According to the women, two factors due to the utilization of La Malienne have resulted in an augmentation of their activities, the time spared and ameliorated health. The health improvement originated from the improved technique on the one hand and from the occasional possibility of resting on the other hand. Thus, "rest" may be both an activity and a prerequisite for other activities. In the following, rest is regarded as an activity and we distinguish rest, income-generating activities and activities related to household chores and social life.

Rest

In about half of the villages the women in both associations stated that they allowed themselves some rest, although to quite a limited extent. Table 5.7 presents their answers.

Table 5.7 Rest

	Number of villages	
	ED	AJAC*
some rest	5	6
no rest	1	4
no answer	1	3

*Without Kataba where the pump in principle never functioned

Income-generating Activities

The project being orientated towards market-gardening, it is not surprising that this activity predominates in all villages. It is more remarkable that in the ED, where virtually all pumps functioned, merely one village (Kabiline) is engaged in additional income-generating activities while almost all AJAC villages added several other occupations.
Always having in mind that most of the pumps in the AJAC did not function, we carefully draw the conclusion that the extension of these activities can only be partly contributed to the installation of La Malienne. On the other hand, the answers show that the women have a large potential and many ideas as regards the utilization of there time - as well as a great desire to earn money.
In Table 5.8 we present in how many villages the women mentioned certain income-generating activities.

Table 5.8 Income-generating activities

ED

activities mentioned	number of villages
market-gardening	7
palm-oil production	1
knitting	1
sewing	1

AJAC

activities mentioned	number of villages
market-gardening	14
palm-oil production	6
soap production	5
individual garden	4
salt extraction	3
dyeing	3
others*	5

* Other activities mentioned were extension of the paddy or millet fields, trading, production of lemon marmelade and conservation of fish.

Activities Related to Household Chores and Social Life

As regards other than income-generating activities Table 5.9 reveals that the women in the ED put much more emphasis on these than the AJAC women.

Table 5.9 Activities related to household chores and social life

ED

Activities mentioned	Number of villages
Daily food preparation	6
Child care	5
Husking of rice	4
Washing clothes	4
Firewood collection	2

AJAC

Activities mentioned	Number of villages
Firewood collection	5
Daily food preparation	1
Talk with friends	1
Braiding	1

Woman in Missira Camarang preparing rice

5.2.4 Increase in Production and Monetary Revenues

When we started our interviews in the AJAC we asked the women about their monetary revenues from market-gardening and other activities linked to the pump project. As described in Chapter 4, there were

various obstacles in obtaining detailed information. Not only were the women reluctant to tell us the exact amount of money earned, but they were seldom able to state their revenues before and after the installation of the pump. At the beginning of the interview series in the ED we therefore decided to change the question and merely asked by how many garden plots each woman had augmented her cultivations. In order to provide an idea concerning the revenues that can be obtained by market-gardening, we account for the figures obtained in the AJAC. Although they represent quite rough estimates the data are plausible when compared to those published by Marie-Denise Riss (1989) who spent two years in Senegalese villages.
We also give an account of the increase in production in the ED in order to demonstrate which concrete changes are possible. But first we examine more closely which was the prevalent aim of the market-gardening activities.

Market-gardening - For Private Consumption or Marketing?

The garden produce presented quite a variety of vegetables in the different villages. The most frequently cultivated were tomatoes, onions, pimiento, gombo, jaxatu (bitter eggplant), potatoes, carrots and lettuce. The interviews revealed that the women in the ED generally did not sell more than half of their produce. The principal aim evidently was self-sufficiency and just the surplus was for sale. Since they had been able to reduce the amount of vegetables purchased on the market, their benefits increased in two ways. They earned more and spent less.
The AJAC women usually preferred to market the main part of their production.[11]

Increase in Production

In the ED quite detailed information on the increase in production could be obtained, since market-gardening was the only or dominating activity extended due to the installation of La Malienne.
As the size of the garden plots varied from village to village the figures below show by how many per cent the original garden plots had been augmented.

[11] For more details see Appendix C

Table 5.10 Augmentation of the cultivated area per woman in the ED

Village	Kabiline	Mahmouda	Touba Coulobory	Katipa	Diounoungué	Diounoung
before	1	2,5	1	2	3	1	6
after	5	5*	2,5	3,5	4	5	7
increase in %	400	100	150	75	33	400	17

*Planned for the coming season. The pump had first been installed in another garden where it was attacked by monkeys in 1987. Therefore the women were forced to wait until they had prepared a new garden on a new site before they dared to install it again.

Table 5.10 shows that substantial increases are, depending on the women's commitment, possible. The increase of production alone can however not be considered as a completely reliable mesure for the augmentation of benefits. In 43 per cent of the villages in the respective association the lack of marketing facilities (means of transport, distances to the potential markets, non-existant or bad roads) hampered the women's possibilities of selling as much as they wanted. Furthermore, since the La Malienne-projects were not the only ones in the region aiming at the increase of vegetable production, the market frequently turned out to be saturated because all the women attempted to sell the same products at the same time in the same place, thus forcing down prices.

About 40 per cent of the revenues generated in the ED villages remained in the common fund while the rest was at the women's private disposal.

Monetary Revenues

As pointed out above, it was difficult ot obtain a clear picture of the changes in monetary income. While most of the community groups where the pump had functioned long enough had experienced an increase in their revenues, Bissine was the only one to be able to state that they had doubled their income since the installation of the pump from 15 000 to 30 000 FCFA[12].
In 1988 the total income from the market-gardening season for a whole community group in the AJAC ranged between 10 000 FCFA (Diafilon) and 75 000 FCFA (Diatock).
The revenues may oscillate considerably from year to year as for instance in Ampountoum where the community group's revenues in 1986 amounted to 100 000 FCFA, in 87 to a mere 70 000 FCFA and in 1988

[12] 1 SEK ≈ 50 FCFA

finally only to 35 000 FCFA.
In five villages all revenues were regarded as the property of the community group whereas in the others a similar system as in the ED was applied. Each member payed a fee between 200 and 1000 FCFA and kept the rest of the revenues for herself. In Kongoly the fee was based on the number of garden plots each woman cultivated.
In our sample, individual income varied between 0 and 5000 FCFA.

Other Income-generating Activities

Compared to the income generated by market-gardening, the monetary benefits derived from activities like palm-oil production, dyeing of cloth and soap production appear to be more promising. In Thionck Essyl the women reported a revenue of 200 000 FCFA achieved by selling dyed cloth. (Of course this activity can be pursued all year long and is not restricted to a special season as market-gardening). However, these activities were practised to a much lesser extent. Especially in the ED the women emphasized that food production was more important than other activities. Furthermore not all community-groups had been trained in such activities.

5.2.5 Employment of the Common Fund

In the ED the employment of the common fund was more restricted than in the AJAC. All the community groups declared that they used the money earned for seeds, the maintenance of the pump and current expenses for their association (as for example food for visitors, transport to meetings and training sessions).
In the AJAC villages the funds were used for [13]

- the pump (13) (sometimes only mentioned when we asked)
- loans [14] (9)
- seeds (6)
- public health facilities (5)
- soap (5)
- clothes (4)

[13] Figures in brackets indicate in how many villages these expenses were mentioned
[14] Loans were accorded to community-group members who needed money in case of illness, for social events, for instance marriages, or during the transitional period when food reserves become scarce and rice has to be purchased. Interest rates varied between 0 and 15 per cent.

