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Ministry of Environment and Protection of Nature

Community-Based Natural Resources Management Project

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DES RESSOURCES NATURELLES

Strategic Monitoring for the CBRNM

SUMMARY ASSITANCE REPORT No. 18

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List of Abbreviations

CBNRMP	Community-Based Natural Resources Management Project
CERP	Centre d'Expansion Rurale Polyvalent
CR	Communauté Rurale
CSE	Centre de Suivi Ecologique
CONSERE	Conseil Supérieur des Ressources Naturelles
ENEA	Ecole Nationale d'Economie Appliquée
ENSAH	Ecole Nationale
GIS	Geographic Information Systems
GNP	Gross National Product
ISRA	Institut Sénégalais de Recherche Agricole
IR	Intermediate Result
KAP	Knowledge, Attitudes and Practices
KIR	Key Intermediate Result
LUMP	Land Use Management Plan
MC	(See NRMC)
MENP	Ministry of the Environment and Nature Protection
MEPN	Ministère de l'Environnement et de la Protection de la Nature
NRBAR	Natural Resources-Based Agricultural Research Project
NRM	Natural Resources Management
NRMC	Natural Resources Management Committee
PMU	Project Management Unit
PRA	Participatory Rural Appraisal
RC	Rural Community
SO	Strategic Objective
TOR	Terms of Reference
USAID	United States Agency for International Development

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Executive Summary

A team of four specialists (agricultural economist, NRM specialist, socio-economist, climatologist) undertook a six-week consultation in order to assist the CBNRM Project to:

1. Define and analyze the Project baseline data and monitoring system in order to identify strategic indicators.
2. Develop additional methodologies for data collection if needed for Project mid and long-term biophysical and economic impact indicators.
3. Analyze and make recommendations concerning the data management and presentation of strategic information.
4. Determine institutional needs associated with the monitoring system.
5. Analyze the current monitoring system
6. Determine training needs for the monitoring system

The team interviewed Project stakeholders and attended numerous informational meetings in Dakar and in the Project zones of intervention in order to obtain information on all elements of the TOR. As a result of these meetings, the team produced a detailed list of strategic indicators, including indicator variables, means of collecting the data, and justifications for the choice of indicators. A justification was required due to the difficulties involved in interpreting and employing within the Project the specific indicators proposed by USAID. Training and institutional needs were also determined.

The team also proposed comprehensive programs for collecting and analyzing mid and long-term biophysical and economic indicators. These programs will require the Project to develop new relationships with domestic institutions, particularly ISRA.

The team proposes that the present database, data analysis and monitoring system be improved initially by organizing the data gathering and analysis activities around the needs of the strategic monitoring system. By focusing these efforts on the essential task of reporting strategic indicators, both the monitoring instruments and the data management system itself can be cut back to their most basic and simplest forms. A simple strategic indicator report to be installed on the Project network serves as the initial screening device. Data elements from whatever source are linked to this final product. After the strategic needs of the information system are dealt with, the operational needs of specific divisions may be further developed and linked to the "Project Intranet." It is hoped that the development of this intranet may help bring about a Project intranet on a grander scale, including information elements from other stakeholders (e.g. CSE, Consere, USAID).

Finally the team presents a list of recommendations concerning the principal findings of this consultancy.

I. Introduction

The Community-Based Natural Resource Management Project (CBNRMP) is recognized by USAID and the Government of Senegal as being on the forefront of innovative approaches to economic development at the regional level. The stated goal of the CBNRMP is to increase private sector incomes derived from the exploitation of natural resources consistent with decentralized, sustainable natural resource management (NRM). The Project sub-goal is to increase soil productivity and its purpose is to increase local community participation in the identification, planning, use, and conservation of natural resources.

To accomplish this ambitious hierarchy of purpose and goals and thereby sustain its promise as a testing ground for innovative development approaches, the CBNRMP has from the beginning concerned itself with the development of an effective information system capable of informing Project stakeholders and others on Project evolution and performance. A comprehensive monitoring system is now in place and is currently being implemented at all levels of the Project. During this early implementation phase, it is appropriate for the Project to closely examine this information system in order to make adjustments necessary to improve Project performance and support.

This report documents the results of one consultancy to begin this process. Specifically, this consultant team was charged with examining the 'strategic' information system and associated performance indicators in order to make recommendations for improvement. Strategic, in this context, refers to relevance to USAID's strategic objectives and corresponding results packages. Although emphasis was to be given to the development of biophysical and economic long-term impact indicators, all indicators were to be examined with respect to relevance to USAID's strategic objectives (i.e., SO2: increased crop productivity through improved natural resource management in zones of reliable rainfall) and associated intermediate results. In particular, Project contributions to Key Intermediate Result B (adoption of improved NRM practices) were considered critical. The detailed Terms of Reference for this consultancy are presented in Annex 1.

Achieving the objectives of this consultancy was complicated by two factors. First of all, the results packages and associated performance indicators for the current SO2 are still evolving. USAID staff disagree among themselves on which indicator formulations are appropriate and consequently cannot give definitive guidance on indicator development. Indeed, given the emphasis on 'participation' and the broad horizontal (team) organizational structure now being used in the new, re-engineered USAID, it is not likely that any definitive guidance will emerge any time soon. Instead, USAID has asked for project input and suggestions on appropriate performance indicators for each intermediate result and has also asked for a critique of presently identified indicators. This report presents our recommendations and observations in response to these requests (see Annex 2). However, USAID has also indicated that whatever our recommendations and criticisms, there cannot be any assurance that what we propose will be ultimately adopted. Consequently, it appears necessary that all projects adopt a flexible approach to indicator development to accommodate what will certainly be evolving demands from USAID. Otherwise, projects will run the risk of later being required to make substantial and costly modifications to their monitoring systems.

Our specific response to this uncertainty is to offer alternative formulations for Project-relevant USAID performance indicators and offer additional higher-level indicators and methodologies to permit measurement of economic and biophysical impacts. Our modifications to lower-level

indicators will maintain, as best we have been able to divine, their original USAID intent while making them more precise to serve Project and USAID-management needs. At the same time, we believe these modifications will make the indicators more generalizable in order to satisfy USAID's need to aggregate results over many different projects. These modifications are described below along with additional indicators for the economic and biophysical impact.

A further complication for this consultancy is that the USAID SOs themselves are in flux. The current SOs will continue until September 1998 at which time Mission strategic objectives will change to support decentralization (SO1: effective and sustainable decentralization in targeted regions) and increased employment (SO2: expand employment opportunities via sustainable private initiatives in targeted areas). As a consequence of this impending change, it is hoped that whatever is proposed for the present strategic monitoring system should as much as possible accommodate the new SOs as well. Although the specific results packages and intermediate indicators for the new system are also currently being developed, it appears CBNRM will be able to make and report substantial contributions to both new SOs without significantly altering its evolving information system. However, without having the final form of the results packages (the likelihood is that this will also be some time off), exactly how and what CBNRM might provide is highly speculative. Nevertheless, this report addresses some elements for responding to what are expected to be USAID information needs based on this new framework. And since it is expected that Project staff will actively participate in whatever future workshops there may be to define this new SO framework, it is our expectation that they will help to ensure that the Project's vested interest and investment in its current and evolving monitoring system will not be sacrificed.

Organization of this Report.

The development of this report follows the organization of tasks as described in the Terms of Reference. Section II deals with the analysis and recommendations for existing data and indicators needed for the strategic monitoring system. Section III presents the analysis of strategic biophysical and economic indicator needs and the methodologies required to obtain them. Section IV deals with the data management issues and needs of the current and future information systems. Brief sections on institutional linkages and needs of the information system; an evaluation of the current monitoring system (closely linked to sections 1 and 2); and training needs are then presented. Finally, a summary list of recommendations is presented.

Methods of analysis for all sections were virtually the same given the interrelated nature of the tasks. Group interviews were used extensively involving the consultants and targeted stakeholders or representatives from other organizations and institutions of interest, and, usually, monitoring personnel of the Project Management Unit (PMU).

Multiple debriefing/consultation sessions with the entire PMU were held early in the consultancy to ensure adequate Project staff input was obtained. Also, the consultants and members of the PMU met on three different occasions with USAID. These meetings included one two-day workshop on USAID performance indicators. A complete listing of contacts is found in Annex 6.

II. Analysis of Existing Data, Indicators, and Variables

The environmental degradation subsequent to climatic changes and human activities over the last few years is at present at the center of policy makers' concerns. Prudent natural resource management is essential since cereal deficits and soil and water resource degradation have shaken the traditional production systems. The most immediate element of this crisis is the decrease in agricultural productivity and the exodus of populations from rural areas.

