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Implementation and Evaluation of Rural Development Projects
Under Uncertainty: With a Special Reference to the Sedhiou II
Project (Casamance - Senegal)

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A Plan.B Paper

MICHIGAN STATE UNIVERSITY
ECONOMICS DEPT.
RECEIVED

MAY 31 1983

REFERENCE ROOM

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE

Department of Agricultural Economics

1983

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my major professor, Dr. Allan A. Schmid, for his generous help, patience and supervision. My thanks are also extended to the members of my committee, Dr. Eric Crawford and Dr. Paul Strassmann, for their helpful comments and valuable recommendations. Dr. Tom Zalla and several informal advisers have been sources of excellent advice in the development of my degree program. My appreciation also goes to everyone who contributed formally or informally to my learning at Michigan State University.

I wish to thank Debbie Andrews for typing the first draft of this manuscript. The assistance of Linda Todd is very appreciated in the preparation of the final draft of this paper.

To all friends I made in this country I am very grateful for your making my stay rich and pleasant.

I am most grateful to the U.S. Agency for International Development for its financial support during my training.

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Chapter I

Introduction

A. Meaning of Development

This paper is centered around rural development projects. But what is meant, specifically, by development? There is a tendency for people to confuse development with economic development and to use national income as a yardstick for measuring economic development. Economic development is too narrow a concept to tell all the development story. There are political and social dimensions to development.

Any definition of development incorporates implicitly or explicitly some value judgements. But where are those value judgements to come from? The common answer is that they should come from governments through their planning documents or the development path of other countries whose present state is judged desirable. A definition of development is basically a political statement. But what are the basic needs all development strategies are intended to satisfy?

One answer is obvious, enough food, which is related to the satisfaction of a basic human biological need. Without enough food it is difficult for a human being to fully use her body and her mind. Enough income is a necessary but not sufficient condition for good nutrition as pointed out by Pinstrup-Anderson.¹ Another basic need is a lucrative occupation for people to earn their livelihood and to be able to satisfy their own needs without resting upon outside assistance. Income distribution is another important

¹"Nutritional consequences of Agricultural Projects: Conceptual Relationships," Oxford University Press for the World Bank.

aspect of development. A country relates its wealth to other countries wealth as do most human beings. The way income is distributed explains the gap between the average income per capita, in a country, and the proportion of the population living in poverty. Other considerations are education, freedom of speech and citizenship of a truly independent nation. But to promote those and other development objectives, plans, programs, and projects have an important role to play.

B. Plan, Programs and Projects, Their Role in Promoting Development

1. Planning of Development Activities

A plan is a systematically elaborated coordination mechanism which is aiming at coordination policies in order to ensure that the maximum impact is obtained from scarce domestic and foreign resources mobilized to foster development objectives. The development planning process as applied to the mixed economies of LDCs uses monetary and fiscal incentives to influence actions in the private sector but assigns production quotas when the government is directly involved.

A plan requires the availability of a range of information about potential investments. For a plan to be a good coordination device, and a means to reduce risk and accelerate the process of development, knowledge about the relationships between, on one side, the commercial and the subsistence sector, and, on the other side, between the public and the private sector is necessary. It is also necessary to know about the relationships through which poverty is caused, unemployment emerges and inequality grows.

Planning does not only require knowing about the fundamental relationships within a society. It also should be aiming at changing the interrelationships which are impeding growth and at anticipating the future, and if possible, shaping it.

To promote the desired goals and make the necessary changes, broad and unmanageable problems should be converted into specific and manageable tasks. It is then necessary to visualize a sequence of steps and mechanisms through which experiences from the past are incorporated into present decisions. In most LDC's, planners lack the data necessary to know about the past and are obliged to make projections about the future without facts as pointed out by Stolper (1966). Besides the lack of data and the uncertainty inherent to any attempt to predict the future, planners are facing two often important problems.

- First after creating the macroplan they need cooperation from ministries to fill in the plan and the needed cooperation is seldom forthcoming.
- Second, the scarcity of domestic resources, and unreliability of foreign resources, to finance the plan, make the planning exercise very difficult to undertake.

2. Programs in the Planning Process

When reading the development literature one cannot help but notice that there is no agreement about what constitutes a program and what is a project. Jon R. Moris (1981), for example, considers the projects reviewed by Weis, Waterston and Wilson (in Rondinelli 1977) as programs. Moris (1981, p. 47) defines a project as "a grass roots organization attempting to bring about development at the village level."

This confusion might come from the fact that different fashions about development, community development, integrated rural development, etc., bring with them different implicit definitions about what a project should be. Moris' definition fits more the community development approach to development, and, for him, integrated rural development takes a program approach to development.

Gittinger (1982) points out that the link between programs and projects is not, most of the time, clearly defined. He defines program activities as policy changes which need to be introduced in order to foster the development process. Among the cited program questions are those dealing with employment policy, and its impact on labor costs, input supplies and pricing, quota problems, and food grain pricing policies.

A program can be defined as a package of policies which are aiming at bringing about some structural changes in order to promote development. The fact that the emphasis of the development process has been put upon projects and that program financing has been neglected is detrimental to project success and development. This is more true for countries very dependent upon foreign capital to finance their development because program lending is still a "missing type of finance" as pointed out by Brandt et al (1980, pp. 232-234). The same authors point out four flaws of an exclusive reliance on project lending:

1. It favors large projects which are necessary to keep administrative costs of lending institutions down;
2. It favors new investments, rather than using existing capacity more efficiently;
3. It may encourage capital intensive technologies which are not appropriate to LDCs because of the tying procedures of lending agencies;

4. It may alter the development process of LDCs by making it subject to changing development views and priorities, to the last fashion, of lending institutions.

Project and program lending need to be seen as two complementary undertakings. Program lending complements project lending because they are disbursed more quickly and provide more flexible funds which can promote changes such as encouraging self-reliance, building social infrastructure, diversifying economies, and helping adjust to balance of payment difficulties.

In most LDCs, national development financial institutions can play a central role in allowing program lending to be combined with project lending, and to accomplish specific specific and well defined development programs which can lend themselves to monitoring and evaluation.

3. Projects, Their Role in the Planning of Development

Projects are units of activity designed to translate national plans into action. They are means to achieve larger development goals. Projects are the "cutting edge of development" (Gittinger, 1982), "the privileged particles of the development process", (Hirschman, 1967) and the "vehicles for social change" in many LDCs (Dennis Rondinelli, 1977).

Projects are the main vehicles for grants, credit, loans and technical assistance to LDCs by international financial institutions and aid agencies. But at the same time that projects are seen as playing a critical role in the development process, criticism of the way they are being planned and implemented has been widespread. The usual conclusion is that the dilemma of LDCs is that successful project planning and execution require a high level of managerial skill which is scarce in nearly all LDCs.

When reading the evaluation documents of completed projects, one has the impression that most LDCs are victims of a vicious project cycle whereby the same mistakes are made over and over again. As long as the necessary structural reforms are not carried out, through well defined programs which will bridge the gap between plans and projects, this unfortunate situation is likely to persist. The implementation and post evaluation phases, of the project cycle, are the places where lessons are learned, which should be taken into consideration not only for present project implementation and future projects design but also to design programs aiming at overcoming the main obstacles to project success.

C. Senegal

1. Some Background Information

Senegal is a middle income, oil importing LDC with a GNP per capita of \$430 in 1979. Senegal has a population of 5.5 million in 1979, is located in the Sudano-Sahelian zone of west Africa and lies from a semi desert at its north to a green and rainy region at its south. Agricultural production is the main occupation in Senegal and almost 75% of the Senegalese population are living in the rural areas.

Groundnut production is the main agricultural activity in Senegal and its performance is affected by the quantity and variability of rainfall. Millet and sorghum are subsistence crops for farmers and are grown throughout Senegal. Rice is the main staple for the urban population and most of the rural population of Casamance, in the south of Senegal. In Senegal, like in most LDCs, the urban population is growing faster, 3.3%, than the overall population, 2.6%, between 1970 and 1979.

The droughts of the late 1960s and early 1970s, which reduced rice and peanut production and increased rice imports, combined with the increase of petrol prices aggravated the already difficult Senegalese balance of payments situation. Indeed, the Senegalese balance of payment deficit before interests payments on external public debt went from \$14 million in 1970 to \$394 million in 1979. To solve those structural problems, and promote the development of the country, planning is a tool which has been, and still is, used by all Senegalese governments.

2. Development Planning in Senegal

Senegal, which played a central role in the French colonial administration, had to build a development oriented administration around that colonial administration after its political independence in 1960. To facilitate local participation and decentralize the planning process, the CER (Centre d'Expansion Rural) and regional planning units were created. Agricultural Marketing and credit were reorganized around ONCAD (Office National de Cooperation et d'Assistance pour le Developpement) and BNDS (Banque Nationale de Developpement du Senegal) respectively.

After twelve years of experience, the weaknesses of the new administration began to appear. Local participation was not effective, and project and program implementation was defective. The administration reform of 1972 was built around rural communities which are supposed to play an important role in the decision making process. To improve the performance of projects and programs implementation rural development agencies (RDAs) were created. In 1981 the Senegalese government began to introduce a system of performance contracting. For each period, the performance of the RDAs is to be judged according to indicators mutually agreed upon. This new approach is expected

to give high level support to the RDAs and diminish political interference into their operations.

The Senegalese planning option consists of combining a five year plan with a long-term development strategy which is aiming at transforming the country into a semi-industrial state by the year 2000. But planning and development are facing several problems in Senegal.

For the first plan foreign public financing was 30% (which was acceptable). Difficulties began with the fourth and fifth plan. Foreign financing was 52% of the fourth plan and, in 1978 at the middle of the fifth plan, 71% of the resources obtained to finance the plan came from abroad. At the same time the heavy debt burden contributed to aggravate the balance of payment difficulties of Senegal therefore limiting the national resources available for development activities.

In Senegal there is a large number of administrative entities which are seldom provided with the resources necessary to the fulfillment of their obligations. Collaboration between local administrative units is made difficult by institutional problems which oblige them to go through distant authorities even for a small piece of information.

If the stated objective is to decentralize the plan, the result is not that promising. For the sixth plan starting in 1981, 96% of the investments are allocated to projects decided upon at the national level.

D. Objective of the Research and Plan of the Remaining Chapters

This research adopts as its point of departure the fact that successful agricultural development project implementation has been scarce in nearly all LDCs. That explains why the evaluation documents of ongoing and completed projects have been often referred to as a literature of failure

by development practitioners. Thus far the emphasis has been put into trying to design and choose better project and using more or less sophisticated methods to take into consideration the impact upon projects of several future states of nature. For rural development projects uncertainty is not the exception but the rule. The uncertainties faced by rural development projects originate from several sources which affect the prediction ability of the project analyst. The implementations stage of projects is the place where the states of nature which needed to be predicted during the design stage of projects really occur and there could be a divergence between what was predicted and what really happens. Project implementation approaches differ as to their ability to allow learning to take place and experience to be gained which could be used to respond to unplanned events. Ongoing and ex post evaluations of projects could be useful at providing guidance not only for actual project implementation but also for future project design as they increase the stock of knowledge available to project managers and designers, therefore, reducing the uncertainty faced by the projects they are managing or designing. But to draw any conclusion from any type of evaluation it is necessary to separate the impact of the project from the influence of other forces working simultaneously in the same or opposite direction.

The objective of this paper is:

1. to look at tools used to introduce the uncertainty into project choice and design in order to point out their strength and their weaknesses and to assess their usefulness in the design and selection of projects, i.e., at the time money is committed to a project;

2. to discuss the ability of project implementation approaches to deal with risk and to learn from ongoing and ex post project evaluations for a successful achievement of project objectives; and
3. to analyze the methods used to isolate the impact of a project from the influence of other intervening variables so that the difficulty of experimentation in the social sciences can be ascertained and the bottlenecks to an effective learning identified.

This paper contains a reference to Senegal in general and to a rural development project in the Casamance region - the Sedhiou II project or P.R.S. II (Projet Rural de Sedhiou) in particular. A case study of the Sedhiou II project is not possible because it would have necessitated some field work which is not allowed by the circumstances and availability of information. Nevertheless, an attempt will be made to use the information which has been obtained to analyze selected aspect of the Sedhiou II project with an emphasis given to institutional issues. The institutional setting of a project tells a great deal about manager's ability to learn from, and to react and adapt to changes in the environment.

The plan of remaining chapters is as follows: chapter II contains a discussion of the ways the uncertainties faced by agricultural development projects are taken care of in project analysis; chapter III looks at the different approaches to project implementation under uncertainty; chapter IV is dealing with the problems linked with the evaluation of rural development projects; chapter V analyses selected aspects of the Sedhiou II project using information taken from the project regular reporting system.

Chapter II

Project Analysis in An Uncertain World

The tradition originated by F. Knight (1921) differentiates risk and uncertainty. According to that tradition both risk and uncertainty suppose an absence of knowledge about the outcome of an event because that outcome is affected by possible states of the world. If we know the probability distribution of the outcome we have a risky situation. The outcome is uncertain if we don't know about its probability distribution. Another presentation of the Knight idea is to associate risk with an objective knowledge of the probability distribution of the event and uncertainty with a subjective conception of the probability distribution of the outcome. No distinction between risk and uncertainty will be made here. First, there is no objective way of determining a probability distribution but only more or less subjective estimates. Second, probability distribution is a very convenient way to summarize the state of our knowledge about an event.

The planning of the development process takes place in an environment dominated by uncertainties. The uncertainties faced by a decision maker are context specific and are dependent upon the responsibilities they hold and the means he/she is provided to fulfill those responsibilities. A description of some categories of uncertainty faced by the analysts when they were about to design the Sedhiou II Project is given, followed by a look at the ways uncertainties are taken care of in project analysis.