- fences for market-gardening (3)
- current expenses for the community group (3)
- dyeing of clothes (2)
- kindergarten (1)
- purchase of cattle (1)
- well improvements (1)

5.2.6 Employment of Individual Income

Here the answers from both associations resemble more than concerning the common funds.

Table 5.11 Employment of individual income

ED/Number of villages		AJAC/Number of villages		
health	6	health	5	
children	5	children	5	(school, clothes, illness)
clothes	5	food	5	
soap	5	family	4	
food	4	clothes	3	
spices	4	husbands	3	(trips, petrol, support in general)
family	2	seeds	2	
household	1	own needs	2	
		soap	2	
		trips, transport to the market, spices, enclosure, cart for the transport to the paddy fields one each		

The table illustrates that a large part of the women's income is needed for everyday necessities. Even if health care, children's schooling and sufficient food supply are indispensable for (future) productivity, few expenses are channeled into investments that allow increased productivity in the short perspective. For instance, only in the AJAC one woman mentioned the purchase of a cart. Obviously the benefits from the project are too low to permit larger investments and the daily needs must be accorded priority.

5.3 PLANNING AND EXECUTION OF THE PROJECT

5.3.1 Decision to Implement La Malienne

The original desire of the women was to alleviate the task of drawing water. In both organizations they communicated this wish to their respective respresentatives. The point of departure was thus virtually the same.
The differences appeared after this first phase. The president of the ED had for a long time known AFOTEC's executive secretary and turned to her for suggestions. This approach resulted in her coming to Kabiline and explaining La Malienne to the community groups' representatives. Afterwards the community groups made the mutual decision to adopt the project. Then each group selected trainees who received education in Mali. An exception is Mahmouda Diola which joined the ED after the first training session and where the community group opted for participation in the project after having seen the pumps in their neighbour village Touba.
The AJAC being a much larger association, the approach was rather different. After a series of disappointments with motorpump projects the general assembly decided to make an attempt with simpler pumps and contacted AFOTEC. When the AJAC executive committee had elaborated the programme with AFOTEC they told the unions to choose the community groups that were eligible for participation. The unions transmitted the message in different ways. According to the AJAC women three community groups in our sample received information on La Malienne, otherwise the community groups were simply instructed to send a woman to the training session. Eleven women thus encountered La Malienne for the first time during the education. The pump attendant in Médina Koundié told us that she had not even known that a pump could be something else than a device to pump up bicycle tires with. In several villages the women contended that they had not been informed about what kind of training they were going to receive. Consequently, it is not a surprise that the women in 13 AJAC villages stated that they had not been able to exercise any influence on the project and that the women in the 14th village did not even understand what we meant by "influence".
In the ED the women had not been able to influence the concrete design of the training session either (trip to Mali etc.) but at least they had voted for the project by means of their community groups' general assemblies.

5.3.2 Training

As to the ED, we give separate accounts of the experiences of the women trained in Mali and those trained during the refresher course in Kabiline. We remind the reader that just six of the present member villages participated in the first session as well as that five AJAC trainees could not be interviewed.

Missira Camarang - The pump attendant demonstrates La Malienne

Duration

As mentioned in Chapter 2 the women in the ED were trained during three weeks while the AJAC women received a two-week training session. Though virtually all pumps in the ED but only a minor part of the pumps in the AJAC functioned, all women, save the pump attendant in Missira Camarang (AJAC) who jugded the duration to be sufficient, agreed that the respective training session had been too short. Alternative suggestions varied between one and two months.

Comprehension

Whereas the trainees in the ED concentrated their remarks on slight language problems because they had to work with an interpreter (the instructor did not speak Diola) and otherwise merely perceived some initial difficulties concerning the comprehension of the new technique, five of the nine AJAC trainees interviewed, expressed that they had had general difficulties in learning how to perform such unknown activities. One of these trainees stated that the group had been too large and three pump attendants argued that the instructors had been so brutal and tough towards them that they did not dare to ask questions. The remaining four women found the training session easy.

Acquired Skills

The acquired skills can be divided into three categories. In the best case the trainee was capable of manufacturing and thus also to repairing and assembling the pump. It was also possible that she could only repair and assemble or only assemble it. In the worst case she had not acquired any of these skills.
Table 5.12 illustrates which tasks the women were able to perform according to their estimates and experience .

Table 5.12 Acquired skills*

Acquired skills:	number of pump attendants	
	ED	AJAC
manufacture	12	1
only repair & assemble	-	9
only assemble	-	-
none	-	1

*As described in Chapter 2, the ED sent on average two women from each village to Mali. Therefore the table includes12 pump attendants from the ED. Concerning the AJAC, the two pump attendants temporarily absent from the villages are nevertheless included in the table since we could obtain this information by the other women.

The results presented in Table 5.12 correspond in so far to Table 5.3 that in the ED where the overwhelming majority of the pumps functions all the trainees claim that they know how to manufacture La Malienne. Concerning the AJAC, it is a question worth contemplating why only four pumps function when ten pump attendants at least are able to repair La Malienne.

Dissemination of the Acquired Skills

As mentioned in Chapter 2, the trainees were expected to diffuse their newly acquired knowledge in the village. Table 5.13 reveals to which extent this was done.

Table 5.13 Dissemination of the acquired skills

	Number of villages	
	ED	AJAC
Oral report about the training session	6	14
training of other women:		
1. manufacture	-	-
2. repair & assembly	3	-
3. assembly	2	1

Obviously, it was much easier for the women to deliver the traditional

oral report about the training session (in many cases the community groups even were present during the installation of the pump) than to actively diffuse their new skills. In the ED the diffusion was more far-reaching than in the AJAC where the pump attendant in just one village taught some others how to assemble the pump. The ED women complained that the lack of material was the reason why they could not teach anybody how to manufacture the pump.

Refresher Course

We questioned the women about the refresher courses that had been arranged by AFOTEC/AJAC respectively AFOTEC/ED as described in Chapter 2.
Curiously enough, not one of the interviewed AJAC pump attendants was able to remember such a course. They had perceived the visit of the two instructors as a pure repair session and not related it to themselves. One of the pump attendants had not even been informed about the session and thus was not present when the instructors arrived.
As to the ED, we concentrated our questions on the additional trainees educated during the first refresher course in Kabiline in 1986. All the women who had been in Mali had followed this course during which they participated in the education of the additional pump attendant. As the new trainee from Diounoung fell ill we present the answers of only six women concerning this training session.
These expressed the unanimous opinion that the training session (ten days) had been too short. This is reflected by the fact that just 50 per cent of this group supposed themselves to be capable of manufacturing a pump in comparison to the first group where all women could do it. Notwithstanding, all of them were able to repair and assemble La Malienne. Concerning comprehension half of them expressed satisfaction about having received assistance from their friends who had been to Mali. Otherwise they had not experienced any difficulties except for the representative from Mahmouda Diola who had language problems due to the fact that her Diola dialect differs from the usual dialect spoken in the region.
Just one of these women participated in a refresher course some time later, the others who had not judged a new refresher course to be necessary.