Facing this crisis, the Senegalese Gouvernment has initiated a decentralization policy aimed at the transfer of decisionmaking powers and abilities to local communities in several domains including ecologically viable natural resource management. USAID, through the CBNRM Project and under the aegis of the Ministry of the Environment and Nature Protection, supports the Senegalese Gouvernment in this policy. The Rural Community (*Communauté Rurale*) has been chosen as the decentralization unit and the site for application of this development model. Senegal has 320 Rural Communities (RC). Each RC includes 20 to 80 villages, with areas varying between 100 and 10,000 km2, and populations from 5,000 to 20,000 inhabitants. The Community-Based Natural Resource Management Project is currently working with 15 RCs located within the "viable rainfall" zone (Cf. Table 1). The CBNRMP anticipates training 50 RCs during the life of the project.

As an umbrella support unit project, the CBNRMP will be periodically evaluated for:

I. carrying out the project objectives (as described in the logical framework), meaning its contribution to reinforcing the abilities of the RCs on the one hand and, on the other hand, to increasing private sector incomes through rational natural resource management in the targeted RCs.

II. the CBNRMP contribution to reach USAID's Strategic Objective No. 2 (SO #2) through the achievement of some Key Intermediate Results (KIR) and Intermediate Results (IR).

To this end, the CBNRMP needs to define a set of indicators and variables capable of supplying the information system of USAID and its partners. In order to better understand USAID's information needs the consultant team participated in the workshop of July 2 and 3 organized by USAID and focusing on the "planning of the monitoring and evaluation of SO#2 activities."

Table 1: *Rural Communities* selected by CBNRM up to the present, their land area and ecological characteristics.

Ecological zone	*Rural Community*	Area (km^2)
Peanut basin, N.14.5, O. 16.3, 400 – 550 mm (mean annual rainfall), sandy ferruginous soils, Serer and Wolof predominate	(1) Mbellacadiao	146
	(2) Diaoulé	115
Peanut basin, N.13.8, O. 15.5, 600 – 800 mm (mean annual rainfall), ferruginous sand and clay soils (some marshes towards West), Serer and Wolof predominate	(1) Kayemor	195
	(2)Médina Sabakh	229
	(3)Ngayène	187
Lower Casamance, N.13, O. 15.9, 1000 - 1200 mm (mean annual rainfall), ferruginous clay soils (saline along rivers), Diola, Mandinka, and Pular predominate	(1) Sansamba	645
	(2)Bemët Bidjini	110
Upper Casamance N.13.5, O. 15, 1200-1400 mm (mean annual rainfall), ferruginous clay soils, Diola, Mandinka, and Pular predominate	(1)Fafacourou	932
	(2)Pata	1060
	(3) Ndorma	1858
Eastern Senegal, N.13, O. 12.5, 800 -1000 mm (mean annual rainfall), ferruginous clay soils, Pular and Wolof predominate	(1)Tomboronkoto	2268
	(2)Bandafassi	3505
Eastern Senegal, N.15, O. 12.5, alluvial soils	(1) Moudery	287
	(2)Gabou	758
	(3) Bellou	293

Consultants went on a field visit in CRs targeted by the CBNRMP so as to test the relevance of indicators relating to project activities and to define the methods pertaining to these. Numerous meetings and discussions with the PMU members have enabled the team to better assess the choice of indicators. Visits to various technical departments of the Senegalese Government permitted the team to locate sources of information that the CBNRMP would need for the analysis and comparison of data from intervention zones.

Strategic indicators are grouped together into two categories: short term impact strategic indicators and medium and long term impact strategic indicators.

Short term impact strategic indicators.

The CBNRMP activities converge essentially on the achievement of some of the IRs of KIR B ("Improved NRM Techniques Mastered and Used by Farmers") and to a lesser extent to the achievement of some IRs of KIR A ("Increased Land Investments"). These activities support Results Package 2 of SO2.

Analysis of the indicators proposed by USAID has proved necessary so as to allow the CBRNMP to respond to these indicators. Several remarks can be made.

- The indicators proposed by USAID are often global in view of its need to aggregate a set of data from different sources. The result is that indicators become vague or too general. Thus USAID loses sight of the fact that each action generates its own indicators which must be adapted to every circumstance specific to the action. In this case, it is difficult to establish a list of typical indicators.

- It also happens that selected indicators include various types of data of which the units of measure are not standardized which complicates the aggregation of information and comparative analysis.

Considering all these elements we have tried to refine USAID's indicators while respecting the spirit in which they were established.

The selected indicators should permit verification of the impact of project activities and achievements in relation to the objectives of SO#2. These indicators must satisfy not only USAID which provides the largest share of financing for the CBNRMP, but also the other project partners namely the Senegalese Gouvernment through the agency of the Ministry of the Environment and Nature Protection (MENP). They should also satisfy the baseline partners, namely, the Natural Resources Management Committees and the Rural Councils.

The indicators that we propose do not replace USAID's, but reinforce them and bring an additional degree of precision to them. The criteria that guided the selection of indicators are:
- to retain the sense of the indicators proposed by the USAID,
- to be able to apply the system uniformly in all the RCs targeted by the CBNRMP,
- to be able to detect the slighest change of observed phenomena,
- to be objective, directly and easily quantifiable with some scientific rigor, yet also able to be compared with similar indicators for other regions or other similar projects,
- to be targeted: a minimum number of indicators chosen to provide the maximum amount of information on the phenomena to know and to monitor,
- to be reliable and low cost,
- to be "concerted," that is, chosen with the participation of CBNRMP partners.

The indicators that will permit measurement of the CBNRMP contribution to achieving SO#2 objectives are recorded in Table 2. In this table indicators are defined as well as the variables which measure them. The parties responsible for data collection and processing are identified as well as the frequency of collection. These tables include USAID's indicators and CBNRMP precision indicators. The latter ones are presented in the form of CBNRMP's contribution.

In annex 2, we present a synthesis table which takes into account USAID's indicators, CBNRMP's refined indicators and the justification which has directed the rewording of USAID's indicators. This also addresses USAID's request for constructive criticism of their indicators.

Long term impact strategic indicators

Medium and long term impact strategic indicators are either biophysical or socioeconomic. The basic hypothesis is clear: the adoption of sound NRM practices brings about biohysical changes which possibly lead to sustainable income increases.

The strategy of CBNRMP is based on targeted populations' active and full participation in the identification, planning, exploitation and preservation of natural resources through their skill and expertise. However, it is also based on the use of NRM technologies validated by scientific research. Establishing a biophysical and socioeconomic monitoring system is thereby necessary to meet the information needs of project partners, and to evaluate the project, but also to test the relevance of the CBNRMP approach and the possibilities for its success in other settings.

The analysis of NRM practices shows that the expected effects and impacts can be numerous and diverse. One single practice can generate several effects and impacts. That can be explained by the fact that environmental phenomena are not isolated, but they are interrelated. That is why, in defining indicators, it is necessary to regard the environment as a system and limit the choice of indicators to those which explain a great number of variables. On the other hand, effects and impacts can be biophysical and/or socioeconomic. Indicators only permit to measure trends, but they do not establish causal linkages.

The expected effects of NRM practices are directly measurable in the project intervention areas while the impacts require a finer measurement scale. Impacts result from the joint action of all the effects of NRM practices. The geographic scale of impacts is not limited to the site of adoption of a technique, and the impact will also vary over time. In fact, the period during which impacts become perceptible can be relatively long.

It will be possible to find some basic data in the existing documentation and they will be able to provide the situation of reference. In fact, this approach is cheap and would enable the CBNRMP to rapidly have a reference situation. In the opposite case, the project would itself conduct measurements and analyses, in which case one would wait for a long time before having usable data. A special list of studies to conduct (which are often studies of synthesis) is recorded in Annex 4 of the document (Sheet No. 0).

Other data relating to the project impacts will have to be measured. Annex 3 includes the methodologies for collection of this information.

The biophysical indicators proposed by the USAID have been taken into account by this study. However, "soil quality," proposed by the USAID as an <u>indicator</u>, is here considered to be a <u>variable</u> explaining an increase in crop yields.

The monitoring system

A monitoring system, at a low cost, would permit collection and analysis of the necessary data relating to the information needs of the project and its partners namely, the CR, the NRMC, the PMU, the MENP and USAID/Senegal.

Establishment of the monitoring system would permit reinforcementof the analytical and diagnostic abilities of rural communities while providing the necessary elements for the evaluation of the project activity impacts. The monitoring system which will have to be :

- low cost,
- efficient and reliable, meaning based on some scientific rigor,
- participatory, involving the *CERP* and beneficiairies,
- open, meaning involvement of the other structures or local institutions like the CONSERE, ISRA and CSE,
- viable, meaning that it has to survive withdrawal of the project; rural communities and the project partners such as the natural resource management committees should be prepared to take over project activities.