A. The Uncertainties of the Sedhiou II Project

There are several ways of classifying the uncertainties faced by a project. One approach consists of classifying uncertainties according to their effect upon costs or returns and according to their political, socio-cultural or economic origin. Another approach differentiates the uncertainties about the project from the uncertainties about its environment without excluding an interaction between them (Little and Mirrlees, 1979). This last approach is more operational and management oriented in the sense that it can provide to the project management some guidance about project actions and ways of adapting the project to its environment. The last distinction will be followed in the analysis of the uncertainties of the Sedhiou II Project.

1. Uncertainties About the Project Environment

Sedhiou II was designed to follow a smaller rice project (Sedhiou I) in the same area.¹ The Sedhiou I Project can be considered as a pilot project in the sense that it certainly contributed to increase the stock of knowledge about the project environment. But still, when Sedhiou II was about to start, several problems were unresolved and others were emerging.

a. Socio-cultural environment

The Casamance region is dominated by a subsistence farming system. It is only recently that the Senegalese Government (SG) tried to introduce some changes in order to commercialize the Casamance farming system. Those changes have been rightly criticized because their aim is to make rural villages more dependent upon exogenous forces rather than to provide them with

¹In Senegal there are eight administrative regions each with administrative departments. Sedhiou is one of the departments of the Casamance Region.

the means of their self-reliance and to help them improve their living conditions (F. Snyder, 1977). The S.G. discovered the Casamance Region when the Senegalese rice imports became a heavy burden on the scarce national foreign currencies. The idea behind the new projects to be designed was to help the peasants improve their methods of production so that a surplus could be created to help feed the urban population. But for these goals to be achieved a good knowledge of the socio-cultural milieu is necessary. In that respect, several problems still have to be faced.

In the Casamance, the division of labor assigns to women the production of rice. Since the credit system discriminates not only against women but also against non-peanut producers, there are institutional barriers which prevent credit from reaching the largest proportion of rice growers (Rigoulot, 1979). This is an obstacle to the introduction of any technological package, through credit incentive, for rice production.

In June 1964 Senegal passed a law on the national domain which replaced all local land tenure systems and which says that the land is a national property whose usufruct should be given to those working it. The law also means that the government has a development right to the land. This means that it can use land to build social infrastructure or it can allow the private sector to use land for commercial purposes judged to be in line with development objectives. The application of the law was to be coupled with the national administrative reform and was beginning to be effective in Casamance only in 1975.

The new law introduced two types of contradiction in the socio-cultural setting (F. G. Snyder, 1977). The first contradiction is between the interests of the peasants and those of the government bureaucracy. There was a widespread belief that legal complexities were manipulated by local

bureaucrats to foster their own interests. There were rumors that government officials were trying to corrupt peasant leaders and village chiefs. The second contradiction involved the peasants themselves. As a result of government action some peasants lost their land in favor of others. There was increased mobilization of villages around their interests, intervillage frictions, and intergenerational conflicts.

At the beginning of the Sedhiou II Project, it was too soon to definitively assess how the national domain law would affect its performance. An unwillingness of farmers to improve and lend land was, however, already noticeable.

b. Politico - Institutional Environment

The contradictions which emerged from the application of the national domain law showed very clearly that there is a duplication of government and indigenous authorities in rural Casamance. The way elected peasants or hereditary leaders see the national domain law, or any other issue raised by government action, can affect its final outcome.

The Senegalese government has established a custom which consists of subsidizing the main agricultural inputs coupled with a heavy indirect taxation of cash crops. Those subsidies and taxes were taken care of by the CCSP (Caisse Centrale de Stabilisation des Prix). The objective of the Senegalese government is to stabilize some politically sensitive prices. It contributed to subsidize and sometimes to tax rice consumers (mainly urban). The CCSP was starting to have some financial problems by 1975. The question could be raised about its ability to keep subsidizing agricultural inputs such as fertilizer.

c. Natural Environment

The Sedhiou II Project is intended to allow for a complete irrigation of only 2000 ha¹ for rice cultivation out of 47,425 ha of total crop production and 14,875 ha planned for rice production. This makes its outcome very dependent upon the amount and distribution of rainfall. In 1972-73 rice production declined about 50 percent (Rigoulot, 1980). Besides the drought there are several biological problems such as crop disease, insect invasion and animal sicknesses which have not yet been mastered.

2. Uncertainties About the Project

The way the Sedhiou II was conceived called for the cooperation of several government parastatals not always under the same ministry²--ONCAD was supposed, at least at the beginning, to provide the inputs, except for the seed which was to be taken care of by the management of the project itself. BNDS was to provide for the farmer's credit to buy inputs. ISRA (Institute Senegalais de Recherche Agricole) was given the task of conducting research whose results would be used by the project. The coordination of this institutional complexity is a very important condition to the success of the Sedhiou II Project.

In project analysis the usual approach is to work with constant prices by assuming that inflation will affect the prices of inputs and outputs equally. This might be true for industrial projects but not for agricultural projects. The available statistics show that the prices of industrial goods increase more rapidly than those of primary goods. Another factor which complicates any evaluation of the costs and benefits of projects

¹ 1 ha (hectare) = 2.471 acres.

² BNDS is, for example, under the Ministry of Finance and Economic Affairs.

is the fluctuation of the exchange rate between currencies. The foreign exchange component of the Sedhiou II Project was estimated to be 43 percent of the total project cost. This makes it very sensitive to change in the relative prices of its costs and benefit components. The likelihood of cost over run is also increased by the difficulty pointed out by the Sedhiou I Project report, of getting on time the funds necessary to run the project.

Another unresolved problem, when the Sedhiou II was about to start, was a lack of an adequate marketing system and of economic incentives for rice to become a cash crop. ONCAD, which was given a legal monopoly for rice marketing, was biased toward peanuts mainly because a commission was paid to its workers on the groundnut collection but not on the rice collection. In addition, the relative prices of agricultural products was not an incentive for Casamance farmers to produce rice for the market. (Rigoulot, 1980).

Despite these uncertainties, the designers of the Sedhiou II had the benefit of the experience from the Sedhiou I Project, which can be seen as a pilot project. They also provided for some contingency allowances.

A pilot project is a means to reduce risk when there is not enough knowledge to predict the outcome. The main objective of agricultural projects in the Casamande is to commercialize the subsistence farming system. In that respect they constitute innovative social activities which justify the needs to undertake limited actions which can provide the knowledge base for future programs.

A contingency account is a reserve to meet adverse conditions. It is usual to differentiate between physical contingencies and price contingencies. Physical contingencies are aimed at protecting the project against adverse

physical events such as weather conditions and crop damages. Price contingencies are special expenditures to meet general inflation. Physical contingencies can be included in both financial and economic analysis, while price contingencies are allowed for only when the analysis is done at current prices. Contingency allowances, if well managed, are investments in themselves and can foster project success by providing a security cushion. For the Sedhiou II Project, a specific price contingency was applied to each project component and a 5 percent contingency to all project components.

Initiating a pilot project and providing for a contingency allowance are two ways of taking care of the unknowables in project analysis, except for price variations which can be predicted with some accuracy using econometric models. We now turn to the other ways of handling uncertainty in project analysis.

B. How Are Uncertainties Introduced Into Project Analysis?

Besides initiating a pilot project or providing for contingency allowances, there are several more or less satisfactory ways uncertainties faced by projects are taken into consideration when analyzing a project.

1. Pay Back Period

The pay back period is the time needed for the benefits of a project to equal the amount of its costs. The pay back period is a measure of project worth, as well as a means of reflecting the risk attitude of the decision maker when there is reason to believe that risk increases with time. If such is the case, the choice criterion among alternative projects or several design of a single project may consist of minimizing the time needed for the benefits of the project to pay off its costs. As a means of introducing risk

into project analysis, the pay back period has the shortcoming of ignoring profits realized late in the project period as well as the time value of money. Gittinger (1982) points out that the pay back period method is consequently seldom used as far as agricultural projects are concerned.

2. Risk Premium

In private decision making, the problem of risk is dealt with when it is time to choose the discount rate. A risk premium is added to the discount rate to reflect the risk attitude of the private investor. The same device is used to reflect the attitudes of farmers toward a new production technology which is likely to increase the variation of their income. Public decision makers also may use the risk premium as a means of penalizing project whose outcome is very uncertain.

The use of the risk premium method is justified when it can be argued that the uncertainties of the project are such that the probability of failure per year is constant. In that case it can be assumed that the risk faced by the project is positively related to time; therefore, the expected value should be reduced at a compound rate. Still, this method has the conceptual shortcoming of adding a probability to the time preference rate. Thus, the risk premium is a simple but unsatisfactory means of incorporating the risk attitude of the decision maker.

3. Sensitivity Analysis

Project appraisers use more or less informed guesses about the value of some key variables to determine the financial and economic values of projects. Sensitivity analysis aims to determine how changes in the value of important elements of the project will affect performance as measured by the internal

rate of return (IRR), the net present value (NPV), or any other measure of project worth. Those elements are usually considered one at a time, but some can be combined if their variations are simultaneous.

The sensitivity analysis technique is widely used as a means to deal with uncertainty. For agricultural projects, Gittinger recommends looking at the sensitivity of the project to assumptions about prices, delay in implementation, costs, and yields.

A good sensitivity analysis can shed some light not only on the actual investment decision but also to the future management of the project. Sensitivity analysis can be used to show how marginally profitable is the project. This is the case when a small percentage change of an important cost or benefit item leads the project to an unprofitable situation.

Sensitivity analysis can help point out the need to redesign the project because it is too sensitive to changes which are judged sufficiently likely that they cannot be ignored. If the performance of a project is very sensitive to the assumption about its implementation period, for example, and if the likelihood of delay is judged very high, then it is necessary to reshape the project.

Sensitivity analysis may lead to the choice of a project whose results seem less affected by alternative states of nature. It can give some guidance to management about the remaining sensitivities of the project, so that these can be watched very closely as the project is implemented.

The technique of sensitivity analysis is not always satisfactory. It has several limitations:

- (1) It is incomplete, because it considers only a small number of outcomes (judged the most important);

- (2) When conducting a sensitivity analysis the analyst is asking what will happen if a state of the world occurs without explicitly addressing the likelihood of the state of the world occurring. Decision still requires a judgement on the likelihood of the state of the world occurring.

Another way of presenting the sensitivity analysis is to compute a switching value. The switching value is a breakeven point from which the project goes from being acceptable to being subject to rejection. It supposes that a choice of time preference for money has been made. Little and Mirrlees (1974) see the switching value approach as a device to get the decision maker's valuation of unquantified values. The switching value relative to an outcome is seen as meaning that the value of that outcome is greater or less than the switching value. The same authors warn against an abuse of sensitivity analysis. They point out that sensitivity analysis should not be a pretext for the analyst to avoid quantifying cost or benefit items which are quantifiable or to fail to give guidance for the acceptance or rejection of the project.

To sum up, it can be said that sensitivity analysis can play at least three important functions. First, it can point out the need to conduct additional investigations about project unknowns or to reshape the project to make it flexible in adapting to unpredicted events. Second, it can lead to project approval by the decision maker if he/she has reasons to believe that the likely variations of the alternative states of nature do not pose a serious threat to project success. And third, it can show that the project success is dependent upon too many uncertain states of nature which are acting simultaneously, implying that more elaborate methods of incorporating risk into project design should be used.

4. Risk Analysis

It was seen in the previous section that sensitivity analysis allows only for some states of the world, looks at their impact upon only some variables, and is not concerned about the likelihood of those states of the world occurring. Risk analysis overcomes these and other shortcomings of sensitivity analysis. Risk analysis is not a way of eliminating judgement, nor should it be considered as a technique which provides a fast and ready formula for choosing among projects or several designs of the same project. It calls for an explicit judgement and suggests the following steps when investment decisions have to be made under uncertainty:

- (1) Use the best available judgements about the states of the world that are uncertain to assign probabilities of occurrence to those uncontrollable variables;
- (2) Use those probabilities to compute a set of expected returns for the competing project i.e., a weighted average of outcomes;
- (3) Choose among alternative projects on the basis of the sets of possible returns and their variance.

But where are the probability judgements to come from? Several sources are possible. Probability can originate from a person's degree of belief that an event will occur. That degree of belief is converted into a subjective or "Bayesian" probability. The judgement a person makes about the probability of occurrence of an event is no better than the tools he/she uses to make such judgement. Among those tools the most important are:

- (1) An information bank and a knowledge base, which give an understanding of the past outcome of the event;

- (2) A model which can explain the past performance of the event, and be used to extrapolate its future outcomes;
- (3) Statistics to relate the model to the data.

Seen this way, a probability is simply a way of expressing a judgement which is based upon a more or less sophisticated knowledge. It is a way of summarizing out knowledge about the outcome of a particular event. Where there is conflict about whose subjective probability to use, the decision maker is the one to solve the question.

Another way of getting the probability of occurrence of uncertain states of nature is provided by the Monte Carlo simulation technique. The Monte Carlo technique uses expert knowledge about the possible values of project parameters and applies a simulation technique to see how randomly selected values of those parameters affect the performance of selected mutually exclusive projects or several competing designs of the same project. The process of randomly selecting alternative states of nature is repeated enough times to allow the construction of a cumulative probability distribution of the measure of project worth.

As far as risk analysis is concerned, the decision rule is centered around the mathematical expectation of the outcome of the project. Given an uncertain variable and the range of its possible outcomes, the mathematical expectation is obtained by summing the products of the outcomes by their probability of occurrence. The expected value is not the only decision criterion, its variance also has to be considered. It is the trade-off the decision makers make between, on one hand, the expected value of the outcome from their investment and, on the other hand, the variance of that outcome, which determines their risk attitude.

The broader perspective taken by economic analysis, as contrasted with financial analysis, reflects itself in the way risk analysis is taken care of. Under economic analysis, the analyst needs to address not only the uncertainty of the outcomes but also how such outcome will be distributed.