Costs

AFOTEC had assumed the major part of the financial cost linked to the project. For the ED they had payed the pumps, education, tranportation, food etc and the women were well aware of this fact.
As regards the AJAC the community groups had to bear the cost for transportation and pocket-money. In ten AJAC villages the women supposed that the AJAC had paid the whole project, in three villages they had a vague idea that AFOTEC might have been involved and in one village nobody knew who had financed the programme. During the course of our interviews we realized that there was no knowledge about the cost of La Malienne.
In order to find out if the trainees had incurred other than financial costs we asked who had taken care of their garden-plots and other chores during their absence. In all cases the community group had carried out the garden work. The households being largely polygamous, the domestic chores were taken over be the other wives or, in one case, by the trainee's children.

Trainees' Opinions Concerning the Training Experience

As expected, the question if the training session had been a new experience for the women caused some problems. The women often did not understand what we meant, forcing us to give them some clues as for instance if traveling or assuming a responsible position was new to them. Therefore several answers were slightly biased. For instance, all the trainees agreed that the training had been a new experience for them and almost all of them claimed that it had been new for them to be assigned such a responsible task. Yet we also received answers that deviated from our propositions. Not surprisingly, the ED women emphasized the importance of their trip to a foreign country and one of them told us that it had been the first time for her to go by train. But also the fact that they had received technical education was highly valued by the women from both organizations. Expecially the ED women pointed out that the education had increased their friends' esteem and aroused the latters' admiration.
If a purely subjective opinion is permitted in the context of such a study, we would like to contend that the ED trainees generally took more pride in their status than the trainees of the AJAC.

5.4 IMPACTS DUE TO THE PROJECTS

5.4.1 Work-load

In all the seven ED villages the women claimed that the project had diminished their work-load.
The picture in the AJAC villages was more diversified. Merely two groups perceived that their work-load had decreased, five stated that they did not notice any difference and six had even experienced an increase. When asked if they considered this to be positive or negative, four groups claimed that the increase was positive because their augmented activities (market-gardening, rice cultivation and other activities in general) permitted them to earn money. Two groups were not that satisfied though. In Kataba the garden plots had been increased prior to the installation of the pump, but since the pump constantly broke down during the market-gardening season they were forced to irrigate the larger surface by traditional means if they did not want the vegetables to perish. In Ampountoum the villagers complained about the increased work-load connected with the visits of strangers who needed water, clean sheets etc. and who occupied their time by discussions and meetings.

5.4.2 Husbands' Reactions

Generally speaking, all husbands favoured their spouses' participation in the project. (We remind in this context of the fact that there were always some men present during the interviews).
The reasons for the husbands' positive attitude originated from different perspectives.
In the ED the women maintained that their husbands were positive because they too were members of the community group and that the decision to realize the project had been made in agreement with all members. In Diounoung the women mentioned that those men who were not members of the community group were of the opinion that it should have been men who travelled to Mali for the training and not women while the men in the ED aimed at promoting their wives' position. On the other hand, other women simply explained that if their husbands had not approved of their participation they would have forbidden it.
The women in the AJAC laid more stress on the fact that their husbands appreciated the improvement the pump implied for the benefit

of the whole family, namely more revenues and diminished work burden for the women. Just in two cases the women supposed that their husbands appreciated that their spouses had widened their knowledge. In three villages the arrival of La Malienne had even influenced the men's behaviour. In Ampountoum they had started to water their cattle themselves and in Badème they drew their own water when constructing buildings. Mongone was a special case. There the men had even commenced to work in the community group's garden where they cultivated trees and potatoes. However, when the pump broke, they ceased from these activities.
These responses illustrate that a project focusing on women can have favourable impacts on men's attitude. And they equally make clear that without men's participation and agreement such a project would probably not be possible.

5.4.3 Women's Position in the Villages

It was easier to ask the question concerning the women's position in the community in the ED than in the AJAC. The women generally showed great pride in the project and vividly claimed that their position in the village had become stronger. Even their community group had been strengthened. In one case the women added that their work was more respected now. It should be noticed, however, that women in four villages contently stressed that they had gained importance and were admired by their female friends who were not members of the community group. This development cannot only be considered as positive because on the one hand the other women's admiration may be an incentive for them to try their own projects or to join the community group but on the other hand the women in the village might be divided into two groups which can have adverse affects on the relations between the villagers.
The AJAC women emphasized the financial aspect of the project. To them, financial independence had been the primordial goal. While six villages claimed to be satisfied, four pointed out that the pump had not changed anything since one pump was not sufficient for so many women. Three villages were of the same opinion as the ED women that their importance had increased and the community group been strengthened.
In Diafilon, the women considered the fact that they now could send their little daughters to the well instead of going themselves to be a step towards independence, thus making plain that female independence does not mean the same to them as to us.

Especially as regards the AJAC we tend to believe that the women said what they would have preferred to be the outcome of the project and not the actual result because in the four villages where the pump actually functioned the women were most reluctant to see drastic changes.

5.4.4 Achievement of the Projects' Objectives

As to the ED, the answers concerning the goals of the project turned out to be rather ambivalent. On the one hand six community groups contended that the project corresponded exactly to their needs and wishes. They even enumerated the advantages of La Malienne compared to motorpumps. Just in one village the women did not hide their wish that they still preferred a motorpump. On the other hand, four villages put emphasis on the fact that La Malienne merely was a part of an integrated project which also comprised training in conservation of vegetables and fruits, dyeing of cloth and of production of soap and hair pommade. They were disappointed that AFOTEC had not fulfilled their promises.
Fifty per cent of the AJAC community groups stated firmly that they preferred motorpumps, even in Sédhiou where the pump functioned. In two further villages the women expressed the desire to have another kind of pump without specifying which type they had in mind.- The most frequently cited disadvantages of La Malienne were its fragility, low capacity and heaviness. Furthermore one pump generally could not satisfy the needs of so many women. In Kataba the women went so far as to declare that the pump had been several times repaired with money from their common fund but that it only benefited a few women when it functioned. Therefore they had finally dismantled it and continued with their traditional system.

5.4.5 Women's Additional Comments

We concluded each interview with the question if the women had anything to tell us that we had not asked about. They always used the opportunity to convey their preoccupations concerning problems not only linked to the pump project.
In the AJAC, the women pointed out that certain constraints hampered the realization of the possible economic impacts of the project. Their cultivations were repeatedly attacked by insects and rats or tramped on and devoured by cattle. Hence their harvest was destroyed or

considerably reduced. And even when they had a good harvest parts of the produce might perish because they had no means of transporting larger quantities of vegetables to the market (which furthermore often was saturated). These statements corresponded to the comments uttered in the ED villages where the women waited for training or refresher courses in for instance food conservation in order to be less dependent on the peak seasons for their marketing.
Moreover, in both organizations the women turned out to be well informed about technical devices like grinding mills and hullers that could alleviate their work burden. They equally expressed the need for literacy, dyeing and sewing courses as well as for public health facilities. These remarks make plain that the women were rather sensitized and knew that one isolated project could not decisively improve their situation.