Table2: CBNRMP contribution to USAID's Framework for SO#2 Results: Key Intermediate Result B: Improved NRM Technologies Mastered and Used by Farmers

Strategic Indicators						
Intermediate Results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
KIR B. Improved NRM technologies mastered and used by farmers		1) Percentage of producers (by gender) who have adopted (used) at least one priority improved technology during the preceding year	Total number of adopters (by gender) b. Total number of adopters (by gender)	Annual survey (see Methodology)	Annual	DER
		2) Percentage of producers (according to gender) who have adopted (used) no priority improved technology because of: • lack of economic resources • lack of human resources • other	a. Number (by gender) of people who have not adopted (improved technologiy) for some reason.	Annual survey (see Methodology)	Annual	DER
B1.0 : Increased access of farmers to improved NRM technologies	1) Number of rural people reporting their knowledge of improved NRM technologies	1) Number (by gender) of producers knowing at least one type of (Improved/Priority) NRM technique and source of knowledge	Number (by gender) and source of knowledge: • CERP/MC/PMU (Project) • Other project • Other producer • Information medium (written material, radio/TV/newspaper, etc)	KAP surveys, Annual survey (see Methodology)	Annual	DER/Provider
B2.1 : Institutional capacity of organizations strengthened	1) Number of farmers and institutions executing activities with limited or no external assistance	1) Percentage of the counterpart resources and manpower used (person/days) by producers in executing microrealizations	a. Total value and value of the counterpart resources (including manpower) of microrealizations	Recapitulative sheets of submissions	Annual	Grants Administration Section (GAS) DER
	2) Number of training sessions targeting farmers	2) Person/days total training of farmers (by gender)	a. Person/days total training of producers (by gender)	Training report and monitoring sheet of indicators for the improvement of training capacities (no. 2)	Monthly	DER

Table2: CBNRMP contribution to USAID's Framework for SO#2 Results: Key Intermediate Result B: Improved NRM Technologies Mastered and Used by Farmers

Strategic Indicators						
Intermediate Results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
		3) Percentage (by gender) of farmers who consider that the CGRN has had a positive impact on the functioning of the CR	a. Total number and proportion	*Annual survey (see Methodology)*	Annual	GAS/Provider/ DER
		4) Amount of the CR budget in public microrealizations	a. Amount of the budget in public microrealizations	CERP quarterly monitoring sheet	Quarterly	DER/CERP
B3.1 : Increased availability of technicians for farmers	1) Public sector and private sector number of available technicians for farmers	1) Number of technicians (person/days on the ground) available for project activities (awareness, microrealization, monitoring)	a. CERP person/days on the ground	CERP presence and activity sheet and report	Quarterly	DER/CERP
	2) Number of farmers reporting their contacts with technicians	2) Number of producers (by gender) having received at least one training	a. Number by gender	Animator's report and CGRN register (contract)	Monthly	DER/CERP/ Training
	3) Number of farmers reporting their contacts with technicians	3) Percentage of farmers (by gender) finding value in training agents' contribution	a. Number of producers (by gender) finding value in training agents' contributions	*Monitoring survey (see Methodology)*	Annual	DER/Provider
B3.2 : Increased skills and means of technicians and producers	1) Availability of means of transport	1) Number of available cars and motorbikes	a.Number of cars b. Number of motorbikes	CERP reports	Monthly	DER/GAS
	2) Public sector and private sector number of technicians available 3) Number of trained farmers	See B3.1 (1) 2) Number (by gender) of people who participate in microrealizations		Community animator's report, monitoring sheets	Monthly	DER/CERP/ Training component

Table2: CBNRMP contribution to USAID's Framework for SO#2 Results: Key Intermediate Result B: Improved NRM Technologies Mastered and Used by Farmers

Strategic Indicators						
Intermediate Results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
	4)Quantity of inputs used 5)Number of agricultural tools used 6)Availability of training materials in agriculture and NRM	3)Costs and rates (in %) of agricultural material and human resources used in microrealizations provided by the project and number of microrealizations by gender	b. Project variable costs in microrealizations according to gender	Recapitulative sheet of tender execution	Annual	DER/CG/ Training component
	7) Availability of per diem	4)Number of technical information units via media and communications	a. number of technical information units via media b. number of communication media	PMU, CERP monitoring sheet	Monthly	DER/DC/SAV Component

Table 2 (continuation) : Other CBNRMP Contributions to USAID's SO2: Key Intermediate Result A: Increased Land Investments

Intermediate Results	USAID's Indicators	CBNRMP Contribution	Variables	Source	Periodicity	Responsible for the processing
A3.1 Reinforced settling institutions for problems and conflicts linked to NRM	1) Percentage of problems and conflicts solved by local institutions at different levels. 2) Percentage of people recognizing institutional authority, efficiency and results as regards the solution of problems and conflicts linked to NRM.	1) Percentage of NRM conflicts solved by CRs.	a. Total Number of conflicts b. Number of conflicts solved	CERP monitoring sheet	Monthly	DER/CERP
A.3.2 Institutions for information management and dissemination of institutional and legal framework strengthened	1) Percentage of problems and conflicts solved by local institutions at different levels 2) Percentage of people recognizing institutional authority, efficiency and results as regards the solution to problems and conflicts linked to NRM	1) Percentage of people knowing at least one law or code on natural resource management through the CBNRMP 2) Percentage of people (by gender) recognizing CR and MC authority, efficiency and results as regards the solution to problems and conflicts linked to NRM	a. Number of people (by gender) knowing at least one law or code through the CBNRMP a. Percentage of people recognizing the management committee as efficient and results as regards the solution to problems and conflicts linked to NRM	*Annual survey (see Methodology household survey)* *Annual survey (see Methodology household survey)*	Annual	DER/SAV component/Provider

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Table 2 (continuation) : Other CBNRMP Contributions to USAID's SO2: Key Intermediate Result A: Increased Land Investments

Intermediate Results	USAID's Indicators	CBNRMP Contribution	Variables	Source	Periodicity	Responsible for the processing
A4.0 Legal and institutional framework related to NRM improved, accepted and approved	1) Government decrees signed, published and circulated 2) Functional dialogue instituted favoring the participation farmers	1. Percentage of people (by gender) giving the first responsibility for land management and NRM to management committees	a. Percentage of people (by gender) giving the first responsibility for the land NRM to management committees	Household survey	Annual	DER/Provider

Table 2 (continuation) : Medium and long term strategic indicators

Intermediate results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
Biophysical impacts of NRM practice adoption	1) Surfaces on which NRM practices and technologies have been used by crop type	1) Surface area or length on which NRM practices and technologies have been used	a. Volume of compost pits (m3) b. Plantation area (ha) and length of rock terraces/ hedges/windbreaks/ erosion or salt control structures established c. Number of cooking stoves	CERP, MC	Annual	DER
	2) Numbers of improved practices and NRM technologies used	2) NRM priority improved practices used	a. NRM practices	KAP, monitoring survey	Annual	DER

Table 2 (continuation) : Medium and long term strategic indicators

Intermediate results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
	3) Increase in cereal and cash crop yields and 4) Soil quality (pH, organic and biological matter)	Increase in yields by adopted NRM practice a. Cereal, food and cash crops b. reafforestation and grazing	Production (kg) Area (ha/km) Crop humidity (%) **Associed variables** a. Maximum load capacity/present load b. Compost chemical composition (% kg dry matter) c. Compost dry density (kg/m3) d. Type, texture, soil depth e. pH f. Salinity g. Rainfall (mm) h. Temperature Max/Min i. Distance covered by the wind j. Geographic coordinates of plots	CERP, producers bibliographic research/ISRA	Annual Monthly Once Annual Once Once Project beginning and end Project beginning and end Project beginning and end Monthly Monthly Monthly Once	DER/ISRA CERP, Animator
Socioeconomic impacts of medium term NRM practice adoption	1) % of men and women able to cite one or several NRM improved practices and/or technologies	1) %of men and women knowing at least one priority, improved NRM practice or technology	See B 1.0 - Rural people's access to improved NRM technologies	*Annual survey (see Methodology)*	Annual	DER/Cabinet