Under uncertainty and at the financial analysis level, the expected value can be used as a decision criterion if the risks faced by individuals are small and are independent of other risks they are bearing (Sugden and Williams, 1978). Those conditions might be met if individuals are affected by the project indirectly through a tax system efficient at spreading risk. But benefits or costs are not necessarily small to a given group or region. Therefore, expected value is not always a good measure of the contribution of the project to the individual's wealth.

In the case of agricultural projects with a selected target group bearing uncertain direct costs and benefits, it is not sure that risks will be small. When there is evidence that a project imposes large risks on individuals who are risk-averse, Sugden and Williams (1978, p. 169) suggest that variance around the expected value be used "to establish upper or lower bounds to range in which the social benefits or costs of the project lie."

There are events whose outcomes are relatively certain at the aggregate level but very uncertain at the individual level. The law of large numbers allows a high predictability of the expected value without taking care of the variability of the distribution of the outcome among individuals. But how should the analyst address the uncertainty related to the distribution of the total outcome of a project? One attitude consists of adopting the potential Pareto improvement criteria which says that cost benefit analysis is only concerned with increasing the benefits available to society and it

is up to the tax system to see that the distribution of such incremental benefit is equitable. The potential Pareto-improvement approach is based on the assumption that the tax system is able to spread risk and equitably to distribute income.

Another approach is to ask to representatives of the target groups prior to the event what their expectations about the outcome are. If their amount at risk are small, and many projects are repeated, they may be risk neutral, and the results may average out to the average expected value. But if their amounts at risk are large some adjustments must be made to take into consideration their risk aversion, sometimes referred to as the certainty equivalent.

Among the advantages of risk analysis are that:

- (1) It reduces the problem of formulation judgement about the outcome of a project into the more manageable task of determining the likelihood of basic uncertain events. This allows more information and experience to be used to improve the rationalization of the decision making process;
- (2) It gives analytical insight into the necessity of project redesign by providing knowledge about the specific contribution of each uncertain variable to the probability distribution of the final outcome of the project.

Despite these advantages, risk analysis has to face the problem of correlation between uncertain variables. Correlation will give biased aggregate results because negative or positive correlation causes the variation of one variable to be lessened or aggravated by the variation of another variable. Great care should be given in understanding the problems

correlation poses to the validity of risk analysis and to properly taking care of them.

As a result of risk analysis, the project designer obtains for each of the competing projects, on one hand, an expected value and, on the other hand, a variance of the same expected value. A trade-off has, therefore, to be made between the size of the expected values and the magnitude of their variance. If among two projects one has a higher expected net incremental benefit and a lower variance, the decision is unambiguous. A difficulty arises when a project with higher and more variable expected outcomes has to be compared with a project with lower but less variable expected returns. For this last case the analyst needs to be given some guidance about the trade-off, as seen by the decision maker, between the expected net incremental benefit and its variance.

C. Incorporating the Risk Attitudes of Decision Makers

To correctly evaluate a project with an uncertain outcome it is necessary to seek knowledge about and incorporate into the analysis risk attitudes of the decision makers. It is also necessary for the public decision makers to provide guidance to the analysts about what expertise to use for subjective probabilities, and how to present the results of the risk analysis for a smooth interaction between project designers and decision makers. To avoid unnecessary inconsistencies in project choice dispersed decision makers need to adopt a common decision making rule.

1. Risk Attitudes of Decision Makers

As far as agricultural development projects are concerned, two categories of decision makers can be distinguished: the project target groups whose

members make micro-decision, and the public decision makers in charge of project approval.

Farmers' production decisions are influenced by uncertainties which originate from three main sources: the physical environments, input and output markets, and policy changes. For the analyst, the problem is to acquire a good knowledge of farmers' aggregated risk attitudes and to incorporate them into the analysis.

The attitude of public decision makers toward risk may not be stable and varies over time and from one project to another. At least two factors can cause the public decision makers' attitudes toward risk to change.

First, the decision makers may have to decide about several projects facing uncorrelated risks. If the national objective, as the decision makers see it, is to maximize total national benefits, compensatory risks can be relied upon for an approximate achievement of the expected benefits. But a complication arises if the decision makers take the position that additional income has different values for different groups or regions. Some projects, because of their political importance, can see their success or failure weighted more heavily than others and independently of their mere financial results.

Second, the trade off is not always between the size of the expected outcome and its variance. For large and specialized projects, the size of the variation of the possible outcomes around the expected benefit can be such that, when compared to the size of the national wealth, the risk becomes unacceptable. The degree of specialization of an undertaking, i.e., the limited number of states of nature upon which its outcome depends, causes

the variance around its expected value to be large. Indeed if the success of a project is dependent upon few states of nature, the gains can be very large if those states of nature are favorable, but the losses can be severe if the uncertain events happen to turn out unfavorably. The analysts need to know the sources of variance of several projects within an overall plan in order to assess the degree of dependence of those sources of risk and to see how they affect the expected performance and the size of its variance.

2. Interaction Between the Analysts and the Public Decision Makers

The analysts' role is to provide assistance to public decision makers, and in performing their duty the analysts use a lot of outside expertises. Risk analysis, for instance, uses expert knowledge to determine the probability of occurrence of uncertain events. Sometimes a choice is necessary between multiple, and often, contradictory points of view. It is thus necessary for the decision makers to provide guidelines about whose expertise to call upon for the design of projects or the undertaking of risk analysis.

The public decision makers' attitude toward risk is affected by several factors which are weighted differently through time depending upon the size and the degree of specialization of the project involved, and the relationship of the sources of their riskiness. It is thus necessary for the decision makers and the project analysts to agree in some guidelines about how to present the analysis results in order to ease the decision making process. Informal application of the game theory approach has been used for presenting consequences of alternative actions to the decision makers. Several decision rules can be devised. The maximum and the minimax rules are the most popular and consist of maximizing the minimum returns or minimizing the maximum losses, respectively. The advantage of the game theory approach is

that it allows the decision makers to weight various factors which can be stated only qualitatively. It has the shortcoming of leading to undesired inconsistencies, mainly when the decision making process is decentralized and there is a lack of precision in describing risk attitude of those who prefer a certain decision rule. The decision making rules can be related to the type of analysis and rejection rules for projects grouped according to their size, or any other relevant characteristic. The decision makers are ultimately responsible for determining the degree of risk which development activities should live with, and the analysts' role is to provide them with all the necessary assistance.

As we have seen, there is no perfect way of handling the uncertainties faced by a project. Each method for handling uncertainty adds its own shortcomings to the lack of reliable information. However, the methods used to deal with uncertainty are very useful at pointing out the variable to monitor closely and to react to as the project is implemented. Ways can be found to improve the way project analysts interact with public decision makers. Still a great deal of questions need to be addressed when considering project implementation.

Chapter III

Rural Development Projects Implementation in the Context of Uncertainty

Each definition of implementation implies an approach to implementation which can be judged only with respect to how well it goes about fulfilling the goals it has been set to achieve. Each rural development project has specific goals which are assumed to contribute to the broader goal of rural development. But what do we mean by rural development? Uma Lele (1975, p. 20) defines rural development "as improving living standards of the mass of the low-income population residing in rural areas and making the process of their development self-sustaining." Self sustenance goes beyond reaching and addresses the question of involvement and local institutionalization of independent decision making and problem solving capacities.

Rural development projects are implemented in an uncertain environment. The methods which are used to deal with risk are useful at easing the process of choice among alternative projects and at pointing out variables to adopt to as uncertain events become known during project implementation. This chapter examines the ability of the implementation approaches effectively to contribute to the achievement of self-sustained rural development and to adapt to unplanned events. Other aspects of project implementation under uncertainty are then considered.

A. Blueprint vs Flexible Approaches to Implementation

Implementation can mean achieving specified goals with specified resources. It can also mean a process through which there is a continuous interaction bet-

ween the setting of goals, and the mobilization of resources to reach them. Each approach to implementation has its own assumption and makes its own political judgement as to where the decision should come from.

1. The Blueprint Approach to Implementation

The blueprint approach puts a lot of emphasis on detailed preplanning and can be connected to the top down approach to planning. In this latter approach, the planner receives orders from the top authorities and transforms them into blueprint arrangements ready to be implemented. In these blueprint arrangements, planners are supposed to organize their efforts so that the policy proposals they put forward are systematic, efficient, coordinated, consistent, and rational. But if we are to judge planners, we have to go beyond the internal consistency of the planning documents, and look at the consistency of their proposals with the real world situation they are supposed to transform. What are the implications of the prerequisite of planning: being systematic, efficient, coordinated, consistent, and rational?

a. Policies Should be Systematic

Being systematic implies not only being orderly with respect to the explanatory variable, but it also implies knowledge of the causal relationship among those variables. To be systematic one should also consider alternatives. It costs time, talent and money to acquire knowledge and consider alternatives. The biological nature of agriculture and the usual complexities of the environment of rural development projects prevent any planner from possessing the causal knowledge needed to propose a systematic blueprint.

b. Policies Should Be Efficient

Efficiency means that the least costly way of reaching objectives should be followed. But this supposes that goals are clearly specified in advance of design. The planner needs to be given guidance with respect to the questions of efficiency for whom and for what before they can design projects which efficiently address those questions.

In the real world situation national objectives are vague, multiple and sometimes contradictory. Ambiguity of goals sometimes performs a political function when interests are contradictory. It is a means of consolidating national opinion to support a development action.

Rural development projects have multiple goals of an economic, political, and socio-cultural nature. What is efficient for the economic system may not be good for the political situation. One project design with a very good economic return may be traded off against another one less satisfactory when judged against the economic criteria alone, but which allows to the political system to perpetuate. The emphasis on efficiency assumes that the problem of contradiction among objectives has been settled which is seldom the case. Continuing arguments over goals may cause the project results to differ from those predicted.

c. Policies and Actions Ought to be Coordinated

Coordination means that the timing, quantity and direction of a package of activities should be supportive of a given objective, rather than contradictory. Lack of coordination has been pointed out as being one of the most important reasons for policy failure. Coordination fosters efficiency if objectives are agreed upon because it implies that participants contribute just what they should at the correct time. It is then a means of avoiding duplication, overlapping, and redundancy which are considered wasteful. Coordination is also aiming at fostering reliability because one of its goals is to

increase the likelihood of a given function being taken care of. Caiden and Wildavsky (1974) point out that in LDCs the lack of redundancy as a reserve has a negative implication for the coordination of the complex activities called for by development activities. There is a trade-off between efficiency and redundancy as a means of reducing risk by fostering reliability. Redundancy may be efficient in the long run.

What is needed to solve the lack of coordination depends upon the source of the problem. Does lack of coordination emerge because of conflict over goals or does it emerge from a failure to communicate? One's ability to coordinate policy is a function of the adequacy of one's opportunity set, meaning "available line of action open to an individual" (Schmid, 1978, p. 6), to the problem at hand. If coordination is lacking because there is a conflict over goals, coordination means forcing at least one party to do what it would not have done without coercion. In this case, the coordinator should be given coercive power if he/she is to bargain successfully (in the sense of reaching the chosen objective). Coordination can also be a way of sharing responsibility. To coordinate a policy in this case means to clear it with another participant whose consent is necessary. This form of coordination is very important in LDC administration where the emphasis is on vertically aligned authority, which complicates the horizontal coordination of agencies whose technical support is needed for successful project implementation.

People can agree over goals and still act in a contradictory way because of lack of knowledge. Achieving coordination, in this situation, means providing the missing knowledge. There can also be a misinterpretation of the goal the collective action is seeking and a meeting of the minds is the way to achieve supportive actions.

d. Policies Should be Consistent

Consistency can be defined vertically, i.e., with respect to a single policy over time, or horizontally, i.e., in relation to several policies at a given point in time. Vertical consistency means that the same policy has to be followed period after period. Horizontal consistency calls for a coherence among policies at any given point in time.

Consistency is not a good way of spreading risk. It can secure very high pay-off but also very severe losses. Inconsistency can be a virtue when it turns out to be a way of taking advantage of new opportunities and avoiding losses.

e. Planners Should Propose Rational Decisions

Rationality is used in the broader sense of reason and does not refer only to technical efficiency which means using the least costly way of achieving one's goals. Paul Dising (in Caiden and Wildavsky, 1974) differentiates between several levels of rationality or types of objectives: the rationality of legal norms and of social structure, the political rationality and the economic rationality. Each type of rationality addresses itself to the impact of a given decision upon its sphere of interest. There can be incompatibilities among the several levels of rationality and any public policy decision should consider those incompatibilities. Knowledge of the interaction between the different realms of rationality is necessary for the analyst to know how much of each to satisfy.

In developing countries, the planning function is most of the time performed by economists who emphasize economic rationality. But the less the market economy is important in a country the less economic planning has to offer. If rationality is to be given the broader sense of reason, knowledge of the economic, socio-cultural and political situation is necessary for anyone to know what reasonable action is.

The blueprint approach differentiates between the functions of the researcher, the planner and the administrator. They are most of the time located in different institutions. The researcher is in charge of providing the data needed for decision making. The planners use long-term prospective plans and five year plans as guidelines for goal identification and sectoral commitment. After identifying manageable subgoals, planning consists of determining the most cost effective combinations for reaching them and reduce those combinations to blueprints for implementation. Administrators have to follow the directives given by the blueprint.

The blueprint is very appealing because of its emphasis on all those virtues of efficiency, rationality, coordination and so on. When applied to rural development, the weaknesses of blueprint planning become apparent because of the assumptions it makes or predictability. Where goals are multiple, ill defined and subject to bargaining, the blueprint approach calls for a clear specification of goals for project design to take place. Where the need is to build a sustained decision making and problem solving capacity for development, it assumes that project staff can realize the targeted output and that projects have finite goals. Where there is a need to build intelligent institutions able to react to an unstable environment it differentiates knowledge building, decision making, action taking roles and assumes that the project is implemented in a stable environment where the needed linkages for the project to work are already operative.