6 ANALYSIS AND COMPARISON

The analysis and comparison of the two projects are based on the theoretical framework and the descriptive material presented in the preceding chapters.

6.1 COMPARISON Of THE PROJECTS

This section resumes and compares the results displayed in Chapter 5 in order to provide an overview and a base for the analysis. As illustrated in Chapter 3, certain social and economic impacts can be attributed to water supply projects. First the economic effects of the projects "La Malienne" are dealt with, followed by a survey on the social impacts.

6.1.1 Economic Effects

Entente de Diouloulou

In the ED, roughly three-quarters of the pumps functioned. According to the women the aim of the project was to alleviate their work burden in general and to enable them to increase their market-gardening activities. In all villages the women had experienced health improvements that they attributed to the utilization of La Malienne. Furthermore it can be estimated that the usage of the pump resulted in a 30 per cent decrease of time needed for the drawing of water for market gardening.
The health improvements and the gains in time permitted them to engage in further activities. Concerning income-generating activities they contented themselves with an extension of their market-gardening which permitted them to increase their monetary income on the one hand and to save money on the other hand.
Although the vast majority had acquired thorough know-how concerning the manufacture of La Malienne, they did not use it in a remunerative manner by manufacturing and selling pumps themselves because they supposed that the potential clientele was not sufficiently solvent.
The income achieved by market-gardening was not directly reinvested in other projects. Community funds were principally employed in order to sustain the market-gardening activities, including maintenance of the

pump, and further expenses connected with the community groups' current needs such as transportation, visitors etc. The individual income was spent on the families' maintenance.
Thus, the economic gains contribute indirectly to the well-being of the families and to the continuity of the community group, which in the long run may benefit the village as a whole, but in the short run, they evidently do not constitute a sufficient base for further investments that could improve the women's situation.
The economic costs are rather limited. The financial part has largely been borne by AFOTEC and the non-financial costs were confined to the trainees' absence from the village during their education. Their work could obviously easily be carried out by community-group and family members.
Thus, the economic effects of the project are largely positive although they are not very important. They permit the women to preserve the status quo but as the gains are too low they are not sufficient to support further concrete investments.

AJAC

Many of the answers obtained during the interviews presupposed that the pumps in the respective villages functioned. Therefore similar impacts to those in the ED seem to have been achieved. However, this is not the case.
Merely 28 per cent of the pumps were in working order. Thus, the actual impacts of the project must be regarded as utterly limited. When the pumps functioned, their utilization led to time gains and ameliorated health and these results allowed a variety of income-generating activities. Since the AJAC women had acquired much fewer skills than the ED trainees, their possibilities of profitably employing their know-how was however even more constrained.
Consequently, the monetary benefits for the AJAC villages as a whole must be regarded as negligible. Still, even in their case the economic costs are low (though higher than in the ED due to the transportation costs) and supposing that each pump functioned at least during one market-gardening season (save in Kataba) they probably have been recouped. Thus, we would like to contend that the project has had neither a positive nor a negative economic impact on the majority of the AJAC community groups.

6.1.2 Social Effects

Entente de Diouloulou

Since the women used their time gains not only for income-generating but also for other activities such as child care and strictly domestic chores which otherwise would have been neglected, we consider that the communities benefited from the project even socially.
As regards the women, the arrival of La Malienne has reinforced their position as a group. It seems that the women have been inspired to undertake further projects which is indicated by the fact that they so anxiously waited for AFOTEC to continue the programme. Concerning their relations with their husbands, it is difficult to say if the project has ameliorated their position or if the ED men's relatively favourable attitude towards their wives had not been the same even before.
The trainees had perceived the project as a positive experience and enjoyed a certain esteem from their female friends.
Since a study like ours only can touch the surface of a society it is not advisable to jump to conclusions. Therefore we confine ourselves to the careful statement that the project seems to have had predominantly positive social effects the extent of which, given the limited time horizon, has been difficult to assess.

AJAC

As concerns the AJAC, the picture is not that positive. The women had searched for more financial independance but even in the villages where the pump functioned they considered this effect to be marginal. Furthermore, since few of the trainees were able to acquire all the skills needed in order to adequately maintain La Malienne, the pump was generally not appreciated and the project considered to be a failure. Consequently, the hopes now were orientated towards the installation of a motor pump, a concept quite the contrary to what La Malienne stands for. The fact that in some villages the men had started to draw water for their own activities shows that there actually exists the possibility of change and that such a project may result in a shift of social hierarchies. However, since the programme did not continue, these changes already belong to the past. While the project otherwise does not seem to have had any social consequences at all, a negative social effect may be that the villagers now have less confidence in their own capabilities and are more prone to turnkey help from the outside.

6.1.3 Concluding Remarks

If we compare the impacts of the two projects we come to the conclusion that these are more distinct and positive in the ED than in the AJAC and, what is more, the project is generally perceived as much more satisfacying in the ED than even in those AJAC villages where the pump functioned. While the results in the AJAC on the average do not correspond to the goals set by AFOTEC, i.e. alleviation of the women's workburden, increased monetary income and promotion of their social position, they have largely been achieved in the ED. In the subsequent section we try to find the reasons why the project achieved better results in one organization than in the other.

6.2 ANALYSIS

In Chapter 3 we pointed out that different outcomes of a development project are conceivable. Generally speaking, such a project tries to convey a message which can be comprehended by the target group and practised, or comprehended but not practised. The message may even not be comprehended and therefore not practised or perhaps it is not comprehended but nevertheless practised (we refer to Figure 3.1 in Chapter 3).
If we apply this concept to the projects studied, we can define the message of the pump project as follows: "La Malienne is based on a concept permitting its female users to control the technique. They do not need any external help for the manufacture, maintenance or repair of the pump. It is supposed to be utilized principally in order to alleviate their work burden and to increase their income-generating activities."
The results of our field study show that in the ED the message of the project has been comprehended, i.e. the women know and accept the advantages of La Malienne and know how to handle and maintain it. They also use at least one pump in each village, thus they also practise the message. The AJAC villages belong to other categories. In none of the villages the message has really been comprehended. All the women expressed the wish to have a motorpump although they would most probably depend on external -expensive- assistance for its maintenance and repair. Still, in the four villages where the pump functioned, the message was practised, whereas the remaining villages belonged to the category where the message was neither comprehended nor practised. Consequently, we have three categories to deal with. In the following, the reasons why the outcome of the two projects was so different will be examined.

Figure 3.1 indicates that the reasons why a message is treated in a certain manner or, as it were, why one project succeeds and the other does not, have to be sought in cultural and social norms, the need perceived by the target group, the resource situation and in the organization of the project.