Table 2 (continuation) : Medium and long term strategic indicators

Intermediate results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
	2) List of information sources on NRM improved practices and technologies	2) Information sources on NRM improved practices (according to gender) and technologies	See B 1.0	*Annual survey (see Methodology)*	Annual	DER/CERP
	3) % of men and women who use one or several NRM improved practices or technologies	3) % of men and women who use at least one improved NRM technology or practice	See KIR B: Increased NRM technology adoption	*Annual survey (see Methodology)*	Annual	DER/Provider
	4) List of constraints and/or incentives to NRM improved technology adoption	4) List of NRM technology adoption constraints	See KIR B: Increased NRM technology adoption	*Annual survey (see Methodology)*	Annual	DER/Trainee/ Provider
	5) % of households which have seen their status (or living conditions) improve through the use of improved practices and technologies	5) Household adoption rate	See long term socioeconomic impact and biophysical impacts	*Annual survey (see Methodology)*	Annual	DER/Provider
	6) % of households having draft animals/animal traction equipment	6) % of household having draft animals/animal traction equipment	a. Households having draft animals, Agricultural material	*Annual survey (see Methodology)*	Annual	DER/Provider
	7) % of men and women having credit(s) for agriculture and NRM	7) % of men and women having credit(s) for agriculture and NRM	a. Number of men/women having agricultural and NRM credit	*Monitoring annual survey (see Methodology, Household survey)*	Annual	DER/Provider

Table 2 (continuation) : Medium and long term strategic indicators

Intermediate results	USAID's indicators	CBNRMP contribution	Variables	Source	Periodicity	Responsible for the processing
	8) % of men and women indicating they have perceived a better access to the market	8) See macroeconomic indicators				
Socioeconomic impacts of long term NRM practice adoption		1) Microeconomic indicators - Economic surplus, Net social benefit	a. Production cost for each technology b. Yield average change c. Surface/adoption rates d. Demand for each agricultural NRM product e. Price of products	Case studies - service providers	End of the project	DER/CERP /Provider
		2. Macroeconomic indicator - Social matrix analyses/ mulplier analyses, GDP, growth rate - income and employment, access to the market	a. Technical input/output matrix for CR b. Each CR household income allocation c. Income sources for CR households	Case studies - UGP/ISRA/VT/ CRSP Groundnut	Once per CR	DER

III. Biophysical and Economic Mid and Long-Term Impact Indicators

Virtually no indicators/variables/data for mid- and long-term biophysical indicators of impact have thus far been collected by the Project. And although data on many socioeconomic variables have been collected, with the exception of financial data on the costs of the various micro-interventions, little of the data is relevant for long-term project economic impact analysis. Consequently, we propose the following programs for long-term impact performance indicator development.

Biophysical indicators for the CBNRM Project

The first step in monitoring system development is to determine what information is needed by whom: in short, who needs the information, on what, and for what types of decisions? Answers to these basic questions were gleaned from the project documents and discussions with the CBNRM Project stakeholders.

A long list of possible biophysical information needs can be conceived as being relevant to the interests of the various participants in the CBNRM project. It is necessary to narrow this list to the minimum needed to provide the information needed for evaluation and validation of the CBNRM project.

Annex 7 is a listing (categorized by natural resource) of natural resource management practices implemented either through public or private entities currently supported by the CBNRM project in the 5 CRs in Senegal. Also, in Table 3, the possible effects, impacts, and ecological or socio-economic benefits of these practices are presented. Effects and impacts shade into each other, the difference between them largely one of degree in time, scale, and scope. Effects are the immediate, short-term impacts of the practices observable over small fields or areas with direct benefits to the user. Impacts imply the cumulative and more far reaching effects (both direct and indirect) of the project's activities distributed over the entire area and over the target community as a whole. It includes unforeseen or assumed spin-offs of project activities. For example, the effect of project activities on the management capacity in the CRs may positively impact management capacity in other decentralized sectors.

As shown in Table 4, the possible effects, impacts, and benefits of the NRM practices are quite diverse and numerous. It would clearly be cost prohibitive to design a biophysical monitoring system to encompass all variables and possibilities. Because of the expected variation in the physical environment, crops and cropping systems, and farming skills etc., within and between targeted communities, implementation of a specified NRM practice would produce varying effects. In order to more fully explain this variation of biophysical effects of adopted NRM practices a number background (explanatory, classifying, or associated) variables and parameters are often required. Many of these are contained in diagnostic socio-economic surveys that measure community and demographic characteristics. In addition to these, the parameters that describe the physical state of the natural resources (soil, range, forests, water, plant resources, etc.) at points in time need to be measured and included in the data collection.

Table 3: Main NRM practices targeted in CBNRMP rural communities, their expected effects, and their socioeconomic or biophysical impacts

Natural resources	CBNRMP global objectives	Main NRM targeted practices	Expected effects directly linked to NRM practice	Long term socioeconomic or biophysical viewed impacts on adopters and natural resource
Soil/water system	Soil productivity improvement and restoration conservation	Antisalt dikes	Protection against saline intrusion	- Rice-growing and market gardening development - Soil structure improvement - Production and food security increase - Net income stabilization or increase
		Rock terraces	- Decrease in soil loss by water erosion - Fight against gullies	- Soil productivity increase - Natural vegetation regeneration increase - Production and food security increase
		Valley-bottom improvements	- Water availability for irrigation and livestock	- Aquifer recharging - Development of market gardening and fall in level crop - Fishery development - Production and food security increase - Net income stabilization or increase
		Composting	- Soil enrichment in nutriments	- Fixed phosphorus liberation in the soil - Yield increase - Production and food security increase - Net income stabilization or increase
		Windbreaks and live hedges	- Decrease in soil loss by wind and water erosion	- Evapotranspiration decrease - Yield increase - Animal damage decrease - Decrease in conflict betweem herders and farmers - Plot demarcation
Vegetal cover system Forest/ pasture	Forest and pastoral resource restoration and protecttion	Reafforestation (tree nurseries	Firewood supplies	- Soil protection against water and wind erosion - Soil fertility improvement - Biodiversity increase
		Improved cooking stoves	-Firewood consumption decrease and decrease in pressure on trees	- Vegetal cover regeneration - Decrease in respiratory ailments due to smoke and fire risk decrease
		Grazing zone demarcation	-Crop seedling protection -Fodder quality and quantity improvement	- Forest space natural regeneration - Soil erosion controlled

Table 4: Monitoring biophysical indicators of NRM practice adoption effects on the soil/water system in CBNRMP rural communities

Natural resources	Effect or Impact to evaluate	Indicators and units of measure	Explanatory variables and units of measure	Measure or appraisal means recommended for indicators and explanatory variables		Periodicity and responsible for measure	[1] Reference Note
				Indicators	Variables		
Soil/water system	Soil fertility increase	Compost pit volume (m3)	(i) Compost chemical contents (% dry matter) (ii) Compost dry density	Microrealization technical monitoring sheet	(i) Compost chemical analysis (ii) Compost pit sample	- Annual volume measured in May CERP - (i), (ii) - Once, special study by one trainee	Sheet No. 1
	Yield increase	Increase in relation to CR average measured yields (kg ha^{-1})	(i) Rainfall (mm) (ii) Maximum minimum temp.(oC) (iii) Wind distance (km) (iv) Plot coordinates (GPS) (v) Type, texture, and depth (cm) of soil (vi) crop dampness contents and crop index (vii) Treated surface	Technical monitoring microrealization sheet data, recorded yields in national and regional surveys, modeling	(i) PVC pipe manufactured rain gauge (ii) Thermometer max./ min (iii) Totalizing anemometer (iv) GPS (v) Direct observation (vi). Analyses to determine humidity and contents (vii) GPS	- Yield, annually (at the end of the season), CERP - (i) Daily, promoter (ii), (iii) Daily, MC - (iv) , (v) Once promotor/CERP -(vi) once, special study, trainee -(vii) Annually, CERP	Sheet No 2
	Decrease in wind and water erosion	Soil increase (mm yr-1)	(i) rainfall (mm) (ii) Wind distance (km) (iii) Plot (of land coordinates (GPS) (iv) Type, texture, and depth (cm) of soil (v) Treated surface (ha) or length (m) of live hedges, rock terraces, windbreaks	Locally made gauge (with a post and a chain) to measure soil increase/decrease	(i)PVC pipe-manufactured rain gauge (ii)Totalizing anemometer (iii) GPS (iv), (v) Direct observation	- Soil net increase before and after the rainy season, promoter/CERP - (i) Daily, promoter (ii)) Daily, MC - (iii) , (iv) Once, promoter/CERP -(v) Annually, CERP	Sheet No 3

[1] Reference note: Provide details of justification (rationale and assumptions), basic value, methodology (data collection, shaping and finalizing, recording and analyzing tools), equipment and training needs, and special studies (if necessary).