The performance of rural development projects shows very clearly that the blueprint approach does not have the means of its ambition. The complexity of the development process calls for some humbleness. There is a need to integrate the knowledge seeking, decision making, and action taking roles so that as additional knowledge is gained, the planning tools can be used to react to unplanned and unexpected events.

2. Flexible Approaches To Implementation

The alternative to blueprint was at first termed "incrementalism" because of the adaptative process it uses to deal with development problems. Learning and intelligent adaption to changing circumstances are the key elements to this approach. The incrementalist's view sees the learning organization as a reactive organism which is able to build on its mistakes, capitalize on new opportunities, identify the ingredients for performance improvements and overcome the constraints to its expansion. A particularity of rural development projects is that they involve farmers whose behavior is not only a function of the adequacy of the project objectives and their interests, but also of their association to the problem definition decision making and action taking roles.

The incrementalism approach has been refined and conceptualized by David C. Korten (1980) to what is known as the learning process approach to rural development. He gives three characteristics of a learning organization. First, it embraces error instead of denying or externalizing it. Second, it plans with the people instead of adopting a top down approach to planning. And third, it integrates knowledge building with action taking instead of being tied to targets long after the situation has changed.

The discussion about the uncertainties of project analysis showed that there is no perfect way of preplanning an intervention. Reality will nearly always prove to be different from the projections planners make about it. The way an organization is responding to its error sets the limit of the experience it can draw from it.

-- In some organizations an error is seen as a proof of personnel incompetence which calls for a sanction. In such organizations, members direct their skills toward hiding their mistakes.

- Some organizations do not hide their mistakes but they speak about them only to put the blame on outside forces beyond their control. They externalize their error and the only action they take is to report their misfortune to higher authorities.
- Hiding or externalizing an error is not appropriate if one is to learn the most from it. The learning organization adopts as a point of departure the limited and imperfect characteristics of the knowledge of its members and looks on error as an important piece of information to be discussed and to learn from in order to take appropriate corrective actions.

The second characteristic of the learning organization is that it involves rural people in the planning process as distinct to simply trying to reach them (Lele, 1975). Rural people have their own ways of doing things and a lot of knowledge to contribute to rural development activities. After all they have their word to say in the design of any activity which affects their living conditions. Planning with the people and building on local knowledge make the adjustment to innovation easier and increases the rate of new technology adoption. It also keeps new technology within the control of the community as opposed to technologies which increase the dependence of farmers on external forces.

The third characteristic of the learning organization is that it links knowledge building to action. It does not adopt the attitude which consists of saying that once the program is designed all the important analytical work has been performed. Research, planning and implementation are brought into closer link. Each function is made partially dependent upon the others and all three are performed by a single organization. This integration is necessary if organizations have to react rapidly to an environment in constant change.

Korten conceptualizes the learning process into three stages each emphasizing on a different learning function which are successively: learning to be effective, learning to be efficient, and learning to expand. In the first stage the main concern is in developing a working device which realizes a high degree of fit between the beneficiary needs and the programs designed to address those needs. This stage is very resource intensive, uses a lot of intellectual input, requires a substantial freedom from normal administrative constraints and is likely to have a high rate of errors which should be on a downward trend. It should be fully used as a means to improve knowledge about learning methods, community dynamics, what are relevant questions to ask, and what is required to achieve fit for a given period of time and in a given setting.

In the second stage the major concern is to find the least costly way to satisfy the needs identified in the first stage. It draws heavily on the experience gained from stage one and tries to eliminate wasteful activities. Effectiveness may have to be traded off for an increase in efficiency. At this stage of the learning process, serious attention needs to be given to the organizational capabilities and constraints so that knowledge can be gained about the limits of program expansion.

The last stage is concerned with finding ways of intelligently expanding the program. This program expansion goes through building upon the strength and reducing the shortcoming of the organization so that it can take care of a larger scale operation. Expanding the program will mean some sacrifice in both effectiveness and efficiency and its rate is directly linked to the speed of organizational capability development.

The fact that the same mistakes are made over and over again, as pointed out by the evaluation documents of completed projects, means that we lack a strategy for progressive learning. To learn from experience an organization has to systematically analyze its results to understand in what respect those results are context dependent and under what circumstances some lessons might have broader application. Perhaps the learning process approach may provide a basis for the removal of organizational blockage and help foster the processes of development. In this approach the initial plan and budget is taken as a starting point, but a freedom should be provided to deviate from it as knowledge is gained and new opportunities present themselves. This calls for planning on a continuing basis.

The challenge of the learning process approach is that it calls for some change in the way the development process is conceived and a reorganization of the way development funding is provided.

- For the learning process approach to work, a bottom up approach to planning should be adopted. A decentralization of the decision making process is needed if farmers have to be involved and rapid adaptation to unplanned events is to be possible.
- Another obstacle to the learning approach comes from its incompatibility with the operational procedures of the lending institutions. The centralized decision making process of those institutions can be a serious obstacle to an appropriate response from an organization implementing a project they finance. Another problem with lending institutions is that the size requirement of the loans they provide is such that they will not be willing to fund programs which are still on the first two stages of their learning curve. This is another reason why the call by LDC governments for more emphasis on program lending, as opposed to project lending, has to be taken into serious consideration.

The learning approach is not calling for a small change, but the challenge it constitutes is the price we will have to pay if we want to bring about a sustained improvement of the farmers situation.

B. Choice of the Implementing Organization

Everybody agrees that flexibility is better than rigidity in an environment in constant change. The choice is not between the learning and the blueprint organization, in between there are a lot of possible combinations. The choice of the implementing organization will affect its ability to react and adapt to its environment. If a program is to be tailored to the capabilities of the implementing organization, the choice of the latter should be addressed from the beginning of the design. Organizational considerations to be dealt with concern the degree of functional autonomy, the control over project inputs and the ability of a given agency to handle another project or program.

1. Functional Autonomy

To avoid the administrative problems of functioning inside the larger bureaucratic system, some international loan and grant agencies such as the World Bank and the U.S. Agency for International Development tried to encourage the creation of administratively discrete service delivery systems focused on a particular area or a particular function. This approach which consists of "going outside the bureaucracy" (Pressman and Wildavsky, 1973), has the advantage of allowing the organization to hire new people, establish its own rule and work out operational procedures which are believed to bring about improved performance. However, the special treatment given to the autonomous organization will create jealousy and lack of support for the operation of the privileged organization.

2. Organizational Control Over Inputs

An important factor to consider when choosing an organization to implement a program or project is the degree of centralization or dispersion of the ingredients being planned for. The extent to which those ingredients are already effectively provided for needs to be considered when deciding which one can be left outside the control of the organization without jeopardizing the outcome of the undertaking. Those ingredients can be inputs, skills or services.

If the success of a program calls for the collaboration of several agencies each controlling some inputs, coordination of the activities of those organizations becomes a very important factor for success. It becomes necessary to formalize the coordination mechanism and define the rules of the game. Contracting can be a means of securing the delivery of an input or service.

3. Single vs Multiple Project Agencies

The choice of the organization can be reduced to answering the question of whether to create a separate administrative unit for the project or program or to rely on a super-agency for its implementation. The super-agency can bring about economies of scale, but its work load can be such that some diseconomies of scale might appear.

The choice of the right mixture of administrative autonomy, control over inputs, and administrative packaging of projects depends upon the environment within which the action is taking place. In each setting, experience and research should be used to relate institutional alternatives to the desired outcome. A transfer of experience should not be excluded, but care must be given to (1) identifying the success factors, (2) analyzing why they contributed to a successful outcome in one setting, (3) determining their likelihood

of being a success factor in the receiving setting and (4) looking for potential substitutes of each success factors. We need to adopt a learning process approach to organizational choice if we are to achieve a fit between "the requirements of the program and the distinctive competence of the organization" (Korten 1980, p. 496) in charge of implementing such program.

C. Ingredients for Successful Implementation

In the previous sections the emphasis was on farmers involvement and on the choice of the administrative arrangement. Now the focus is on problems linked to staff and leader relationships.

The relationships a leadership develops with its staff is a function of a lot of factors upon which it does not always have control. In some cases, the bargaining power of the leadership, its ability to use coercive power, is limited by political or social interference thus impeding the internal coordination and the effectiveness of the organization. Protecting the organization against negative political and social interferences is one way of fostering its efficacy. This is easy to say but difficult to do because those interferences are the bread and butter of some people.

Another problem to be dealt with is related to staff motivation. The approach which consists of putting a lot of emphasis on direct remuneration of monetary nature is not satisfactory to the uneven demand on the staff by rural development activities. Some indirect means, to obtain noncontractual additional capacities to handle temporary but heavy demands, are needed. For individuals to accept to respond to the unplanned needs of the organization, they have to be sure that their extra effort is appreciated and will be rightly considered. The group characteristics which allow the organization to face those peak load situations "include the evolution of an internal ideology, peer group loyalty, confidence in the potential efficacy of group action, and

the opportunity for individuals to achieve what they regard as being significant" (Moris, 1981, p. 26). The main characteristics of such an organization is that it seeks a reciprocally based internal cohesion through very intimate group learning and action.

D. Managing Data Collection

Caiden and Wildavsky (1974, p. 312) differentiate data from information. For them, "data is any bit, any number, any valuation that we collect; information is any subset of data actually used in making decisions." Data is necessary for an organization and its sponsor to know where the project or program is, what adaptative decision to take and what lesson to learn from the present experience. The attitude which consists of collecting a superabundance of data on the hope that it may, one day, be used to make decisions may be detrimental to the reliability of the data collected. The suppliers seeing that the product of their laborious effort is not used might stop worrying about the quality of the data they collect. Data collection has a cost, it uses staff time and organizational resources and should be subjected to a meticulous management.

Four management functions can be identified with respect to data collection (AID November 1979). The first is to identify what data is needed, when it is needed and what decision is made with it. No data should be collected unless satisfactory answers to those questions are provided. The second is to decide about the optimal level of time and money to invest in data collection. The management should define its optimal level of accuracy given the resource constraints it faces and the quality of data and resources trade-offs. The third management function is to identify the best data collection approach. Additional data collection should not be undertaken unless it is proven that existing and readily accessible data is not appropriate to the decision on

hand. The last management function is to coordinate the data collection and analysis exercise. Data collection is an investment as such it should be subjected to cost benefit analysis. Before investing in data collection we should ask ourselves if the value of the data is greater than its cost or if what we are giving up is less valuable than what we are getting. A similar reasoning can be applied to data quality. We can compare the incremental increase in data quality with the incremental expense needed to bring it about.

Too much attention has been given to quantitative data. More attention should be given to gathering qualitative knowledge if we are to understand the social impact of policy decisions.

E. Using Monitoring Information

Monitoring is a management function which is aiming at providing information about the progress of project implementation and to allow timely corrective actions to be taken in reaction to new unplanned events. It provides the basis for an assessment of the performance of the input delivery system as well as the level and initial effects of input usage. If properly used, monitoring is a tool which provides project management with information about where the project stands as compared to planned objectives. It can also provide some explanations as to what explains the observed performance, and point out the need to undertake a case study aiming at examining the validity of some project design assumptions. Monitoring is thus basically aiming at providing some feedback for an effective management of projects (Casley and Lury, 1982). Those feedbacks are related to several project aspects which are listed in Figure 1.

Figure 1

Data Requirements for Monitoring and Their Use
Use by Project Management

Data Required	Management Use
Financial	Comparison of expenditure and physical progress; financial accountability
Staff	Assessment of recruitment progress and quality of work
Construction	Watching progress of physical construction
Physical Inputs	Assessing the delivery system (timing, quality, quantity and price; reaching target groups)
Marketing	Evaluation of marketing channels
Input Usage	Determination of cost of production and technological levels
Production	Comparison of production performance to planned objectives
Adoption Rate	Assessment of the adoption of the technological package.

Adapted from Casley and Lury, (1982, p. 10).

The information which is necessary for a project management to have some feedback about what it is doing can be obtained from the monitoring of three main project aspects. First, monitoring project financial accounts can allow a comparison between expenditure and physical progress so that possibilities of cost overrun can be detected early enough for corrective decisions to be taken. It is also a source of strict financial accountability control.

Second, monitoring of project staffing can allow a check to be made between realized recruitment of project staff and the recruitment timetable so that contingency arrangements can be made if needed, for a successful project implementation. The quality of the work performed by the staff needs also be given the necessary consideration. Experience has shown that if productivity is the only performance measure, extension workers assigned in initially more depressed areas will be wrongly penalized. It is necessary to use indicators which measure the change in farmers' attitude toward the recommendation made to them by extension workers.

And third, the advancement of physical construction, and the performance of input delivery and output marketing systems need to be assessed and contrasted to planned objectives. As far as the input delivery is concerned, the project management should satisfy itself "that it is reaching the intended recipients at the right time, in the right quantity, and at the right price." (Casley and Lury, 1982, p. 17). The quality of the delivered input is also an important factor to consider.

Besides the strict timeliness of the input delivery system, as related to the planned time, its ability to face unplanned events, e.g., earlier than usual rainfall, is also to be sustained. An adequate and timely monitoring system is a prerequisite to a flexible, and adequate reaction to unexpected events.

Chapter IV

Evaluation of Rural Development Projects

A post evaluation consists of looking systematically at the elements of success and failure of a completed project so that experience can be gained which can be used to improve planning for the future and to reduce uncertainty. To learn from the experience of a completed project, its outcome should be determined, but the process which brought that outcome about should also be analyzed. The common elements of a post evaluation are: financial auditing to see that funds were used properly; examination of the effectiveness of the implementing organization in attaining the project's stated objectives; and looking at the impact of the project on sectorial, regional, and national objectives. The post evaluation process should go further and assess the distribution and permanence of results, the costs and benefits produced, the impact of socio-economic, political and physical side effects, the effectiveness of the technology diffusion and adoption process, and the impact of external factors on project outcome.