6.2.1 Social and Cultural Norms

As previously mentioned, we make the simplifying assumption that the cultural and social norms in the community groups studies are virtually the same, i.e. we maintain that there exist no such cultural or social differences that might substantially have contributed to the divergent outcome of the two projects. The only two variables that have been examined are the ethnic groups and the size of the villages. The ED villages as well as ten of the AJAC groups are Diola and while the majority of the ED-pumps functioned, only two of the pumps in the AJAC's Diola villages functioned. The other two that were in good condition were encountered in community groups each belonging to different ethnics. Therefore the conclusion seems to be justified that the success of the ED project cannot be traced back to the fact that the villages were Diola. Concerning the other ethnics, comparisons are, due to their limited number in the sample, not possible.
As to the size of the villages, most of them count between 200 and 2000 inhabitants and the distribution in the samples seems to be quite homogenous. Just two AJAC villages have more than 10 000 inhabitants and in one of them the pump functions and in the other not. We carefully maintain that the possible assumption that the outcome of the project might be related to the size of the village is not confirmed.
Since we presuppose that the remaining social and cultural variables do not vary significantly between the different villages and therefore do not explain the divergent results of the projects, we proceed to the next factor, the resource situation.

6.2.2 Resource Situation

Since the villages are situated in an area characterized by largely the same geographical and economic conditions, the community groups' resource situation as concerns the financial and non-financial demands of the projects is assumed to be roughly the same.
Besides, the community groups' financial contribution to the project was very restricted and the technique of the pump adjusted to the

restricted and the technique of the pump adjusted to the environment to such a degree that all the material necessary for the maintenance or manufacture of the pump could be obtained locally. Therefore, we do not see any significant deviations in the local conditions either.nce the villages were situated in an area which was caracterized by largely the same geographical and economic conditions, the community groups' resource situation as concerns the financial and non-financial demands of the project is assumed to be roughly the same. Besides, the community groups' financial contribution to the project was very restricted and the technique of the pump adjusted to the environment to such a degree that all the material necessary for the maintenance or manufacture of the pump could be obtained locally. Even here, we do not see any significant deviations in the local conditions.

6.2.3 Felt Need

The women in both associations had expressed the need for alleviation of the task of drawing water before they received the pump. Thus the condition that there ought to be a perceived need for the project was fulfilled for both organizations studied.

6.2.4 Organizational Factors

The remaining causes are summarized under the headline *organizational factors* and represent the main focus of our study. In the following we are going to examine if and to which extent the choice of target group, the cultural fit of the new technology, the information prior to and during the project, the training, the staff, the follow-up procedures, the financial conditions and the preliminary assessment of the benefits may have influenced the outcome of the projects.

Choice of Target Group

Since the two organizations had approached AFOTEC and put forward the wishes of their female members there was no need to identify a potential target group. It was given that the women were to be the beneficiaries of the projects and, in accordance with AFOTEC's philosophy, in both organizations they also were the principal actors.

Cultural Fit of the New Technology

In Chapter 3 we maintained that three factors ought to be taken into account when attempting to diffuse new technologies. The new technology was supposed to fit into the *frame of reference* of the target group, it had to be *legitimized* and this legitimization was to be achieved by the utilization of existing *networks*. We equally contended that "the usage of indigenous knowledge systems plays a fundamental role. Indigenous knowledge systems are by definition a part of the culture's frame of reference. Therefore it appears to be easier to employ them as a basis for the improvements envisaged than technologies imported from other cultures, since acceptance barriers are probably much lower". According to this latter statement, the introduction of La Malienne ought not to meet any major obstacles. It was adapted to African - and Senegalese - conditions by Africans and the material to manufacture or repair La Malienne can be found in the local environment which renders it relatively cheap and promotes its users' autonomy. Consequently, it can be described as an appropiate technology, adapted to indigenous knowledge and ought to be easiliy incorporated into a Senegalese villager's frame of reference.

But, our investigations revealed that the fact that people do not own or utilize certain things obviously does not mean that these are not a part of their frame of reference. The women in our study made plain that they were rather well informed about "the market". Their wishes uttered at the end of the interviews, namely grinding mills, hullers, fences, insecticides etc. illustrated that they had very concrete ideas about what they envisaged as solutions to their problems. And this was also the case with the pump. The AJAC women asserted frequently, and the ED women sometimes, that, prior to the project, they had considered a motor pump to be apt for resolving their problems. Their frame of reference thus simply surpassed the limits of the indigenous knowledge system and it would therefore probably not have been necessary to legitimize the implementation of a motor pump. The women did not consider the disadvantages (high initial expenses, high maintenance cost, operative expenses, need of external assistance) connected with the more advanced technology. They did not see why a motor pump should fit less well into their culture than La Malienne.

An essential condition for the success of the projects was therefore to convince the target groups of the appropriateness of La Malienne. Otherwise their engagement could not be ensured. As regards the ED, AFOTEC obviously succeeded in legitimizing the hand pump. Although

several women mentioned that they had a motor pump in mind before the project, six of the seven groups now maintained that La Malienne was more appropriate for them. They were also informed about the disadvantages of motorpumps. In the AJAC however, the attitude towards motorpumps was unchanged and thus the women did not appreciate the advantages of La Malienne but merely saw its negative aspects. It had not been legitimized.
As mentioned above, the legitimization is to be attained by the usage of accepted networks. This is surely especially true for foreigners who do not have any relation with the target group. In the case of AFOTEC, the task was facilitated due to the fact that their employees were a part of the culture. During the collaboration with the ED, they acted personally as well as utilized the community groups' network of elected representatives to diffuse knowledge about the pump. In the AJAC, however, they entirely delegated this task to the responsibles of the organization and relied on their internal network. As will be accounted for in more detail in the next section, the information did not reach many community groups. The usage of the network therefore was not sufficient and since several AFOTEC responsables were well aware of the conditions in the AJAC, it is surprising that they did not insist in playing a more active role in the presentation of the project.
Concerning the cultural fit of the projects we can summarize that the technology certainly was appropriate, as demonstrated by the good results achieved in the ED, but that it had obviously not been legitimized in the AJAC.

Information

The primordial aim of information generally is not the adjustment of the target group's frame of reference to the project but, on the contrary, the development of a dialogue which leads to the mutual elaboration of the project's aim and design. Information is a necessary prerequisite for the beneficiaries' influence in the project. As mentioned before, AFOTEC utilized the possibility of approaching the ED members at the community level while they, concerning the AJAC, confined themselves to contacts at a much higher level of the organization's hierarchy. As a result, solely the ED women were directly involved in the decision-making process. Since they themselves had decided to participate in the project, we estimate that they accepted La Malienne prior to its implementation. The AJAC women were dependent on the AJAC's information system, which seems to be quite inefficient. The information had to pass from the executive committee through the

unions to the community groups. Obviously, it reached the women only in so far as they were told to send a trainee to a training session at a determined date. Just in four cases, the community groups were informed about La Malienne in advance. If the aim of information is to engage people in a project, i.e. in their development, it is clear that this could not be obtained in this case because the women mostly did not even know what they were supposed to be engaged in. This factor must certainly be kept in mind when searching for the reasons why the project did not work in the AJAC.

