

Sociocultural Factors in Farmer-Managed Irrigation System Performance Measurement: A Contribution to Methodological Approach

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ABSTRACT

THE POLITICAL DECISION to improve Farmer-Managed Irrigation Systems (FMIS) in Senegal makes it necessary to use a new monitoring method, different from those used in Agency-Managed Irrigation Systems (AMIS).

The lack of a theoretical and methodological framework using sociocultural and financial indicators makes performance measurement a difficult task.

Because of increasing powers of farmers in decision-making in FMIS compared to AMIS, sociocultural factors become more decisive. And, they must be used to measure farmers' management performance.

The aim of this paper is to find a method to identify and appreciate these factors.

After a theoretical discussion on performance concept measurement, we identified two units of observation levels: the plot level and the whole-perimeter level. In each level, it is proposed to measure FMIS from two perspectives: internal performance and external performance.

Tested in the **Thiagar** Perimeter case, this methodological approach gives interesting results which can be used to improve FMIS.

These sociocultural indicators must be linked with environmental and economic indicators to get a holistic approach in FMIS performance measurement.

INTRODUCTION

After a century of state-managed irrigation system policy, the Government of Senegal (under pressure from funders) decided to change its approach.

Societe d'amenagement et d'exploitation des terres du delta et de la falemè (SAED), the government institution which has been in charge of irrigation system development in the Senegal River Basin since 1965 is now withdrawing from many of its functions such as supplying inputs to farmers, and managing irrigation.

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The transfer of the irrigation infrastructure management, the credit system and the input supply to farmers' organizations and the private sector has been underway since 1986 but in any specific perimeter it started with the prior rehabilitation of the infrastructure.

The first experience of farmers' management of large-scale irrigation systems started only a year ago. Although strict conclusions, about farmers' management performance cannot be drawn at this moment, studies made by ISRA (Institut Senegalais de Recherche Agricole) researchers in the Senegal River Valley may help to identify performance indicators in both agronomic and socioeconomic aspects.

Conceptual Framework

With regard to performance measurement in farmer-managed irrigation systems, one must tackle questions such as:

- * What do we mean by performance?
- * Does performance relate to technical and economic achievements or to social ones?
- * How may sociocultural factors may be conceptually linked to technical constraints?

In many cases, the concept of performance raises two kinds of questions:

- * What goal were we pursuing? and
- * What results do we get?

The discrepancies between goals and results may be considered as performance measurement criteria. In irrigation systems, one may say that good results mean achieving the water requirement of plants and increasing production.

When measuring production performance, for example, engineers (industrial approach) use yield per unit of land while farmers may use yield per unit of labor in addition to other sociocultural criteria.

In the same token, when looking for performance indicators in water management efficiency, the engineers' observation unit is the whole system itself whereas farmers' unit of observation is the individual plot. Therefore, in the farmers' approach, although the operation remains important, the performance of individual plots has priority.

Defining industrial approach Huibers and Speelman (1988) said: "... all irrigation elements are defined a priori to determine layout dimensions in order to find the optimal system scale."

From this system-scale perspective, the industrial approach assumed one productive goal, because production is not meant to be individualized.

AMIS are designed and operated from the industrial approach so that a central organization is useful.

Although many FMIS are also designed by engineers from this approach, they are operated from opposite perspectives.

It is the case of rehabilitated schemes of the Senegalese Delta River Valley, where the former technical conception is maintained for different management options.

It makes system's operation rather complex and performance evaluation problematic.

METHODOLOGICAL APPROACH

The farmer's approach shows two performance measurement levels: the plot level and the whole system level.

Plot level

The plot is the level managed by individuals with specific goals and constraints. The management of any individual plot depends on the importance of these activities in the whole farming system. It depends also on family resources such as capital and labor.

For instance, in the case of Thiagar the socioeconomic surveys showed three categories of farmers:

- * Those who have more parcels outside the perimeter.
- * Those who have all their parcels in the perimeter.
- * Those who have all their parcels in the perimeter but perform nonagricultural activities as well.

At the plot level, the methodology may be a threefold approach:

- 1) The identification of cropping activities under farmers' supervision.
- 2) Interviews of a sample of farmers' groups before cropping activities. The survey may be oriented by questions such as:
 - * What did the farmer plan to do?
 - * How does he plan to manage the cropping agenda?
 - * What does he expect from his cropping activities?
- 3) Observing and monitoring of the cropping campaign at the plot level in order to compare actual results to planned goals.