Post evaluation is not the only type of evaluation. On-going evaluation is an important management tool which provides project management with the guidance needed for an appropriate adaptation to changing circumstances. Special evaluations can be called for under certain situations. They can be periodic for important long-term investments and are aimed at giving guidance to important follow-up decisions. They also can be exceptional when a project faces very serious problems. No matter why or when it is undertaken, evaluation has the difficult task of isolating the impact of the project from those factors which are simultaneously working in the same or opposite direction.

A. Design of the Post Evaluation

The process of post evaluation involves the need to secure data that establishes causal relationships. One approach can consist of using available data to deduce the answer to a cause and effect question using strong established theories and knowledge about some aspects of social and economic processes to validate the deduction. Another approach which can be used to make explanatory statements is the diagnostic reconstruction method. (AID, November 1979). This approach is borrowed from the field of medical science and consists of working backward and reducing the plausible explanatory variables to a limited number of them. If the approach points out a single dependent variable as causing the effect we are trying to explain, we can have a higher degree of confidence on our explanatory statements. There are situations in which the only way we are able to make a more or less strong explanatory statement is to formulate testable hypotheses. There are several ways hypotheses can be tested.

1. Formal Experimental Design

The terms and the approaches used for testing hypotheses in the social sciences are borrowed from the scientific disciplines such as physics or chemistry. In a formal experimental design it is necessary to randomly define two groups, taken from a population as homogeneous as possible; one receiving the treatment, the other being used as a control group. If the experimental design is followed and if data is secured before and after the treatment, our confidence is increased as to the conclusion we draw about the causal link between the experiment and the observed outcome. When trying to apply a formal experimental design to the social sciences, the impact evaluation faces two important

problems. First, it is not possible to control all the factors which are working simultaneously with the experimental treatment. Second, unlike the scientific disciplines, there is no unambiguous way of determining causal linkages in the social sciences. This is to say that we can reject our hypothesis that the predicted change does not occur but can never be 100% sure that the predicted and observed change is due to the ingredient we added to the environment. It is thus necessary to adapt the design of the experiment to the complexities of the social science disciplines.

2. Practical Compromises

There are three important characteristics of the formal experimental design with respect to the relationships between, and the choice process of, the control and experimental groups and the period for which data is secured. First, the two groups must be chosen randomly. Second, they should be drawn from a population whose members have similar characteristics. And third, the measurements should be secured before and after the treatment. The quasi-experimental designs that are relatively common in rural development projects can be distinguished with respect to their divergence from those characteristics of the ideal design.

a. Quasi-experimental Designs

The first type of quasi-experimental design used by agricultural project impact researchers is the dynamic control group method (Campbell and Stanley, 1966). This method uses two groups, one being exposed to the project, and takes and contrasts before and after measures. The two groups are not chosen randomly but the more similar they are, and the more unbiased is the method used to select them, the more strong a case is the conclusion we can draw from our experiment. For the evaluators to be able to use this method data must be secured for the two groups during the planning phase of the project.

The impact evaluators are often limited on their choice mainly if they are only called upon when the project was already in operation or had been terminated. They often end up using a second quasi-experimental design which consists of defining a control group and securing data about it only at the time of the evaluation.

There are some equity problems related to the use of the two quasi-experimental designs if the project is designed to provide social services such as health, family planning and nutrition, and it is more so with the dynamic control group. The equity question raises itself because on the name of knowledge about causal relationships a group of people are prevented from receiving a social service. For that and other more pragmatic reasons other simpler but less satisfactory devices have been developed. One approach consists of taking before and after measures for a single group.

b. Single Group Before and After Measures

Before and after measures of a same group can be good measures of the impact of an intervention in two situations. The first is when we want to measure the impact of a policy or an event that affects everyone in the population of interest, roughly the same way. The second situation occurs when we are trying to determine the impact of a project that serves everyone. Most of the time, however, the before and after measurement method and other less satisfactory approaches are imposed upon the evaluation researcher by pragmatic constraints and cost considerations. There is a trade-off between an increased control over the threat to validity of the conclusion we draw from our experiment and the price we pay to secure such increased control.

B. Threats to Post Evaluation Validity

The evaluation designs differ not only according to their costs but also in relation to the way they control for alternative explanations of the observed

incremental outcome. Another problem is related to the extent to which the lessons learned from the experiment can be transferred to other settings. This is to say that there are threats to internal as well as external validity of the experiment.

1. Threats to Internal Validity

To discuss the idea of threat to internal validity it might be helpful to introduce the concepts of variable and hypothesis. To make any explanatory statement the impact evaluator needs to secure data about those behavioral or physical factors that changed during the time horizon of the study. Those factors are called variables. There are three types of variables: dependent, independent, and intervening variables. Dependent variables are those variables which the project is intended to change. Independent variables are the conditions under the control of the project and which are used in order to change the dependent variables. Intervening variables are those variables that are outside the control of the project but can contribute to change the dependent variables in ways not always known. A hypothesis is a statement of the expected causal relationship between one or several independent variables and one or several dependent variables. The intervening variables are the threats to the validity of the conclusion which consists of attributing the entire change of the dependent variable to the independent variables. Gittinger (1982) warns about confusing the with and without, and the before and after approaches to impact evaluation. The before and after approach fails to take into consideration the positive or negative effects of the intervening variables. Campbell and Stanley (1966) list seven possible threats to internal validity which are not mutually exclusive and can interact to complicate even more the impact evaluation process.

Five of those threats to internal validity are time related intervening variables. First, an element of the environment may have changed between the two observed periods. Second, the comparison groups may be affected differently by the running of time through aging and maturation. Third, the performance measurement tools may have changed. Fourth, the pre-project test may have given different levels of learning opportunity to the experimental and control groups. Fifth, the samples may differ because of changes in the composition of the groups being observed due to mortality or migration. Two additional threats to internal validity are related to the selection of the comparison groups and to the inherent instability of the dependent variables. The selection process of the experimental and control group may be biased because of the power or some other distinguishing characteristics of the former group. Any improvement in the post-project period might be due to some natural regression activated toward the mean level rather than being caused by the project.

Changes related to the environment, the personal characteristics of the participants, and the test and testing procedures can provide competing explanations to the difference between the before and after project situations. The impact evaluation designs differ as to their ability to control for the threats to internal validity. It is necessary to know the limits of the design which was followed when drawing conclusion from the testing of the hypothesis.

2. Treats to External Validity

One goal of project evaluation is impact measurement. Another is to capitalize the experience so that it can be used to improve actual project implementation and future project design. There are, however, threats to the transfer of experience from one project to another. The main difficulty stems from the fact that the characteristics of the two environments, their parameters, might be different. The replication can be complicated by the fact

that the project components are seldom the same from one case to another. The degree of complication of project has the tendency to increase and so does the talent needed to implement them. Even if pilot projects are designed, as a means to experiment more ambitious changes, their artificiality, the emphasis of the evaluation methods on making definitive and quick judgement, and our lack of efficient learning methods can be serious threats to the external validity of the potential experience of the pilot project.

C. The Evidence and Its Weight

The first step in any impact evaluation exercise is to define the norms against which the outcome of the project has to be judged. Those norms are most of the time defined by the objectives the project has been designed to achieve. A critique of those objectives might be appropriate to see if they are compatible with the broader development objectives. The adequacy of the project components to the objective set forward has also to be sustained.

Another step is to choose the evidence which shows the relationship between the objectives and what has been achieved. The tendency has been to emphasize quantitative data and to neglect qualitative evidences which inform about perceptions and intangible costs and benefits. Proxies are used as second best measures of some goal performance which are difficult to measure. The choice of evidence and the unit of their measurement is not neutral: political preferences of institutions and individual researchers have an important role to play.

The judgemental function of impact evaluation faces the evaluation design constraints which dictate the threats to internal validity researchers will live with, and the learning aspect is made difficult by the several obstacles

which make the result difficult to replicate. More emphasis on learning and learning devices might be a good way to improve the usefulness of project impact evaluation by making their result more useful to actual project implementation and future project design. Post evaluation should not be given priority over on-going evaluation but instead should be a way of finalizing and harmonizing the lessons drawn from several on-going evaluations.

CHAPTER V

THE SEDHIOU II PROJECT

The Sedhiou II project was financed jointly by the World Bank, the French CCCE (Caisse Centrale de Cooperation Economique) and the Senegalese government. It followed a first Sedhiou rice project and was supposed to be completed after four years which seems to be too short a time for an integrated rural development project to reach its objectives. A third Sedhiou project is now either in its negotiation or implementation period. This four years project cycle seems now to be accepted as a rule of thumb by the Senegalese Government and donor agencies mainly the World Bank. It is likely to lead people to spend more of their time designing projects for foreign financing than looking at ways to make them work.

This analysis of the Sedhiou II project will proceed as follows: (1) description of the project, (2) look at the constraints imposed by the source of data and the project reporting system to any analysis likely to lead to the undertaking of a corrective action (3) analysis of selected aspects of the project and (4) conclusions and recommendations.

A. Description of the Project

1. Project Location

The project is located at the middle of the Casamance region in the South-West of Senegal and covers the 7,300 square kilometers of the Sedhiou administrative department. In 1975 the Sedhiou department

had a population of about 197,000 people of whom 90% were rural. There were about 800 villages, 18,000 family farms of 4.5 ha average size. The average family size was 11 people of which 7 were active. The main ethnic group is Manding with 36% of the population. The other dominant ethnic groups are:

Balante	22%
Peulh	20%
Diola	14%

The climate is characterized by a rainy season of about five months, from June to October, followed by a dry season from November to May and 80% of the annual rainfall occurs during the months of July, August and September. The average annual rainfall is about 1,390 mm and varies from 1,500 mm in the South to 700 mm in the north of the project area.

Four main soil types prevail in the area (1) the ferralitic leached tropical soils of the plateau or "beige soils;" (2) the feruginous leached tropical soil of the plateau or "red soils," those two types of soils are very well suited to groundnuts, millet, and rainfed rice; (3) the mixed colluvial "ocre soils" on the slope of the plateau less suited to dry crops; the "grey" and hydromorphic soils of the valley very well suited to rice cultivation.

The Casamance river crosses the flat Sedhiou department and in some part of the year bring some salt water from the Atlantic Ocean to the project area.

Agricultural production is quite diversified and for the 90,000 ha cultivated in 1974/75, the following cropping pattern was observed: 20% of rice; 20% of millet and sorghum, 42% of groundnuts and 8% of

other subsistence crops such as maize, cassava, cowpeas and vegetables. The livestock herd consisted in 1974 of about 113,000 cattle, 77,000 sheep and goats and 12,000 hogs.

The road system is fairly good but the all weather roads give limited access to most of the villages of the project area. The secondary roads which serve most of the villages need to be improved to make these villages more accessible during the rainy season.

The town of Sedhiou is connected to the Senegalese telephone network. Under the first project radio equipment was purchased to link the project subunits with project headquarters.

Thirty percent of the 32,000 school age children of the Sedhiou department are going to school and some form of functional literacy among adults is provided by a special government unit (Secretariat d'Etat à la Promotion Humaine). Cooperative officers are provided training by ONCAD and a center at Sedhiou trains rural blacksmiths, masons and carpenters.

There is one 60 bed hospital at Sedhiou which is not well equipped and does not have a medical doctor as part of its staff. There are nine secondary medical-aids posts in the Sedhiou department.

Agricultural research is conducted by ISRA which has two stations in Casamance: one at Sefa, in the Sedhiou department, for rainfed and upland crops, the other at Djibelor near Ziguinchor which works on irrigated rice. ISRA has bred well adapted seed varieties which are multiplied under contract by selected farmers who are paid a premium. The seed multiplication program would be the responsibility of the Project Management Unit.

2. Project Objectives

The Sedhiou II project was aiming at encouraging farmers to adopt improved crop and livestock production techniques by supplying them with inputs credit and technical assistance. The farm families which already participated in the first project were provided assistance to induce them to adopt a higher level of technology. Some farmers which were previously using traditional techniques were provided assistance to help them adopt the improved cropping techniques which have proven to be effective under the first project. In addition the project was aiming at encouraging farm families from both groups to take up better livestock practices and to strengthen cooperatives by training their management and promoting the organization of Cooperative Unions. The project was targeted to about 50% of the rural population of the Sedhiou department and was implemented by the same management unit as established under the first project.

3. Project Main Activities

The Sedhiou II project was designed to promote improved farming practices and the integration of livestock raising and crop growing. The project was supposed to undertake the following activities:

- (a) establishing water control schemes for the improvement of 2,000 ha of paddy rice fields;
- (b) introducing animal traction with the goal of generalizing it;
- (c) providing training facilities for project staff and farmers;
- (d) production and distribution of improved seeds;

- (e) organizing the supply of farm implements, fertilizer, pesticides, and seeds, and distributing these to project farmers either for cash or under medium term and seasonal credit arrangements;
- (f) installing 28 small cooperative owned rice mills equipped with storage facilities;
- (g) promoting improved livestock husbandry through better animal health care and use of supplementary feedstuffs, and organizing the marketing of livestock products;
- (h) constructing 100-150 tons and 5-500 tons warehouses, and 5 warehouse shops to ensure an adequate storage of first need goods and improve their distribution to villages involved in the project;
- (i) providing assistance to rural craftsman;
- (j) monitoring and evaluating project activities.

The project implementing unit was given additional means to enable it to carry out its increased responsibilities. It was supposed to become part of a regional development agency which would be given the responsibility of planning and carrying out integrated rural development activities in the Casamance region.