Education, Training and Staff

Several factors distinguish the two organizations' training sessions. Although the goal of both courses was to transfer the know-how linked to the pump in order to ensure the autonomy of the project, the basic conditions differed considerably. First of all, the duration of the ED's training session exceeded the AJAC's by one week. Secondly, every ED village was required to choose two women who afterwards would be able to assist each other, whereas the AJAC's community groups just selected one woman. As a consequence, the AJAC trainees were not only less well trained but they were also left alone once the training session was over. Since the AJAC villages are dispersed all over Casamance, contact between the trainees was in most cases difficult. Furthermore, the average age of the AJAC pump attendants was some years higher than the ED's which was aggravated by the fact that they were alone, while in the ED there almost always was at least one trainee per village who was seven years younger than the average AJAC pump attendant. It is imaginable that the AJAC community groups would have selected younger women if they had known the scope and content of the training session.

Officially, the AJAC women were to be assisted of the two male advisors who had been trained to help them but due to a certain lack of financial means, these were seldom able to visit the villages and carry out that task. Furthermore, the mere existence of such advisors may have adversely affected the trainees' will to assume the entire responsibility of their pumps because they knew that there were men who had the skills and the material to maintain and repair them. In the ED, the women were forced to rely on themselves.

Concerning the execution of the training session, the most striking differences are, of course, the site and the staff. The value of the ED women's training course consisted not only of its duration but also of the

fact that the trip to Mali permitted them to do something that hardly anybody in their villages had ever done - especially not a woman. The project therefore probably had a prestige effect which may partly explain our impression that the ED women were so proud over it. Even the staff was quite unusual. Although the main instructors were men, the Senegalese trainees were taken care of and assisted by a Malian women's organization.
All this stands in sharp contrast to the AJAC training session which was organized and executed by Senegalese men in Casamance. Some AJAC women also complained about the instructors' tough manner during the course.
The ED women evidently benefited of a range of advantages compared to the AJAC trainees who, admittedly, received an education that was better than women in Third World countries usually get, but that in no way is comparable to the quality of the ED training session.

Follow-up

AFOTEC chose to organize refresher courses in order to guarantee the continuation of the projects. But even here we observe differences in the quality of the approaches. As regards the ED, three subsequent refresher courses were held, the frist one a year after the trip to Mali. The occasion was utilized to train one additional pump attendant per village, thus providing the community groups with further know-how and pumps. Again, AFOTEC used women to train women. The two following courses merely aimed at deepening the pump attendants' knowledge.
Contrary to what one might expect, the AJAC women who were not that well trained, did not receive an entire refresher course. Their skills were supposed to be refreshed during a one-day visit by AFOTEC's technician and one AJAC advisor who had come in order to exchange the valve-piston. This "refresher course" took place two years after the first training and the fact that not one woman remembered it as such demonstrated that it cannot have left deep traces.
Concludingly, if taking into account that in 1989 each ED village had several trained pump attendants, while the AJAC villages had at the most one pump attendant who had received considerably less training, the percentage of pumps in good condition in the respective organizations is quite comprehensible.

Financial Conditions

As pointed out in Chapter 3 the financial costs that the beneficiaries of a project are to bear ought not to surpass their means.
Concerning the projects La Malienne, AFOTEC stood for the major part so that the financial burden for the community groups was not too heavy. AFOTEC's policy of not involving the villagers financially resulted however in their not being able to assess the cost of La Malienne. This seems to have had at least two consequences. On the one hand, there were community groups in the AJAC that did not appreciate the pump because they did not know the value of the material. When it broke, like in one village where the pump had fallen into the traditional well when the latter caved in, they did not bother to save at least the material because it had not cost them anything. Furthermore the women frequently did not perceive the price difference between a motor pump and La Malienne. As La Malienne was considered as a present they did not see why they could not as well have received a motor pump. On the other hand, we had the impression that the ED women did not dare to manufacture La Malienne because the lack of knowledge about its cost impaired them to estimate if their neighbour villages who had shown interest in the pump would be able to pay one. La Malienne costs at the most as much as can be gained on average during one market-gardening season. If one takes into account that the villages also receive income from other acitivities, the price cannot be regarded as a decisive obstacle. Several women both in the AJAC and the ED equally maintained that they had too few pumps and one reason why they did not manufacture more may have been that they just overestimated its cost.
Thus there were both over- and underestimations of the pumps' cost which influenced the appreciation and the diffusion of the project but while there was a tendency towards overestimation in the ED, the picture for the AJAC was not homogenous. The project would probably have benefited from the women's financial contribution not to the project but specifically to the pump.

Assessment of Benefits

The assessment of the potential benefits of a project is supposed to be carried out before the implémentation of a project and should preferably influence it positively. As our study was not oriented towards AFOTEC's activities prior to the organization of the projects we cannot say to which

degree their assessment of the expected benefits has influenced the project's goals and design. However, it is possible to say that AFOTEC's professed aims show that they slightly overestimate the benefits of an isolated project and that the women in both the ED and the AJAC were conscious of this fact.

6.2.5 Concluding Remarks

The preceding sections confirm our assumption that the organizational approach played an essential role for the outcome of the two projects. While the external conditions for the AJAC and the ED villages were highly similar, the organizational frameworks of the projects differed considerably. The most important differences concerned the cultural fit, the information of the women, the education and the follow-up procedures.

While the technology was adapted to the cultural environment, it was legitimized in the ED but, due to lack of information, not in the AJAC community groups. Preliminary information was essential in order to guarantee the women's acceptance of the technology and to enable them to choose the right trainees. As the AJAC women did not get adequate information they did not comprehend the message of the project. The groups where the pumps were in good condition still wanted another type of pump but admitted that they for the moment did not have the possibility to acquire such. Thus they practised the message. The other groups obviously practised it as long as the pumps worked but due to lack of interest and as a result of the design of the training session and follow-up procedures, the majority did not have the knowledge and/or the will to repair the pump once it was broken and consequently stopped practising the message. The ED women, on the contrary, had been involved in the decision-making process and had had the possibility of embracing the project as theirs so that they comprehended its message. Since their education was very special, their positive attitude was reinforced and the design of the education and the follow-up courses achieved to provide them with the necessary knowledge to continue the project i.e. to practise the message.

7 CONCLUSIONS AND IMPLICATIONS

We are conscious of the fact that the scope of this study does not permit too far-reaching conclusions regarding the implementation of development projects in general but some tendencies may be established. After the discussion about what the results of the study imply for AFOTEC, some general conclusions and implications are presented.

7.1 ED, AJAC AND AFOTEC

Concerning the projects studied, it is reasonable to state that the positive outcome of the ED project could have been transferred on the AJAC project if AFOTEC had utilized the same organizational approach. It is astonishing that they chose to organize the AJAC programme as they did and relied on the association's internal network and the technology of the pump whereas they had so carefully designed and implemented the project of the ED. As concerns the AJAC, the project can be described as a waste of resources. During our investigations it never became really clear if AFOTEC voluntarily designed the project as they did or if the AJAC responsibles insisted in it, but our study implies that AFOTEC had better not comply with a request at all if the demanding organization does not want to accept an adequate organizational approach. Another reason why AFOTEC may have chosen to implement a project of, as it were, inferior quality might be their restricted financial means. In this case the results of the study ought to be considered as a warning signal for their plans to extend their activities to the whole region of West Sahel.