Figure 1 shows the generalized overall structure and information flow envisaged for the PGCRN biophysical monitoring system. As shown, the key source of information is the project activities and interventions taking place at the CR level by the individuals or groups adopting GRN practices. The results and data at this level needs to be converted into useable and useful information for feedback to the project management hierarchy. This would often require additional data or information which can be used in conjunction with the data collected at the CR level. As shown these may consist of special studies or other data collected by other structures both within and outside of PGCRN. The data collected must be analyzed to quantify the impacts of the GRN practices implemented by adopters.

The most time consuming and costly approach in data collection and monitoring at the CR level is the rigorous scientific experimental approach. Here subjects are grouped into treatment and control groups and effect variables (the state or behavior that the intervention is expected to change) are measured. Such a system is appropriate when causal relationships are required. Inferences from such monitoring can be made with specified levels of certainty. However, it is a necessary condition in this approach that the groups are equivalent. This would clearly be impossible within the participatory operational framework of the CBNRM project.

A second alternative to the rigorous scientific approach is "quasi-experimentation" (i.e. a watered-down version of scientific experimentation). Here the requirement for assuring group equivalence is relaxed and observations are made on groups that differ in many other ways than by the presence or absence of a specified treatment. If sufficient background, explanatory, or classification variables or parameters are concurrently measured, it is possible to account for non-equivalence through various forms of covariance analyses. However, regardless of such analytical corrections, causation cannot be determined with the same confidence as more rigorous scientific experimentation.

A third alternative, and one that is more appropriate to fulfill the participatory imperative of the CBNRM project, is the monitoring of effects through direct observation and interaction with individual adopters and groups. This direct interactive monitoring approach, coupled with judicious use of existing information, is simple to organize and much less demanding in time and resources than the more rigorous alternatives described above. It would also be easier to fit into the existing socioeconomic monitoring activities. Direct interactive monitoring is usually carried out by a single individual or a small multidisciplinary team. The concentration of the entire process of monitoring in a small multidisciplinary, well-trained team working closely together has many advantages. They are able to work together with the case study groups and bring together different aspects of information into a common framework. This can lead to insights not possible in experimental approaches. The CERP (Centre d'Expansion Rurale Polyvalent) teams already present in all CRs constitutes the ideal structure for the direct interactive case study approach.

Figure 1: Schematic showing structure and information flows in a biophysical monitoring system for CBNRMP

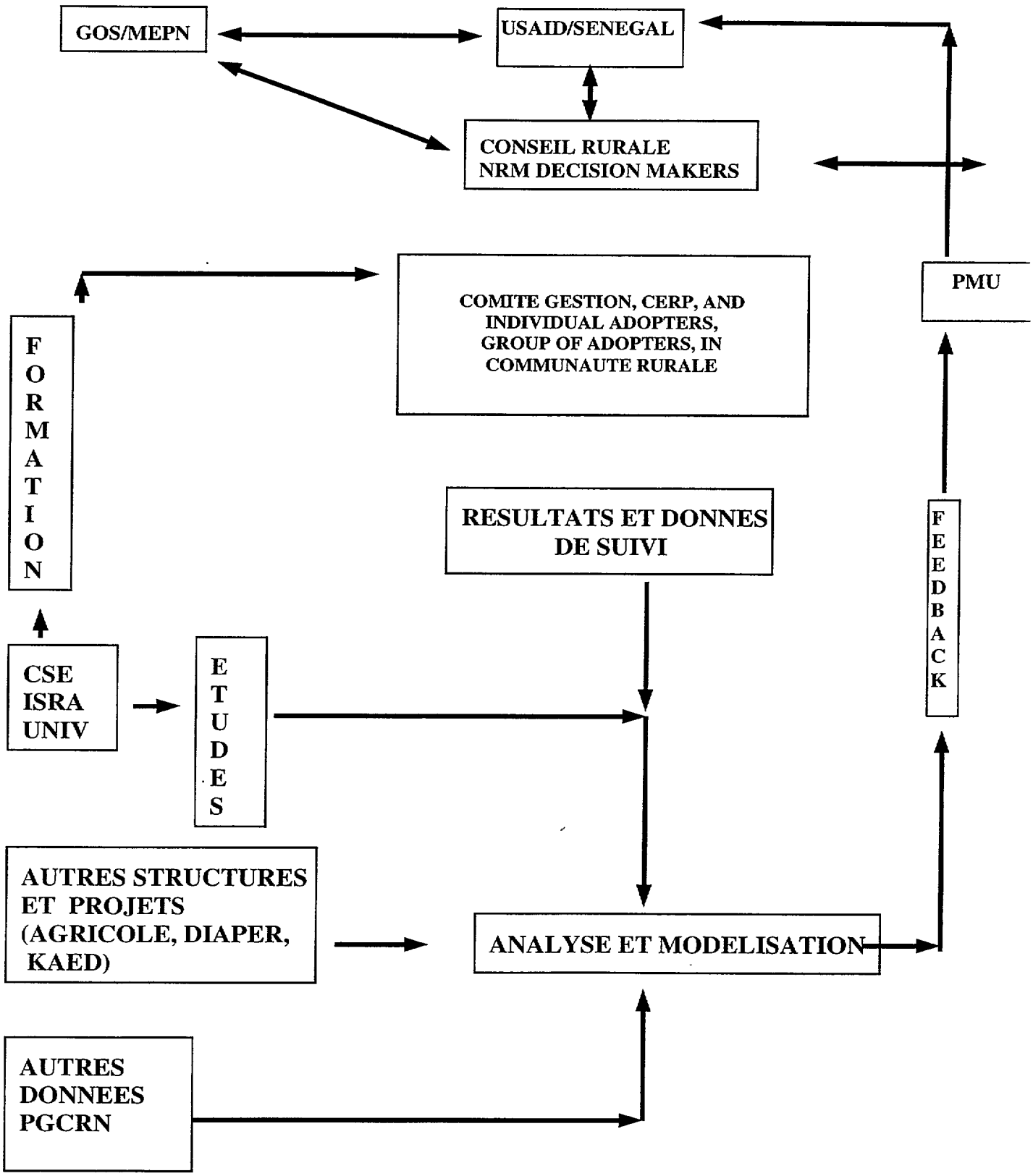


Table 4 shows the biophysical indicators of NRM practice effects on the soil and water system in CBNRMP rural communities. For reasons of convenience and parsimony, the natural resources are grouped as soil/water, vegetative cover-foret/paturage. The last column of this table lists the reference sheet which provides details of justification (rationale and assumptions), baseline values, methodology (data collection, editing, recording tools and analysis), equipment and training needs, and special studies (if deemed necessary), and the summary tables for annual reporting (see Annex 4). Based on the structure of the annual reporting, the changes needed to permit data collection at the CR-level becomes self-evident. The possible places where these changes can be made are indicated in section C of these reference sheets for each proposed indicator.

The frequency of collection and the sampling frame necessary for the monitoring system can already be defined in relation to each indicator (see part B - Appendix 4). At present, there is a relatively small number of microrealizations. The established monitoring system permits monitoring of each microrealization individually. The sampling strategy will depend, to a large extent, on the monitoring system available budget. Nevertheless, we make some propositions in reference to each indicator and the diverse variables that will measure it.

For the first year of microrealization execution, we propose a microrealization systematic sampling. The sampling strategy for the following years will depend on the microrealization growth rate. It is, however, clear that some data will be systematically monitored when establishing every new microrealization, as they will only be collected once (ex. Plot GPS coordinates for all sites)

The biophysical indicators and the collection system of their variables

The system for collection of data for the biophysical indicators is detailed in sheets No 1 to 5 for each indicator. Some additional notes and explanations are as follows:

- The surface or length on which NRM practices and technologies were applied. The data relating to the surface and length will be available in the monitoring annual surveys or CERP technical monitoring sheets. There it is a matter of systematic sampling of all microrealizations.

- The surface of grazing zones is already indicated on soil occupation maps. It will be interesting to produce a second map at the end of the project to see its evolution (references for this are provided in the discussion to follow regarding the data base).

- The compost pit volume: this evaluation will only be done once and will include all microrealizations (systematic sampling) where this technology is practiced.

- Etablished/improved plantations: the sampling will be systematic.

- The measures relating to soil net gain and available wood through reforestation activities will be done every year. Monitoring sheets 3 and 4 describe the calculations applied to these data.

- The number of improved cooking stoves will be determined for each RC. This piece of information will be available in the monitoring annual survey. This is a general piece of information which will regard the whole CR. The sampling strategy will depend on the one retained in the annual monitoring survey framework.

- The number of improved practices and NRM technologies used: this piece of information will result from the monitoring annual survey and will regard all the CRs targeted by the project.