4. Organization and Management of the Project

The project management organization went one step further toward the integration of the rural development institutions in the Sediou department. The project implementing unit was given the responsibility of supervising agricultural production, livestock raising, improved seeds multiplication and distribution, and farm input distribution. Those activities were previously taken care of by different government

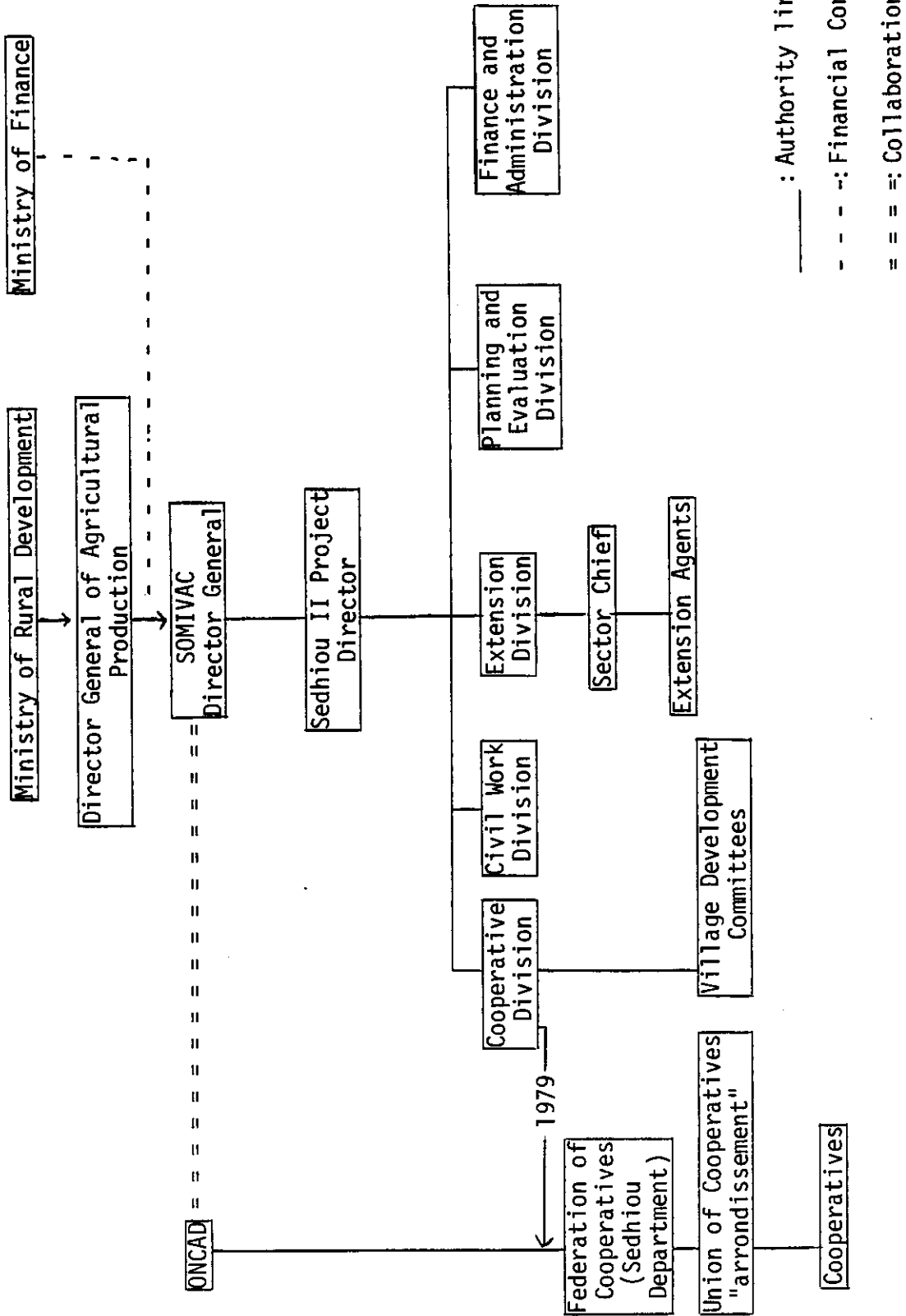
services. In order to institutionalize the new practices the project has as one of its objectives the consolidation of farm cooperatives.

Besides the project manager the project was organized around five divisions each with a division chief. The responsibilities of those divisions were as follows:

- (a) extension: promoting improved agricultural production and storage practices; taking care of seed multiplication and distribution; training of field extension workers, other staff members of the project and pilot farmers who are supposed to be the agents of technological change; promoting improved animal husbandry practices; providing assistance for animal nutrition and health; supervising and promoting animal traction;
- (b) planning and evaluation: programming and monitoring of project activities and evaluating its impact; coordination of research and extension activities;
- (c) finance and administration: financing, accounting, personnel, general services and procurements;
- (d) civil works: preparing layouts and contracts for civil works, supervision of works, maintenance of project infrastructure, road and equipment including rice mills;
- (e) cooperatives: assisting and supervising cooperatives in credit, procurement, input distribution and accounting training of cooperative staff.

The organization of the project as well as its place in the Senegalese bureaucracy is shown in Chart 1.

Chart 1. Administrative Organization of the Project



B. Source of Data: The Project Reporting System

Most of the information used for this analysis is taken from the project's regular reporting system. The quality and quantity of the monitoring information and its level of aggregation set the limits of the type of analysis which can be performed with it. Therefore, before going further, it is necessary to take a critical look at the monitoring system of the Sedhiou II project, to state the problems it was facing and to search for alternative solutions.

1. Critique of the Project Monitoring System

If a monitoring system is to help project management keep track of project activities and provide knowledge about project progress it has to be more than a data compilation exercise. The data to be provided by a monitoring system is to be tailored to the evolving needs of the project decision makers. Those needs vary from one project to another but there are three basic issues any monitoring system should address. Those issues are related to (1) the input delivery system, (2) the actual use of input as contrasted to their planned use and (3) the initial effects of input-usage as compared to the planned effects (Casley and Lury 1982). Knowledge about those issues is necessary if corrective and strengthening actions have to be taken as the project unfolds. To those and other very important questions the Sedhiou II project monitoring system provided an incomplete or no answers.

The input delivery issue has been dealt with and the monitoring system provides a basis for assessing its timeliness and its ability to respond to unexpected circumstances such as an early beginning of the rainy season. The monitoring system allows also a comparison between the input demands of the farmers and their satisfaction.

The weaknesses of the monitoring system start to appear when the issue of the use of the delivered inputs is raised. The quantity of

inputs used by the project are given in an aggregate fashion by type of inputs. There is no disaggregation of input use per crop which would have allowed some averaged computations of cost of production. This is very important for crops such as rice for which an alternative to local production is importation. The debate about whether or not Senegal has a comparative advantage for producing rice is beginning to be well documented, and one of the project's stated objectives is to reduce Senegalese rice imports through an increase of local production and marketing of rice. Any project management concerned about knowing how its project is doing compared to the alternative solution would try to gather information which will make possible the computation of the average cost of production of its main outputs. Average costs computations are also very important tools if the project management is to be able to analyze the impact of input and output pricing policies on farmers' cropping pattern and technology adoption.

Furthermore, the Sedhiou II appraisal documents refer to several levels of production techniques and make some assumptions about their importance during each of the four project years. Even if the information allowing the computation of the average cost of production for each crop was available, we would still be unable to assess the validity of the assumptions about farmers' rate of adoption of new technology. The monitoring system does not classify the used inputs and the obtained outputs per level of production technique so that the importance of each level of technology and its average performance can be ascertained. It is not, therefore, possible to gain from the project monitoring system an understanding of the adoption, or lack of adoption, by farmers of the different technological packages recommended to them by project extension agents. Furthermore, it is not possible, for the project management, to monitor the work performed by a large group of project employees, i.e., the extension agents.

The project monitoring system has another important shortcoming. Enough emphasis is not given to qualitative data which provides information about the reactions of the farmers to the service they are provided. That qualitative information could be related to farmers' rating of the extension services based on the availability of extension agents and the relevance of the technological package, or to the constraints which prevent them from following some project recommendations. Suggestions, from farmers, about ways to improve both the technological package and the way it is delivered to them could be very useful to collect.

Given all these weaknesses of the monitoring system it is difficult to document any departure from expectations, and to provide arguments for the need of an on-going evaluation and/or of taking corrective or strengthening actions. The reason given for not providing information which classifies inputs use and output performance according to the anticipated levels of production techniques is that there is a lack of a clear-cut understanding about the Sedhiou farming systems. It is only in 1979, at the end of the Sedhiou II project, after the donors expressed their criticisms about the weaknesses of the project monitoring system, that a SOMIVAC (Societe de Mise en Valeur Agricole de la Casamance) study was started which was aiming at providing a description of the farming systems in the Sedhiou area.

2. Source of the Difficulty

The situation in which the Sedhiou II management found itself illustrates the complexity of the Casamance societies, and points out the importance of trying to better understand them for an effective contribution to their development. In LDCs in general, and in the Casamance

in particular, the development practitioners have the problem of finding a workable definition of the farming system. On theoretical grounds a farming system can be defined by combining sociological and technological characteristics. The sociological characteristics refer to the size and composition of the farming family as well as the way decisions to produce and consume are taken. The family farm can be composed of several households whose members consume and/or partially produce together. It can also be composed of a single household. In the first case there are two categories of fields: (1) there are collective and mainly subsistence crop fields to the cultivation of which every active member of the extended family contributes, (2) there are cash crop fields which are owned and cultivated mainly by members of any given household.

In the Sedhiou area to the diversity of the ethnic groups corresponds a variety of the ways production and consumption decisions are taken. In the Mandingue, Peulh, and Diola societies the extended family is still very important. The household type of farming families are predominant in Manjak and Mankagne societies and tends to gain in importance in relation to the extended family farm for all the societies of the Sedhiou area (SOMIVAC 1979/80).

The technological aspect of the definition of the farming system, refers to the availability of animal traction and/or the adoption of improved production techniques.

3. Search For a Workable Definition of the Farming System

For practical purposes several characteristics have been adopted by development practitioners to define the family unit. The adequacy of any definition is dependent upon the objective at hand. Spencer (1972)

and Norman (1973) adopted the definition which consist of saying that the family is composed by all the people eating together. Tollens (1979) adopted a production oriented definition of the family unit. The SOMIVAC study (1979) seems to call for a definition which combines those two characteristics (people consuming and producing together).

All those cited definitions might be sociologically satisfactory but for the purpose of project monitoring the information they provide should be used to determine the impact of different family structures upon technology adoption. The family farm incorporates a technical as well as a sociological component, but for the purpose of monitoring agricultural development projects which are aimed at promoting adoption of technical packages, we prefer Tollen's definition. To systematically assess technological change the following two steps are proposed:

(1) Using the level of technology as defined by the availability of animal traction in the family and/or the level of input usage as the basis for data collection, monitoring and evaluation. Sales records of farm implements and inputs can be useful sources of information. This data might need to be updated by a rapid survey, but are generally available within Senegalese parastatal organizations.

(2) within each group as characterized by its level of technology, make a classification of the family farms according to the sociological characteristics mainly single vs. multiple household families.

The simplicity of this proposed solution comes from our belief that for the purpose of efficiency and for pragmatic reasons the Sedhiou II monitoring unit should go step by step by first adopting and mastering simple procedures before refining its research and analysis approaches.

C. Analysis of Selected Aspects of the Sedhiou II Project

The project reporting system limits the scope of the analysis which can be performed with the data it provides. The following areas are selected for analysis: (1) the project institutional problems (2) the agricultural production achievements, (3) rice as a cash crop in the project area, and (4) the credit repayment performance of the Sedhiou II project.

1. Institutional and Management Issues

a. Administrative and Coordination Problems

As a parastatal or part of a parastatal, the Sedhiou II project was subjected to the disbursement and bidding rules defined by the Senegalese Government. In Senegal there is a committee in charge of examining and approving all public contracts and a very strict control is exercised on any public fund disbursement. Public contract biddings and fund disbursements go through a long and slow process. The further the administrative unit is from Dakar, the capital city, the longer the bidding or funds disbursement process will be. The local administrative constraints combined with the multiplicity of the outside donor agencies involved made it difficult for the project management to reach a satisfactory execution of the investment and extension programs. The civil work and extension divisions suffered the most from the weaknesses of the Senegalese administrative procedures.

The performance of the civil works division was impeded by its lack of material, mainly cement, due to the slowness of the public bidding procedures. Another problem faced by the civil works division was its inability to enforce public contracts once signed. One enterprise contracted to build a water control scheme did not finish the work on time.

In Senegal, priority is not given to public contracts which private businesses regard as a way to fill gaps in orders because of slow public debt payment procedure and weak public contract enforcement by government officials.

At a certain point in the life of the Sedhiou II project it was very difficult for the project staff to supervise project activities because of lack of vehicles in good condition. The project vehicles were not repaired because the spare part delivery was stopped due to unpaid bills.

The Senegalese Programme Agricole (P.A.) was started in the early 1960's and consisted of providing credit to farmers through cooperatives and ONCAD for acquisition of farm inputs and equipment. The aim was to improve production and productivity of groundnuts and cereals. The P.A. contributed to increase agricultural production up to 1968 when it became evident that any further increase in production would need to go through stronger extension services promoting more advanced agricultural practices and improved cropping patterns. While the cooperatives were still under the supervision of ONCAD, the project created 351 Village Development Committees (VDC) out of the 479 villages of the Sedhiou department. Those VDC were used by the project to channel credit, and to prepare and execute the agricultural program. The VDC are devices to overcome the credit constraint faced by rice growers. Most rice growers are women who are not allowed to become cooperative members and thus do not have direct credit from the cooperative. The credit capacity of the cooperatives is based on their groundnuts production sold through ONCAD which limits the credit volume of cooperatives which are mainly rice growers.

In June 1979 the Sedhiou II management was supposed to take in charge the cooperatives in the project area following an agreement signed by the

directors of ONCAD and SOMIVAC. The transfer took place under conditions which made it difficult for the management of Sedhiou II to fulfill its obligations:

- the transfer was done in November 1979 instead of June 1979 as agreed upon;
- ONCAD moved all its vehicles to Ziguinchor making difficult any conjoint visit of the cooperatives by ONCAD and PRS staff and a timely beginning of the crop marketing activities;
- the ONCAD staff did not receive any instruction about an orderly transfer of the cooperatives to the PRS management. Some ONCAD staff members left before any contact with the PRS management;
- the files which were transferred were most of the time very poor and lacked basic information such as membership, share and non-recovered debt situations.