7.2 DEVELOPMENT PROJECTS IN GENERAL

Our study implies that there exists a connection between the organizational factors of a development project and its outcome. These factors are interdependent and if the design lacks one component this may decisively influence the other factors.
One crucial factor evidently is adequate information of the potential beneficiaries because it constitutes the basis for their acceptance of and engagement in the project.
The results of the study equally illustrate that it obviously is not sufficient to know a target group's perceived need and to provide them

with an appropiate technology which is considered to be adjusted to their frame of reference. The latter may in fact be much wider than we imagine. If we take into account that thousands of projects have been implemented in the Third World and that the majority of these aimed at diffusing the latest technologies, it is not surprising that people are initiated in "the development market" and base their ideas about what is appropriate for them on what they have seen during trips or in neighbour villages. The two case studies show that the potential beneficiaries may not want what the development agency considers to be an appropriate technology and therefore a dialogue - and thus information - is indispensable if the target group is to be given the chance to either change the agency's or their own frame of reference before the implementation of the project.

The study also indicates that the beneficiaries' education in combination with follow-up procedures must be attributed considerable importance. Although La Malienne is based on quite a simple concept, the two-week training session for the AJAC women was not enough to achieve the transfer of know-how necessary to guarantee the continuity of the project. The ED experience shows, however, that not the technology was too complicated but the training in the AJAC not adequate. In this context it is also interesting to note that both the AJAC and the ED women commented that the instructors did not speak their language and that they had to work with interpreters. If considering that the instructors were African and thus at least belonged to the same culture, the question arises how African trainees perceive for instance European instructors who often do not speak the native languages and to which degree this influences the outcome of training sessions and entire projects.

Concludingly, we maintain that this study gives clear indications that an appropriate organizational framework is fundamental for a development project's outcome.

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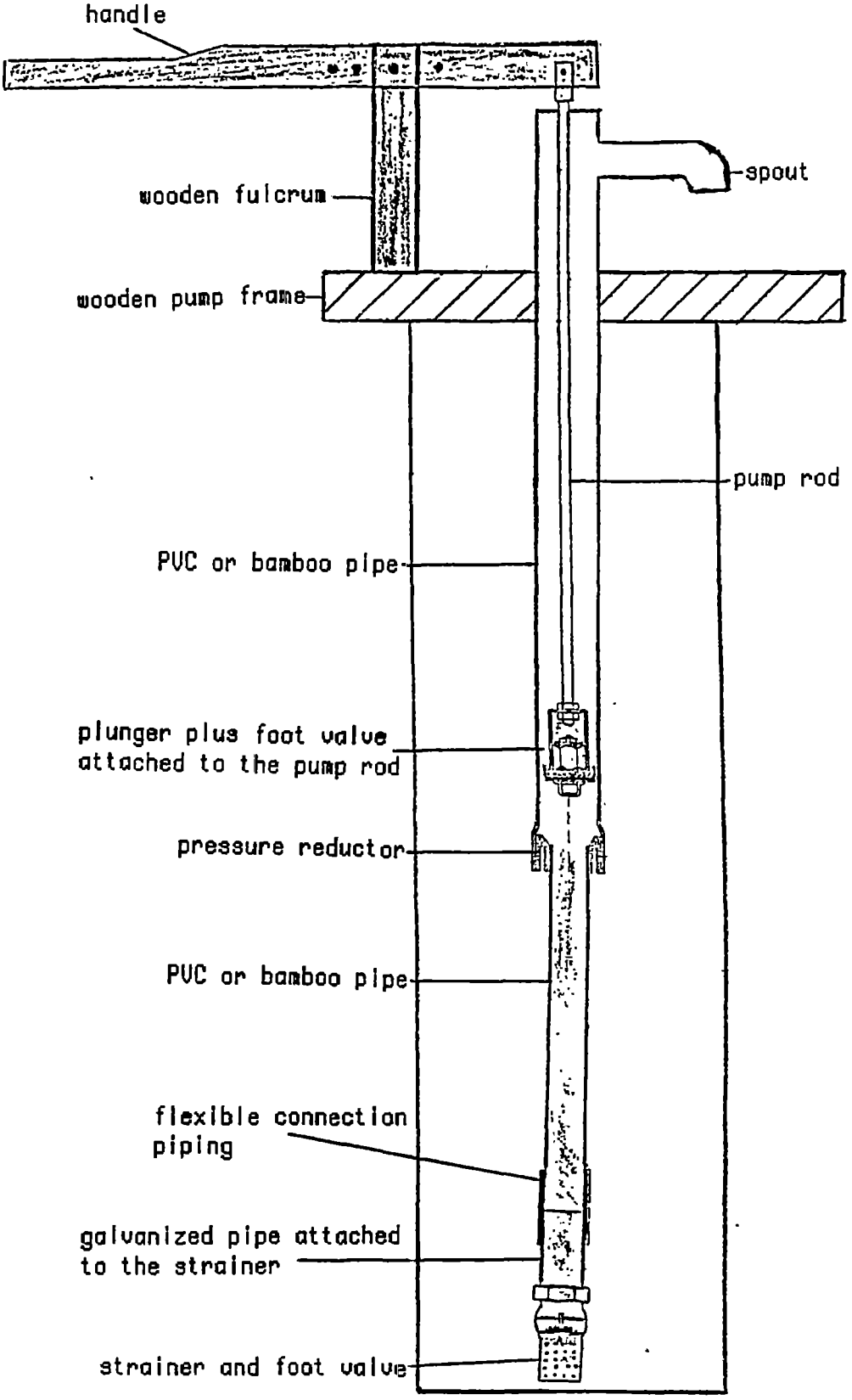
Ousmane Mary, accountant, Entente de Diouloulou

Pascal Sambou, technology department ENDA, January 1990

APPENDIX A - DESIGN OF THE PUMP "LA MALIENNE"



Adapted from AFOTEC material

APPENDIX B - QUESTIONNAIRE

A. BACKGROUND DATA

Name of village	Number of members
Number of inhabitants	Number of female members
Number of community groups	Number of women present

1. How many pumps "La Malienne" are there in the village?
2. Is/are the pump/s in working order at the moment?
   - Yes
   - No
   - If no: - why not?
     - since when?
3. What is the pump used for?
   - Drinking water
   - Market-gardening
   - Others
4. Who has the right to use the pump?
   - The whole village
   - The members of the community group
   - Others
5. Is the pump attendant still the same?
   - Yes
   - No
   - If not, since when?
6. How old is she?

B. WOMEN'S ACTIVITIES

1. How much time do you spend each day on water collection?
   - Without the pump .....hours
   - With the pump .....hours
2. Has the installation of La Malienne made it possible for you to undertake new activities? Which ones?
3. Do you sell any of your production?
   - Sale %
   - Consumption %
4. How much of your revenues is
   - collected in the common fund?
   - individual?