- The increase in yields of cereal and cash crops:

a) the yield of cereal, food and cash crops:

- the cereal production and the corresponding surface cultivated will be systematically researched for in all microrealizations. The data will be recorded in the CERP technical monitoring sheets.

- the crop moisture contents is a datum which is already available and it will not be necessary to search for it (See sheet 2).

- the compost chemical composition and compost dry density will have be to researched only once in the existing literature.

- the soil type, soil texture, its depth, its pH and its salinity will have to be researched only once in the existing literature or in the Soil Office. That will permit the cartography of microrealization sites. Once this piece of information is available, at the end of the project, the soil texture, the pH and the salinity will be evaluated by a systematic sampling of microrealization site soils.

- the climatic data: the rainfall levels, the temperature and the distance covered by the wind are noted down on a daily basis by the MC members. The CERP will record them in the montly technical monitoring sheet. The sampling will only concern the MC site.

- the geographic coordinates of plots will be defined systematically and only once for all microrealizations. It will be useful to do so in order to be able to locate the different microrealizations on the maps already existing.

b) the quality of pastures and wood production:

- the maximum carrying capacity is a datum which will have to be researched only once in the existing literature. It will concern the different types of pastures in the targeted CRs.

- it will be possible to determine the present carrying capacity through the annual monitoring survey. A systematic sampling of the CRs targeted by the project will be carried out as the present livestock in the zone can be calculate on the basis of the vaccination sheets of the cattle-breeding division.

- special studies will be conducted to determine the production of the various forest species used in plantations. Once these data are known, it will be easy to calculate, every year, the project contribution to the fire and service wood available (See sheet No. 4).

Economic Impact Indicators

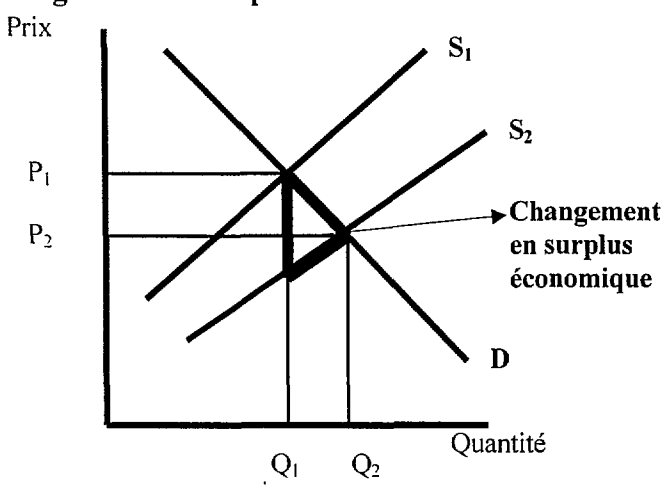
The socioeconomic indicators proposed by USAID to measure the impacts of adoption (see Table 2) are in general valid and useful. We propose to retain all with one exception; "market access" cannot be retained as it is much too vague to be useful in practical application or interpretation and is dropped in favor of recommended macroeconomic indicators discussed below. For the rest of the indicators, however, modifications are proposed to make the indicators more precise and meaningful not only to CBNRM, but also to USAID. It is appropriate to point out that virtually all of the baseline data for the retained socioeconomic indicators are already in the process of being obtained by the Project through the ongoing CR-level household surveys.

The major deficiency regarding the list of socioeconomic indicators offered by USAID is that, as a recommended database, it does not provide the basis to permit an estimation of long-term economic impact. The need for such an economic assessment of the Project must be assumed and prepared for. If the data needed for such analyses are not being currently obtained by the Project monitoring system, the future opportunity for providing this analysis will be lost. Given the stated importance of the Project to both USAID and the Government of Senegal, this would be an extremely costly oversight.

Economic impact may be measured in different ways. We propose both the creation of a database to permit a traditional 'microeconomic' impact assessment and the use of a more innovative macroeconomic approach to measure CBNRM Project impact.

The Micro Approach. The basic microeconomic approach is illustrated in Figure 2 .

Figure 2 : Conceptual Framework I



Data Requirements

1. Product prices
2. Demand for products
3. Cost of production
4. Changes in adoption
5. Supply curve for products (production systems)

The adoption of improved NRM practices increases long-run production and creates a shift in the supply curve (from S_1 to S2). This supply curve shift causes equilibrium product prices to fall (from P1 to P2) and equilibrium quantities to rise (Q1 to Q2). The change in net social welfare (the microeconomic indicator of long-term impact) is given by the outlined triangle and is equal to the change in economic surplus brought about as a result of (with) the adoption of improved NRM practices.

It is not the intention of the consultants to ask the Project to undertake this analysis but rather to ensure that the relevant data are available if and when this becomes necessary in the future.

As indicated in the Figure, data on product prices is required in order to estimate microeconomic impacts. Fortunately, these data are easy to come by (e.g. government agencies regularly monitor product prices) and will not require the Project to undertake any specific data gathering activities. The relationship of prices and quantities demanded is slightly more problematic. However, there are numerous, relevant regional studies of the demand for different products that future impact evaluators may take advantage of, and consequently, this too is information not required to be supplied by the Project. It is worthwhile to note, however, that information supplied by the Project if the recommended macroeconomic approach is followed will provide the basic data to estimate demand functions for the products of interest.

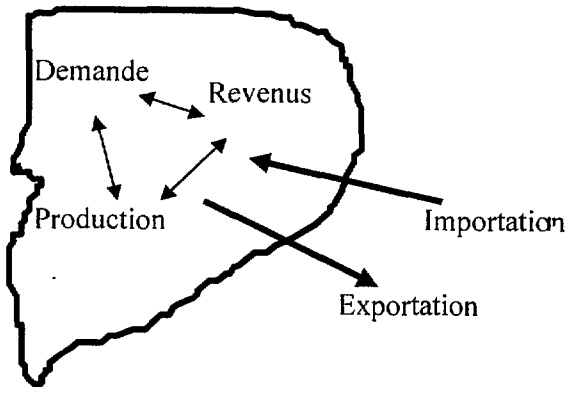
The micro approach will require two types of data to be provided by the Project: cost of production (for the micro-projects) and adoption rates. To gather the latter (among other data requirements), we recommend the use of an annual monitoring survey (see below) that will provide both adoption rate estimates and areas of coverage. Cost of production data are already available through cost "standards" developed for each type of NRM practice by the Project. These cost standards are used as the basis for negotiating cost-sharing arrangements with Project partners and are available through the financial advisor's office. Although these standards cover the costs of only the first year of each activity, they are considered to be sufficient. NRM interventions typically incur the vast majority of their total costs during the first year. Future impact evaluators should be able to find reasonable NRM intervention maintenance cost estimates to supplement these first year costs and include in their calculations. Consequently, no additional data gathering for this need is required by the Project.

Knowledge of the supply curve and how adoption of a technology shifts this supply curve is also required to estimate the micro economic impact of the Project. Basically, detailed knowledge of the production system and how it changes with the adoption of a new practice is required. The Project may encourage 'stagiaires' to examine these microeconomic changes in production systems where possible. However, given limited resources available to the Project for monitoring and given that a number of such studies at the regional level are already being undertaken independently of the Project, it is concluded that direct support for such data gathering activities by the Project are not currently necessary. Future impact evaluators should be able to find sufficient data from related studies to use as needed.

The Macro Approach. Given the unique nature of the CBNRM Project, it is apparent that overall Project evolution, ultimate impact, and success can best be measured by using "macro" or holistic CR indicators. These macro indicators fall into the domain of macroeconomics and will seek to provide measures similar to country-level GNP estimates for the CRs. This and related indicators will not only provide information relevant to the existing SO framework, but also position the Project to address the new SO structure, particularly with respect to measuring the differential impact of decentralization and employment creation in the countryside.

The development of such macro indicators will require the development of innovative regional economic measuring techniques and consequently will involve research. Consequently, it will also require the development of new partnerships for CBNRM. The proposed general approach is illustrated below in Figure 3. In Annex 5, the proposed research and research partnership is presented in detail.

Figure 3: Conceptual Framework II
CR Map (hypothetical)



Data Requirements

1. Income/Expenditures of CR institutions (ménages, gov't, etc)
2. Secondary economic data
3. SAM matrix

Output (Indicators)

1. Multiplier analyses income and employment
2. GDP estimates
3. Market access

The performance of the economy for any area (village, CR, country) can be measured by tracing the flows of the demand-production-income cycle. The demand for goods and services leads to production that, in turn, generates income. Income then provides the basis for additional demand and a continuation of the cycle. This basic macro economic model, supplemented by measuring the changing stocks of resources available to the economy and the imports and exports of the economy, provides a reliable, holistic snapshot of a region's economy. The measure (indicator) used most often is the gross national (regional) product (GNP) - the value of all final goods and services produced by an economy.