This unfortunate situation occurred because it was not possible for the Sedhiou II project management to use any coercive power in its coordination of project activities with ONCAD. Before being dismantled in 1980, after national and foreign voices mounted for a limitation of the already important damages, ONCAD had a huge and powerful bureaucracy having at its disposal a budget larger than the Senegalese state budget. ONCAD made any effective project management difficult because of its inefficiency and the control it had over inputs and output marketing.

After dismantling ONCAD the Senegalese government gave to individual project authorities the responsibility of supervising the cooperatives. But a timely delivery of farm inputs and an adequate marketing of outputs still calls for an effective coordination of activities outside the control of project managers. Input have to be delivered to the project by SONAR

(Société Nationale d'Approvisionnement de monte Rural) before they can be distributed to farmers. In addition, funds for the marketing of farm outputs have to be gotten from BNDS.

The Berg Report (World Bank 1981) refers to negotiations between the rural development agencies and the Senegalese government to adapt performance contracting schemes, already operational in few Senegalese parastatals, to the requirements of rural development project implementation. Currently project manager can rightfully externalize the difficulties they face as they implement projects. It is, therefore, necessary to increase the managers' control over the elements of project success if there are to be responsive to changes on the project environment and to be held responsible for project success or failures. It is urgent that the special biological and economic characteristics of agricultural development activities be understood by the central administration.¹ The biological nature of agriculture defines the time needed for production activities. In addition, the production clock limits the ability to react to unplanned events. It is thus necessary to simplify the funds disbursement and public contract bidding procedures for the Senegalese parastatals in general, and those in charge of implementing agricultural development projects in particular.

A progressive decentralization of the decision making processes is also needed as managers who have adequate decision making skills and are responsive to farmers' need are available, and as an effective financial accounting system is put into place. Such decentralization will make managers' reaction time compatible with the speed needed to adequately respond to unforeseen events and take advantage of new opportunities. It will also allow increased

¹It is mainly referred to the CEP (Centre des Etablissements publics) in charge of controlling the funds disbursement of parastatals and the CCP (Commission des Contrats Publics) whose responsibility is to approve public contracts. They are under the ministry of finance.

knowledge of local people and institutions to be used for a continual improvement of the fit between local needs and the programs which are designed to address those needs.

b. Farmers' Participation

The number of farmers served by the project more than doubled, in four years, going from 34,880 to 77,267 between the first and the last project year. Farmers participation in rural development activities in Senegal is done mainly through the cooperative system which developed first in the groundnuts producing areas before spreading over the entire country. The cooperatives are given the responsibility of evaluating the input needs of their members, informing ONCAD of those needs and the credit volume needed to satisfy them, distributing inputs and collecting the members' debt, and purchasing agricultural products for ONCAD.

Members from the same cooperative are collectively responsible for the total amount of money they are loaned by BNDS through ONCAD. In normal years, the rule is that 80 percent of the total annual debt of any given cooperative should be paid in cash or in kind before any crop marketing can start for that cooperative. Since the parastatals have a monopoly over the marketing of the main agricultural products farmers might see the rigid administrative definition of the cooperative boundaries as being harmful to their interests.

The weaknesses of the Senegalese cooperative system comes from the rigidity of its structure and rules which are defined from above. This has several consequences.

- cooperative boundaries follow administrative limits and the use of local knowledge to operate groupings which can work is not allowed. This has been a problem in the Sedhiou II project when the supervision of the cooperative was transferred to the project management. It was not possible to proceed to the regular election of some cooperative officials because of very serious divergences which went beyond the functioning of the cooperative;
- the cooperatives are not encouraged to be creative and undertake activities which go beyond the role they are assigned by the Senegalese government. Farmers' initiative needs to be liberated if they are to play an important role in credit mobilization, and technology development and adoption;
- the membership rules of the cooperatives are very strict. Women for example cannot be members of any cooperative. This created a lot of problems in the first Sedhiou project which was mainly a rice project since women were the main target group.

This last weakness of the cooperative system was certainly an important factor in the decision of the Sedhiou II project to create village development committees outside the cooperative system. This allowed inputs and credit to be channeled directly to this important portion of the project rice growers.

There are five cooperative Unions in the project area, one for each subdepartment. Those unions were calling for more responsibility in the management of the PA. It is necessary to give to farm organizations more responsibility if they are to play an important role in the agricultural development process. The fact that the cooperative

Unions are calling for more responsibility shows that farmers are tired of seeing decisions being taken from them, and that they want to be problem solvers and decision makers.

Functional education is provided to cooperative and Union personnel to allow them to perform the management accounting and store keeping tasks they are assigned by ONCAD.

The 5 Cooperative Unions are regrouped at the department level into a Cooperative Federation. The Cooperative Federation was supposed by the project third year to take over some functions performed by the project staff. It would be responsible for input and output marketing, union stores management, and public relation and control of the unions. In reality the Cooperative Federation was not given any responsibility. Since the same cooperative structures exist in the other departments, the Cooperative Federation of the Casamance can be the place where the three farmers' representatives at the Board of Directors of SOMIVAC can be designated.

The project reports relate to cases where the maintenance of the infrastructure is made difficult by the fact that animals are allowed to destroy the small dams. This kind of problem arises because there is a specialization of work among local people; the Peulhs being mainly herd raisers and the others mainly crop growers. To take an integrated approach to project design is not only to combine several activities but to see the impact of a project component on different project target groups. The attitude of farmers towards an infrastructure will be determined by the way they are served or disturbed by such infrastructure. Small dams provide good water control schemes to rice growers but can

disturb the access to food and water of the herds. To assume a unique and positive attitude of farmers toward a given infrastructure is to assume also that it serves in the same positive way the interests of the group in the area where it is located.

A farming system research approach to development which consists of defining a stable arrangement of farming enterprises, looking at the whole farming system, and focusing on the interdependence among the components can help, at the design stage, predict farmers' attitude toward project components. This allows for provision of alternative solutions. If small dams for rice growers are an obstacle to water access for herd raisers alternative water sources should be investigated and provided for as a project component.

Some of the civil works, building a warehouse for cooperatives, was designed to be done using farmers' voluntary work but this did not reach the expected level (P.R.S. report 1980). It was not realistic to expect a high level of farmers' participation in the implementing of activities they were not associated in defining, planning, and designing.

2. Agricultural Production

Agricultural production is the project's most important component. The limited number of hectares under water control makes the agricultural output very much dependent upon rainfall but there are other parameters which can help explain the agricultural production performance.

The project was concerned with six crops: rice, millet, maize, groundnuts for oil, edible groundnuts and cotton. It is difficult to appraise the contribution of the project to edible groundnuts production because a F.E.D. (Fonds Européen de Développement) project was already trying to promote its production in the area, and the

project reports did not consistently differentiate the edible groundnuts productions of the two projects. Cotton was produced in the eastern part of the project area under the supervision of SODEFITEX (Société pour le Développement des Fibres Textiles). It was only during the last two project years that the responsibility of supervising cotton production was handed over to the project. For the above reasons edible groundnuts production will not be mentioned in this analysis and cotton production will be referred to only for the last two project years.

a. Area Cultivated by Project Participants

Farmers make their planning about what cropping pattern to adopt based upon their expectation of the amount and the distribution of the rainfall, their assessment of their family subsistence needs, the relative returns from the crops which can be grown and the market availability of the cash crops.

Table 1 shows the area cultivated per crop for each of the project years as contrasted to the design objectives. It also shows the percentage share of each crop in the total area cultivated.

The absolute area cultivated in rice, millet, maize, and groundnuts for oil followed an upward trend through the four project years. Rice cultivation, however never reached the targeted objectives while millet and maize areas were above the planned objectives only during the last project year. Groundnuts for oil cultivation was below the targeted objectives only during the first project year. The total area cultivated has been higher than planned except for the first project year during which only 69% of the area cultivation objectives were reached.

Table 1. Area Cultivated in Hectares for Each Crop as Percentage of Planned Objective and Total Area Cultivated for the Four Project Years.

Crop	1976-1977		1977-1978		1978-1979		1979-1980	
	Realized	% of Planned Objectives	Realized	% of Planned Objectives	Realized	% of Planned Objectives	Realized	% of Planned Objectives
Rice	5,559	77	7,152	83	8,476	84	9,405	80
Second Rice Crop	641	-	437	-	-	-	-	-
Millet	2,267	42	4,809	78	6,903	96	10,191	22
Maize	717	41	1,389	67	2,475	98	3,405	7
Groundnuts for oil	7,686	80	13,437	121	18,282	138	23,894	51
Cotton	-	-	-	-	653	113	214	29
Total Area	16,870	69	27,224	101	36,789	109	47,709	129
								100
								100
								75
								51
								0

Source: SOMIVAC, P.R.S. Report, June, 1980

The importance of rice in the cropping pattern followed a downward trend and went from 33% of the total area cultivated in the first project year to 20% in 1979-80. Millet, maize, and groundnuts for oil areas increased in importance in the cropping pattern. Groundnuts for oil was since the beginning the most important crop and reinforced its position through the project years going from 46 to 51% of the total area cultivated between the first and last project years.

The good performance as far as area cultivated is concerned during the last two project years seems to be due to the close to regular rainy season in 1978-79, the importance of early rains in 1979-80 which raised farmers' expectation, and the increase in the price of groundnuts for oil from 41.5 to 45.5 FCFA during the last project year which contributed to increase the groundnuts for oil areas.

b. Yield Performance

Table 2 gives the yield performance of the project and compares it to planned objectives. The yield performance seems to follow the rainfall pattern which is described in Appendix 1. The largest yields are obtained during the close to average rainfall years for all crops. In two reasons two crops, rice and groundnuts for oil, experienced an increase in yields compared to planned objectives. The maximum extent to which yields surpassed the targets for these crops were 45 and 42% respectively. The design targets were probably conservative for those two crops since during the four years of the project rainfall was below average, though it did approach average in two of the years. Using conservative yields estimates could have been a means chosen by the analysts to include rainfall uncertainties into the design of the Sedhiou II project. It should also be noted that rice and groundnuts

Table 2. Yield Obtained (tons per hectare) in Percentage of Planned Yields for the Four Project Years.

<u>Crop</u>	1976-1977		1977-1978		1978-1979		1979-1980	
	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>
Rice	3	145	1.7	85	2.5	117	1.9	90
Millet	1.1	85	.9	69	1.2	96	1.1	82
Maize	1.7	74	1.4	58	1.5	62	1.4	55
Groundnuts for oil	2	142	1.3	93	1.7	120	1.1	77
Cotton	-	-	-	-	1.2	100	.6	47

Source: SOMIVAC, P.R.S. Report, June, 1980

for oil yield fell short of the yields assumed in the project design phase. Shortfalls during the other two years reaches maximum of 15 and 23% respectively.

Maize and millet yields were always less than planned. For those two crops the design assumptions were too optimistic. This problem was particularly acute for maize which never reached 75% of its expected yield. The cotton yield went from being about equal to planned yields to a dramatic shortfall of 53% below the objectives, during the last two project years. The poor yield performance for millet and maize is partially due to the fact that the quantity of selected seeds supplied for those two crops were never able to satisfy the demand expressed by farmers. The situation also holds for rice as supplies of improved seeds were never more than 50% of the quantities demanded. Only for groundnuts was the project able to fully satisfy the selected seed needs of the farmers. Another obstacle to the achievement of planned yields was the distribution of fertilizer which seldom reached the desired level. Also during the cropping year 1979-80 fertilizer deliveries were late relative to the beginning of the rainy season.

c. Production Achievements

The quantity produced by the project is first given and then contrasted to planned objectives in Table 3. Among the crops only millet production knew a constant increase in absolute terms going from 1,242 metric tons in 1976-77 to 11,699 T in 1979-80 but, still for millet, the targeted output was surpassed only in 1979-80. Rice, maize, and groundnuts for oil productions fluctuated in absolute terms as well as compared to targeted outputs.

Table 3. Production (in tons) in Percentage of Planned Production for the Four Project Years.

<u>Crop</u>	1976-1977		1977-1978		1978-1979		1979-1980	
	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>	<u>Realized</u>	<u>% of Planned Objectives</u>
Rice	18,457	166	12,272	71	21,041	100	11,778	69
Millet	1,242	37	4,170	53	8,601	89	11,699	105
Maize	1,219	31	1,913	39	4,898	80	4,656	62
Groundnuts for oil	14,988	114	13,437	87	30,878	163	27,515	121
Cotton	-	-	-	-	776	136	121	13

Source: SOMIVAC, P.R.S. Report, June, 1980.

Rice production was 66% greater than expected during the first project year, roughly the same as planned in 1978-79, and below targeted output for the other project years. Maize production has been always less than planned. For groundnuts for oil, beside the cropping year 1977-78, production has always been above the planned targets and reached a peak of about 31,000 metric tons in 1978-79 with a production 63% above the targeted performance.

Four years is not a long enough period from which to draw any definitive and strong conclusion regarding the crop production of the Sedhiou II project. The project monitoring system does not allow an assessment of the impact of the project on technology adoption by the farmers. Still some lessons can be learned which should be used to improve the design of future projects.

First, future project designs should reflect the increasing importance of groundnuts for oil in the cropping pattern. Their importance is essentially due to institutional factor which reflect the bias of the Senegalese government toward groundnuts. These biases are reflected by relatively favorable prices, availability of improved seeds, access to credit for groundnuts producers and ready market for groundnut production. If the Senegalese government's goal is to increase food crop production some institutional reforms and a reorientation of the research facilities toward developing drought resistant food crop seed varieties is necessary. This could be an indirect way of stimulating cash crop production by reducing the time farmers will spend trying to provide for the family's subsistence needs.