5. What do you employ
   - the common fund for?
   - your individual income for?

C. HEALTH

1. Has the time that you have gained permitted you to rest?
2. Have you remarked any changes concerning your health (diarrhoea, pain in the back)?

If changes due to ameliorated water quality:

3. Have there been implemented any health projects in the village?
   Yes
   No

D. SOCIAL LIFE

I. *Education*

1. Where did you learn about AFOTEC/La Malienne?
2. How did you get into contact with AFOTEC? Why?
3. Have you been able to influence the project as much as you wanted?

Questions to the pump attendant:

4. What do you think about the training?
   - duration
   - comprehension
   - cost
   - refresher course
5. Did you diffuse your newly acquired knowledge? How?
6. Can you manufacture/repair/assemble the pump?
7. Has this education been a new experience for you?

II. *The Project in General*

1. Has the project resulted in an increase or diminution of your work burden?

If increase:

2. Do you consider this to be negative or positive?
3. How have your husbands reacted concerning the project, your activities etc.?
4. Has the project had any impacts on the women's position in the village ?
5. Who has payed the pump?
6. Has the project reached its aims?
7. Other comments

APPENDIX C - RESULTS OF THE FIELD STUDY

BACKGROUND DATA

Table C.1 AJAC villages

Villages visited	Ethnics	Inhabitants*
Diafilon	Diola	320
Ampountoum	Diola	418
Sédhiou	Manding	15 000
Missira Camarang	Peul	175
Médina Koundié	Peul	290
Mangacounda	Manding/Balant	2 500
Bissine	Diola	997
Badème	Diola	550
Kongoly	Diola	570
Djidjipoune	Diola	517
Thionck Essyl	Diola	10 000
Diatock	Diola	1 895
Mongone	Diola	250
Kataba	Diola	480

Table C.2 ED villages

Villages visited	Ethnics	Inhabitants*
Kabiline	Diola	2 686
Mahmouda Diola	Diola	800
Touba	Diola	1 000
Coulobory	Diola	200
Katipa	Diola	900
Dionoungué	Diola	800
Diounoung	Diola	800

* Estimates made by the villagers

Table C.3 Community groups AJAC

Villages	Group members†			Female members present	
	Total No.	No.female	% female	Number	%
Diafilon	n.a.	48	n.a.	12	25
Ampountoum	90	40	44	17	42
Sédhiou	34	31	91	11	35
Missira Camarang	49	25	51	23	92
Médina Koundié	60	20	33	5	25
Mangacounda	25	12	48	10	83
Bissine	60/60††	30/30††	50/50	27	††
Badème	50	30	60	12	40
Kongoly	80/80††	50/50††	62/62	21	††
Djidjipoune	60/90††	38/66††	63/73	35	††
Thionck Essyl	n.a.	39	n.a.	21	72
Diatock	66	50	76	17	34
Mongone	78	38	49	11	29
Kataba	114	59	52	15	25
		Average:	58	Average:	46

† Based on information from the villagers

†† Two community groups were present during the interview although only one group was touched by the pump project. We do not know how many women of each group were present.

Table C.4 Community groups ED

Villages	Group members†			Female members present	
	Total No.	No.female	% female	Number	%
Kabiline	125	76	61	9	12
Mahmouda Diola	50	30	60	18	60
Touba	100	75	75	13	17
Coulobory	35	17	49	8	47
Katipa	45	30	67	8	27
Diounoungué	50	32	64	13	41
Diounoung	64	23	36	8	35
		Average:	59	Average:	34<

† Based on information from the villagers

Table C.5 The AJAC pumps

Villages	Number of pumps Total	In working order	Broken
Diafilon	1	-	1
Ampountoum	1	1	-
Sédhiou	1	1	-
Missira Camarang	1	1	-
Médina Koundié	1	-	1
Mangacounda	1	-	1
Bissine	1	-	1
Badème	1	1	-
Kongoly	1	-	1
Djidjipoune	1	-	1
Thionck Essyl	1	-	1
Diatock	1	-	1
Mongone	1	-	1
Kataba	1	-	1
Total	14	4	10
Per cent	100	29	71

Table C.6 The ED pumps

Villages	Number of pumps Total	In working order	Broken
Kabiline	3	2	1
Mahmouda Diola	1	1	-
Touba	3	1	2
Coulobory	3	2	1
Katipa	3	3	-
Diounoungué	4	3	1
Diounoung	2	2	-
Total	19	14	5
Per cent	100	74	26

IMPACTS DUE TO THE PUMP

Table C.7 Time needed for market-gardening/AJAC

Villages	Hours needed		Gains in time	
	Without pump	With pump	Hours	per cent
Diafilon	3,5	3	0,5	14,3
Ampuntoum	†	†	†	†
Sédhiou	2	2	0	0
Missira Camarang	8	6	2	25
Médina Koundié	††	††	††	††
Mangacounda	3	2	1	33,3
Bissine	4	2	2	50
Badème	4	3	1	25
Kongoly	5(5)†††	4(5)†††	1(0)	20(0)
Djidjipoune	4	3	1	25
Thionck Essyl	4	3	1	25
Diatock	5	3	2	40
Mongone	5	3	2	40
Kataba	5	3	2	40
Average	4,4	3,2	1,2	27,2

† In Ampountoum the women were not able to estimate how many hours it took them to draw water. Instead they said that they were able to fill their containers twice as fast with the pump than without.

†† In Médina Koundié the women said that they were four times faster when they used the pump instead of the cord and the bucket.

†††Old women's estimations in brackets

Table C.8 Time needed for market-gardening /ED

Villages	Hours needed		Gains in time	
	Without pump	With pump	Hours	per cent
Kabiline	5	3	2	40
Mahmouda Diola	2	1.5	0,5	25
Touba	4	3	1	25
Coulobory	2	1,5	0,5	25
Katipa	4	3	1	25
Diounoungué	5	3,5	1,5	30
Diounoung	2	1,5	0,5	25
Average	3,4	2,4	1	29,4

Table C.9 Market-gardening: consumption and marketing/AJAC

Village	Consumption in %	Marketing in %	Perished produce in %
Diafilon	50	50	-
Ampountoum	35	65	-
Sédhiou	50	50	-
Missira Camarang	50	50	-
Médina Koundié	n.a.	n.a.	n.a.
Mangacounda	40	60	-
Bissine	45	55	-
Badème	30	70	-
Kongoly	25	25	50
Djidjipoune	25	25	50
Thionck Essyl	n.a.	n.a.	-
Diatiock	10	75	15
Mongone	20	65	15
Kataba	-	-	-
Average	36	54	12

Table C.10 Market-gardening: consumtion and marketing/ED

Village	Consumption in %	Marketing in %	Perished goods in %
Kabiline	75	25	-
Mahmouda Diola	75	25	-
Touba	<50	>50	-
Coulobory	60	40	-
Katipa	65	35	-
Diounoungué	40	60	-
Diounoung	60	40	-
Average	61	39	-