The evolution of GNP provides an excellent holistic indicator of a region's economic development. Multipliers derived from the same product accounts required for GNP estimation can provide additional measures of impact. For example, employment and income growth multipliers can provide overall impact estimates for the economy as a consequence of changes in production demand brought about by the adoption of NRM practices. Furthermore, differential impact estimates can be estimated for different groups of interest (e.g., poor households vis a vis rich households). Also, comparing and contrasting the economies of different CRs may provide interesting insights into the consequences of effective and not-so-effective CG activities and leadership, thereby providing measures of effective and non-effective decentralization. In short, the suggested macro approach will provide a vast array of information useful for Project in its effort to measure impact in the present and future SO frameworks.

IV. Database Development and Management

USAID and its partners have defined a number of indicators to measure progress toward attainment of KIR and IR objectives. In principle, there should be a large convergence among indicators measuring the achievement of the project objectives and those relating to the project contribution to the attainment of SO#2. However, the CBNRMP has not developed a data base liable to give an account of these major objectives.

In fact, the first year of the project execution consisted of selecting CRs. The second year was devoted to the establishment of natural resource management committees, the training and awareness of their members and to the elaboration of land use management plans. Elaboration of the plans provided an opportunity to gain some basic data regarding the biophysical and socioeconomic background (through execution of the PRAs). Priority action lists have been defined in relation to the constraints in targeted sectors without focusing on following these actions according to precise indicators.

The CBNRMP conducted a national KAP survey in 1996 based on the different agroecological zones in Senegal. This survey aimed at evaluating NRM policies and knowledge, and it remains a data bank on a national scale. The measurement system of project results was reinforced substantially during the year 1997; one can now predict trends on the basis of collected or incoming data including the results of household surveys and microrealization monitoring.

The monitoring Manual recently produced sorts out many problems in defining monitoring tools, but a database must be rapidly established in order realize the benefits of multisource data: the referential data bases compiled from household surveys as well as those recorded on the monitoring sheets of the NRMC, CERP and PMU. There is a good reason for taking stock of what exists; also, the present situation militates in favor of a conceptualization of these aspects so as to assist in establishing a database capable of effectively giving an account of the strategic monitoring.

The conceptualizaton in question focuses on a catalogue of referential data which must be gathered by the project at the beginning and at the end of execution (see Figure 4). Diagnoses on NRM are achieved in partnership with diverse structures for the knowledge of the initial state and evaluation. The project computer scientist made a basic study of the computer system established at the beginning of the project. Thus, a computer development plan was proposed (implementation standard plan and specific plan). That study fit in with the attempt to make the system operational; subsquent to the search for a harmonious data structure for the SRP and the proposal of a guide for the documentary base (Cf. see A. Savadogo's end report, 1994). A configuration of the "Data Base System" is proposed as a way to facilitate access, research, filtering, modifications and editing.

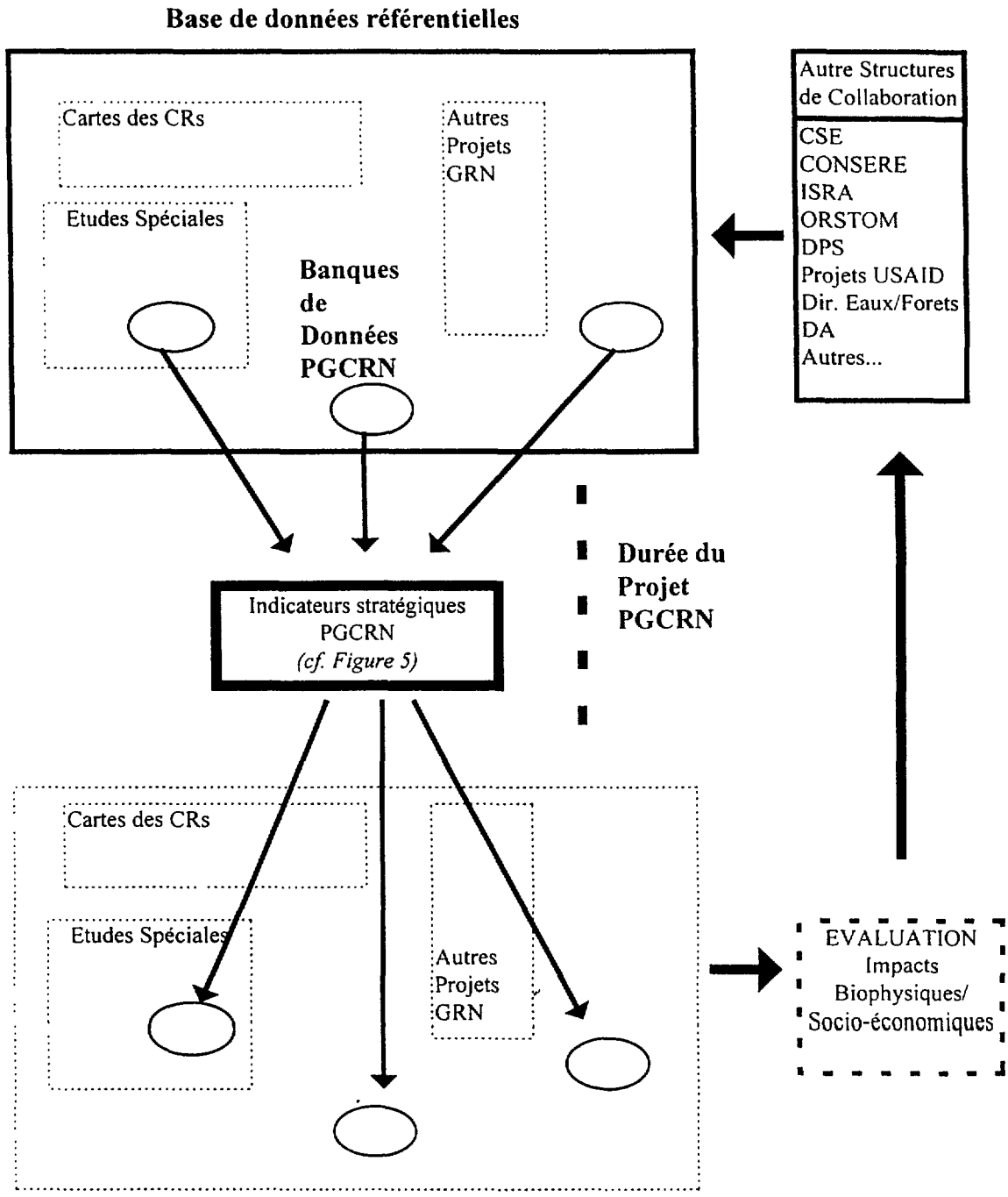
The established system can be characterized as an interface "documentary data base" designed under the platform of Microsoft Windows, with Paradox as an engine. The necessity to review the system appeared very quickly, not in terms of data storage but to achieve rational management that can respond to the need for quarterly reports and the annual activity plan. The birth of three operational data bases was witnessed:

- a data base on microrealizations is at present available at the secretariat where updates take place; requests for this information serve various needs;

- a data base on training is available for the reporting needs of the head of the training component; the state obtained remains fixed;

- the data bases of KAP surveys are evolving and being partially translated into Paradox (there is also the idea of georeferencing these data in the framework of a GIS.

Figure 4: NRM information storage categories



The systemic character of the project, the relatively long processing time, the rapid growth of the data, and the complexity of each of these, impose limits on the efficient use of data bases. These problems must be addressed in relation to the monitoring of NRM strategic indicators.

A large portion of the referential database has already be defined; it is composed of the variables included in the national CAP and CR household surveys and is stored in SPSS and Paradox computer files. At some future time, these surveys will be redone and the vast array of changes that have occured during Project execution will be brought to light for study and interpretation. Most of the biophysical component of the referential database is yet to be gathered, however. The steps proposed in this report will remedy this deficiency.