Second, it is necessary to decrease the yield assumptions for maize and millet in the future so that they reflect what can be achieved under prevailing conditions.

Finally, the variation of realized yields as compared to design objectives is suggestive of the percentage change which should be considered when conducting sensitivity analysis for future project designs. It might be good for future project designers to consider the 50% drop in cotton yields experienced in the Sedhiou II project. It is necessary to assess the performance of new crop production technology under alternative rainfall situations, particularly the performance of crop seed varieties under rainfall deficit. The knowledge gained from those performance assessments should be reflected into the way future projects are designed.

3. Constraints to Official Rice Marketing

The quantities of rice marketed by project participants through the official marketing channels are very negligible as evidenced by Table 4. In Senegal there are several constraints which prevent rice from becoming a cash crop most of which are institutional in nature. The stated official objectives are, however, to increase rice production and marketing in order to decrease the dependence of the country on rice imports which became costly to the country's international reserve position and budget. In the late 1960's and early 70's Senegal was no longer receiving a preferential price from the French government for its groundnuts and the price of rice became very unstable. The policy adopted consisted of stabilizing the price of rice for the consumer through subsidization or taxation, and to develop more reliable rice production methods mainly through irrigation techniques and/or introduction

Table 4. Rice Production and Quantity Marketed Through the Official Market in Metric Tons

<u>Years</u>	<u>Rice Production</u>	<u>Rice Official Marketing</u>
1976-77	18,457	460
1977-78	12,272	36
1978-79	21,041	55
1979-80	11,778	18

Source: SOMIVAC, June, 1980.

of improved production packages. At the same time ONCAD was given a legal monopoly over rice processing and marketing. Farmers are not allowed to process and sell their rice production directly to consumers.

Rigoulot's study (1980) showed that: (1) the lowest total unitary cost of milled rice in the Casamance is obtained by combining improved production techniques and small scale milling; (2) ONCAD's monopoly over rice milling is not a Pareto better situation because ONCAD's actual gain can be more than compensated by the potential farmers gain without the legal monopoly; (3) rice produced in the Casamance can be a competitive substitute for importations of rice which are intended to satisfy rice deficit in the Casamance and nearby areas, and; (4) the price of 41.5 FCFA for rice is not an adequate incentive for rice to become a cash crop mainly under traditional production technologies.

The Senegalese strict economic comparative advantage based on the ability of rice and groundnuts to earn foreign exchange is shown by several studies to favor groundnuts production (Styker, 1978; Rigoulor, 1980). Rigoulot's analysis went beyond the mere economic arguments and pointed out that the negative impact of continuous groundnuts production on the soil and the strategic importance for Senegal of having a control over its food supply.

The two cited studies were done when groundnuts and rice official producer prices were both fixed at 41.5 FCFA per kilogram. Since rice was more demanding in terms of the farmers' time it was economically more attractive for them to produce groundnuts for the market. In 1979, the groundnuts price was raised to 45.5 FCFA while the paddy price stayed the same. This policy decision was exactly the opposite of one of the recommendations made by Rigoulot at the end of his analysis wherein he was calling for a reduction of the relative price advantage of groundnuts over paddy. This government price decision came to strengthen all the forces which were preventing rice from becoming an official cash crop. Unofficial rice marketing channels are known to exist in Senegal but their real importance is not known with exactitude. Informed guesses (A. Tuly, 1981) ran around 10% of the annual production in the Senegal river valley.

Besides the economic constraints some studies refer to some sociological constraints for rice to become a cash crop in the Casamance (SOMIVAC 1979/80). In the Diola milieu, it is argued, the social status of rice is such that rice marketing is not socially acceptable. The Diola initiation ceremonies is the place where those values are taught and reinforced. The argument went on to point out that the accumulation of stocks of rice year after year is a sign of wealth the Diola family is very proud of. Since the economic arguments alone are not making official paddy marketing very attractive to farmers, it is thus difficult to know what importance to give to the raised sociological arguments.

4. Credit Repayment Performance

Table 5 shows the credit repayment performance of the Sedhiou II project participants. The debt collection index which indicates

Table 5. Loan Due and Credit Repayment for the Four Project Years

	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Loan due (1,000 FCFA)	92,444	4,256	146,542	158,562
Loan repayment (1,000 FCFA)	70,030	2,900	71,357	7,667
Collection index	76%	68%	49%	5%

Source: SOMIVAC, June, 1980.

The percentage of the loan due in any given period which has been repaid follows a downward trend going from 76% to 5% between the first and the last project years. The overall debt collection index during the four years of the first Sedhiou project was around 85%, and if compared to the actual debt repayment performance seems to indicate a change of attitude of Sedhiou farmers toward credit repayment. Several other factors can help explain the low debt recovery.

- Each year the Senegalese government determines the percentage of their normal annuity to be paid by farmers taking into consideration mainly the impact of weather patterns upon local crops. This is a way for the government to share the risk associated with technology adoption with the farmers. The low amounts, in absolute terms, of the loan due and repayments for 1977-78 is explained by the fact that there has been a rescheduling of cooperative loans for that cropping year. In 1979-80 the Sedhiou farmers received contradictory information from government officials about the required rate of debt repayment (P.R.S. 1980). This confusion was taken by most farmers as pretext for not paying their debts.

- The coexistence of the cooperatives and the village development committees created some confusion which was taken advantage of by farmers to avoid repaying their debt. The lack of coordination between the two organizing forums can be exploited by farmers to borrow more than needed and to delay as long as possible the repayment of their contracted debt. A complication with the Village Development Committees is that they are centered around subsistence crops such as rice which prevent them from having the coercive power needed for an effective debt recovery.
- Debts are easier to recover from the cooperatives because they are mainly involved in groundnuts marketing. But even for the cooperatives several problems disturbed the debt recovery operations mainly during the last project year when ONCAD was transferring the cooperatives to the P.R.S. management. First, the documents showing the debt situation of individual farmers were not entirely transferred to the project management. Second, the financial and material resources necessary for the marketing of the crops were not available on time. In that situation even the seed debts which used to be paid 100% by the farmers at the opening of the marketing period were not repaid.

D. Conclusion and Recommendations

The information upon which the analysis of selected aspects of the Sedhiou II project was based does not allow any strong and definitive conclusions to be drawn from the project production performance. Still, some lessons were learned from the crop production component of the Sedhiou II project which should be used to improve the design of future

projects in the same area. In the following conclusions and recommendations section four aspects of the project are examined. They are:

(1) the timing of the project; (2) the administrative and institutional issues; (3) the project monitoring system, and (4) rice marketing.

1. The Timing of the Project

The Sedhiou II project was mainly an institution building and extension project. It was designed essentially to promote the creation of a Rural Development Agency in charge of coordinating rural development activities in the Casamance, to strengthen the cooperative movement in the region and to provide extension services to farmers. It was also undertaking investment activities which were aiming at improving the production and marketing facilities available to farmers. The project was planned to be completed within four years which were not enough even for the project planned investment to be completed. A third Sedhiou project is now underway. This four year project cycle is too short and is an example of an abuse of the project approach to rural development which leads to a discontinuation of services which need to be institutionalized if a sustained rural development is to take place. A program approach needs to be taken to the provision of extension and credit services through an increased involvement of local people in the technology conception and adoption, and credit distribution and repayment processes. The form of this involvement cannot be defined in a vacuum but needs to be tailored to the specificity of each context.

The Senegalese Government needs also to think about ways of nationally financing the cost of providing agricultural research, extension and credit services. This could be done through an allocation of a certain percentage of the proceeds of cash crops marketing, let us say 1 percent, to the financing of those services. This way the government will, in the medium term, call upon foreign donors only to finance investment on physical infrastructures which will need to be progressively, locally financed in the long term. Since the agricultural sector is the main source of financing for the functioning of the Senegalese bureaucracy, through an heavy taxation of cash crops, it is only fair to provide it with the mean of its development. That would also be in line with the long term interests of Senegal because a development of the agricultural sector would increase and stabilize its contribution to the financing of development activities.

2. Administrative and Institutional Issues

In the text explaining the rationale behind the creation of the SOMIVAC the Senegalese government argued for the need to create a permanent institution which is able to learn from experience, and to adequately respond to an environment in constant change. This intention of the Senegalese government was evidenced by its decision to adopt performance contracting arrangement with rural development agencies. But a simplification of the Senegalese administrative procedures, a decentralization of the decision making process, and an increase of managers' control over project ingredients are needed if managers are to be held responsible for project performance. Without those changes an effective response to new opportunities and a quick reaction to a changing environment are not possible. An adequate reaction to the project environment might be impeded by a slow fund disbursement or decision approval from Dakar or a lack of collaboration of an agency which has control over a main project input.

A flexible approach to project implementation is essential because agricultural development projects face many uncertainties. They cannot adequately be taken care of by any project analysts no matter how experienced and knowledgeable they are or how sophisticated are the techniques they are using. The way to go is thus to include in the project design as much information as possible and to provide guidance for the solution of as many problems as can be foreseen, and to staff projects with a management which can promptly react to unforeseen situations. The attitude which consists of calling in analytical skills only at the design stage of project should be abolished since an adaptative approach to project implementation calls for a perpetual project redesign.

To take an adaptative approach to project implementations means also learning how to deal with local people whose involvement is a precondition to a sustained rural development. The Senegalese rules about how to involve rural people are too strict. Those rules should be revised to allow local knowledge to be used to define workable cooperative boundaries, functions, and membership rules. Farmers effective collaboration will never be forthcoming as long as they are always told what to do and how they should organize themselves.

3. The Monitoring System

A flexible approach to project implementation calls also for relevant information for any serious adaptative redesign to take place. One of the weaknesses of the Sedhiou II project has been its lack of a good reporting system. The reporting system did not allow the project management, at any given point in time, to know where the project was standing with respect to planned technology adoption objectives. Information about technology adoption, and average cost of production of the project main output, cannot also be gotten from the project

reporting system. The bottleneck for an effective monitoring of project activities seems to be a lack of a workable definition of the farming system. Over emphasizing the sociological complexity of the Sedhiou societies will not provide a good way out of this problem. For the purpose of monitoring the impact of the project on technology adoption it is necessary (1) to use the technological characteristics of the farming system as a basis for sampling data collection, (2) to proceed to a secondary classification of the information according to sociological characteristics, and (3) to show during the data analysis phase, in what respect the sociological factors are driving forces or impediments to the process of technology adoption. Simplicity is a virtue when talents and resources are limited.

4. Rice Marketing

The Senegalese government has not been successful in its attempt to transform rice into an official cash crop. The institutional constraints are such that farmers sell a very small portion of their rice crop through the official marketing channels even during a good rice crop. Rigoulot's study has shown that removal of the legal public monopoly over rice marketing could be a Pareto better situation, the public present gain being more than offset by the potential farmers' gain.

If the government's main objective is to substitute local rice for imported rice in order to reduce its trade balance deficit it should allow farmers to process the paddy, and directly sell rice to the market without going through the official marketing channel. The government can also generalize the solution adopted by the MAC (Mission d'Aide Chinoise) project which consist of processing rice for the farmer against a remuneration in cash or in kind. This is a way to increase the capacity usage of most government

owned rice mills and to implement the planned construction of rice mills which are postponed because of the small amount of rice sold by farmers through the official marketing channels. The official rice marketing activities have not been a good way for the government to make money and should be limited to imported rice because of consumer price protection purposes. By allowing a rice growers involvement in the marketing of rice, the government can stimulate the production of rice and create a lucrative occupation for those ethnic groups for which rice marketing is socially acceptable.

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APPENDIX

List of Used Documents

--P.R.S., Projet de Developpment Rural du Deparement de Sedhiou P.R.S II on
Sedhiou II 1976-1979, Tome I Rapport de Synthese, Tome II Annexes

_____ Tableau de Bord du PRS II, Situation au 30 Juin 1978, Juillet 1978

_____ XVII Rapport d'Activites, Juillet. Decembre 1979, Mars 1980.

_____ XVIII Rapport d'Activites, Janvier Juin, 1980, Juin 1980

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Appendix 1

Rainfall Situation During the Four Project Year

The Sedhiou area knew, for each of the four project years, an overall rainfall deficit as compared to the average year (see Table A). The worst rainfall shortage occurred during the second project year with a rainfall deficit which reached nearly 570 millimeters (mm). During the same 1977-78 cropping year the rainfall started late and stopped sooner than usual (no rain during May and November). The last project year also know an important deficit, 323 mm, even if the rain started with more than average rainfalls during the months of May and June. These early rains created a great deal of farmer's hope which were deceived by an increase of the relative rainfall deficit later during the rainy season. The first and third project years knew close to average rainy seasons with successive deficits of around 76 and 132 mm.

TABLE A
 Amount (In Millimeters) and Distribution of the Rainfall in the Sedhiou Area During The Four
 Project Rainy Seasons Compared To The Average Year

Month	Average Year	1976-77		1977-78		1978-79		1979-80	
		Amount	Deficit Or Excess	Amount	Deficit Or Excess	Amount	Deficit Or Excess	Amount	Deficit Or Excess
May	11	41.3	30.3	--	-11	5.4	-5.6	19.2	8.2
June	121	96.2	-24.8	59.4	-61.6	101.2	-19.8	156.5	35.5
July	284	285.8	1.8	179.7	-104.3	294.6	10.6	234.5	-49.5
August	447	400.6	-46.4	181.9	-265.1	381.7	-65.3	299.9	-147.1
Sept.	287	273.9	-13.1	232.4	-54.6	201.4	-85.6	178.9	-108.1
Oct.	132	91.4	-40.7	70.7	-61.3	152.3	20.3	71.1	-60.9
Nov.	11	27.9	16.9	--	-11	34.9	23.9	9.8	-1.2
Total	1,293	1,217.1	-75.9	724.1	-568.9	1,171.5	-121.5	969.9	-323.1

Source: P. R. S. Report July, December 1979