In the Thiagar case, activities which have been identified as the farmer's responsibilities are:

- * Drainage;
- * Seeding; and
- * Pest control.

Perimeter level

Large-scale perimeter management is essentially water management including infrastructure maintenance and conflict management. This level deals with organizational problems and sociopolitical factors. The management procedures are determined by the perimeter technical conception.

In order to evaluate management performance at this level, one has to distinguish internal performance from external performance. By external performance we mean activities which depend on external services such as the credit system, the input market, etc. Internal performance on the other hand, is related to the ability of farmer's organizations to manage efficiently all the tasks which had been defined during the goal-setting process including the relationship between the organization and its components.

The methodological approach used in the plot level is also appropriate to investigate the performance indicators at the large-scale perimeter management level.

First stage. This step deals with the identification of socio-organizational groups which are targeted in the study. For instance, in the Thiagar large-scale perimeter case, three groups of farmers have been identified. The first group represents farmers from the village of Thiagar where there are more farmers than the other groups but which lacks land.

The second group is composed of farmers from the villages of **Ndietene** and **KHOR** who traditionally own land rights. And the last group from the villages of **Thienel Doki** and **Loug Demis** is composed of farmers who are also livestock breeders.

The perimeter is 870 hectares with one electric pumping station. This technical conception implies a centralized management structure of the 55 irrigation units.

In every irrigation unit, farmers are organized in Economic Interest Groups (EIG). In order to well-manage the centralized structure the EIG's formed the Economic Interest Group's Union (EIGU) which is in charge of the pumping station, the water distribution and the whole-scale maintenance. The EIGU in other perimeters may also be responsible for machinery management, land preparation, and harvesting and post-harvest operations. But in the Thiagar case, these responsibilities rest with organizations at the village level.

Second stage. Group discussions are organized with the EIGU in order to find out the plans in terms of activities, expectations with regards to partners, and, finally, the rules and principles under which these things are to be done.

Third stage. This last step deals with observation and monitoring in order to identify conflicts and technical problems that may occur during the campaign.

The analysis of EIGU planned goals and actual results is done in order to evaluate management performance of the structure.

RESULTS

In the Thiagar case, we can conclude, at this points of time, that at the plot level most of the planned activities were achieved. Some problems occurred in the cropping operations due to the lack of fertilizer in the input market. At the large-scale level, we observed a low performance due to

external relations with partners. For example, when there was a failure in electrical power, the EIGU was not able to solve the problem efficiently with the National Electric Company and most of the time SAED had to intervene. Farmers' EIGU is not strong enough to face national companies.

On the other hand, while the formal scheme extended only to 870 hectares, the EIGU increased it up to 1,520 hectares. The difference in the area of cultivated land went to small-scale perimeters around the main scheme, although SAED did not authorize such extension.

The maintenance program did not reach a very high level of performance. Frequency of conflict occurrence related to water distribution was very low.

If we compare total production expected from 870 hectares with production obtained from the 1,520 hectares with a very low investment, we can conclude there is a high performance of FMIS which integrate these social objectives.

The following Table summarizes the methodological results obtained from the study. These results are only indicative. They are not those of a comparative analysis between FMIS and AMIS but indicate how, with this monitoring procedure, one can identify where FMIS needs to be improved. It is also realistic about FMIS in terms of constrains.

CONCLUSION

Expressed in economic indicators, the concept of performance is a static one. It assumes only productivity and homogeneous objectives. However, it does not deal with sociopolitical and environmental aspects of disengagement problematics.

Without a conceptual framework and a holistic approach one cannot draw conclusions on FMIS performance. An interdisciplinary approach is necessary to link quantitative data from financial and economic analyses with qualitative ones from sociocultural approaches.

Table 1. Performance evaluation of Thiagar's FMIS.

Level	Socio-organization unit	Responsibilities	Performance	
			Internal	External
Plot	Farmer/EIG	Seeding	High	—
		Drainage	High	—
		Pest control	High	Low
		Harvesting	Low	High
Perimeter	EIGU	Irrigation	High	Low
		Maintenance	High	High
		Land preparation	Low	High
		Conflict settling	High	

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