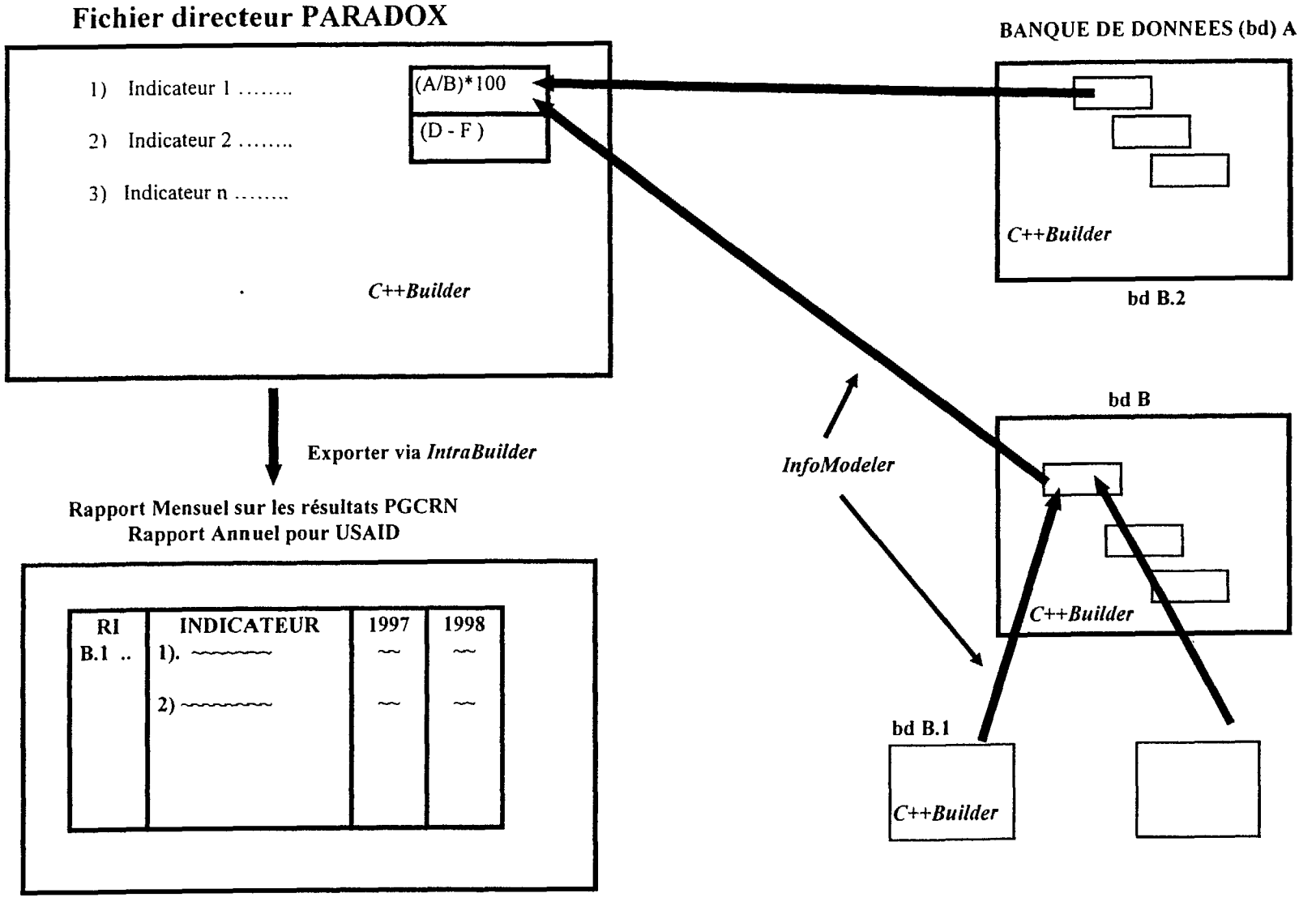
Of greater concern than the referential database is the strategic (indicator) database. This, presently, does not exist. We propose the development of a minimum strategic database containing the minimum list of strategic indicators we have proposed within this report. This database will serve as the core around which other Project-related databases can be anchored.

The final product of the strategic database that we envison is illustrated in Annex 9. This is the model report that the Project will have available on a daily basis and make available to USAID when required. The evolution of the indicators illustrated in this example will, of course, require context and interpretations to be added to any report by CBNRM staff. The hypertext-linked series of data files illustrated in Annex 9 will serve as the filter for all strategic data gathering and analysis activities. This database will be placed on the Project network and updated regularly in order to keep all staff informed on Project performance. The presence of this database on the network will also stimulate the development and integration of other, related Project database efforts. It is hoped that it will also stimulate the development of an 'Intranet' among CBNRM stakeholders.

The structure of the proposed underlying strategic database is simple (see Figure 5). The final hypertext files uploaded onto the network will be an exported Paradox spreadsheet files wherein individual spreadsheet cells (and related calculations) containing indicator values are linked to the separate (primary) databases containing the necessary variables. Each time new data are added to the primary databases, the calculations in the Paradox spreadsheet will be automatically updated. On a monthly basis, the data processing unit will export the new (revised) Paradox spreadsheet to the network server.

Besides simplicity, the advantages of this sytem include: flexibility. Variables or even new data sets can easily be added to the system minimum of training necessary. If the recommended software is purchased (see below), staff will not need to learn the fine details of different software packages in order to see Project information. Rather, they will be assisted by the Project computer specialist to construct tables of results (finished information products). The background database linkages and calculations will be made transparent to the final users.

Figure 5: Modélisation systémique de la Base de données du Projet



Software Recommendations. To facilitate the above, we recommend the purchase of :

. *C++ Builder*. This is to reinforce *C++ (de Bordland)* which already exists; this will increase speed and allow for complex mathematical operations.

. *Borland IntraBuilder*. This software will be used by the Project computer specialist to construct the interactive Intranet (Project network) files and make the necessary conversions from Paradox and other databases.

. *InfoModeler Personal Edition*. This software will allow the Project computer specialist to work with other Project personnel to construct transparent relational databases, thereby permitting all personnel to obtain access to Project information without having to learn complicated software commands and syntax

V. The institutional connections

The institutional connections address three scopes of activities:
.data collection,
.training,
.special studies

Several institutions play a role (see Figure 4):

The CONSERE
The CSE
The ISRA
The Department of Statistics
The Department of Agricultural Statistics
Training schools (ENSAH, ENEA, etc)

The institutional connections to be estabished should enable the CBNRMP to take advantage of the expertise of some structures in the matter of environmental monitoring (for example, CSE), to better understand national trends in NRM, and to benefit from their experience in training, in monitoring/evaluation, in undertaking special studies and in data collection.

There is a collaboration protocol among the CSE, the CONSERE and the CBNRMP which will allow the project to work closely with these structures in the monitoring and the NRM-intervention evaluation fields. These structures can serve as relays in the monitoring system.

The CSE monitors biomass, livestock and agricultural resources. It already has experience and expertise in the monitoring of biophysical indicators and has a reliable means of data collection. It can inform the CBNRMP of the agricultural yield estimations carried out in the targeted CRs. It can take photographs over the CRs involved.

It can also play a major role in training as regards collection methods as well as biophysical indicators. In fact, the CSE begins numerous ground activities by using *GPS*, for instance. Field exercises are of use on the one hand in collecting complementary data necessary to produce the

vegetative cover maps and on the other hand in validating cartographic productions form satellite images. This information is used for activities relating to the vegetative growth monitoring and soil occupation/use cartography. For this last activity, the geographic coordinates of checkpoints are noted through use of GPS.

The CONSERE can help the CBNRMP through its field experience related to decision making to prepare the National Environmental Action Plan. As a framework of a national observation post or an environmental monitoring system, the CONSERE is an interdepartmental structure which can contribute to finding solutions to problems that come up on the ground and can assist in making decisions at the national level.

ISRA has several possibilities for collaboration with the CBNRMP in the areas of:

- data collection - ISRA has done a lot of research at stations and in farming environments in the project zone. Existing data are an important source for the establishment of referential data in the biophysical environment;

- making limited or special studies: that particularly regards the macro-economic study which will have to be made;

- the fact that ISRA can contribute to training through the presence of Research Regional Unit teams in the project intervention zones. This training is necessary to reinforce the abilities of the CERPs, the community animator and the MC in the monitoring of indicators;

- NRBAR engages in collaborative research with ISRA researchers. NRBAR research has been carried out in the Peanut Basin and most targeted CRs are located in this zone. The project could thus build on the experience of this program.

Training schools have human resources (students) capable of making limited studies within the scope of their dissertations.

The Forestry Department has a monitoring-evaluation and training-awareness facet. Moreover, it can compile all studies relating to NRM and likely to be of interest to the CBNRMP.

The Department of Agricultural Statistics will be useful for a collaboration aiming at the collection of data and the harmonization of collection methods as well.

The Department of Statistics will also be interesting for harmonization of data collection methods. It has already developed survey forms for the informal sector, which can be useful for the macro-economic study.

VI. Analysis of the monitoring system and its instruments

The monitoring system is a set of collection and processing operations organized to watch a process over a relatively prolonged period. The monitoring plan is generally organized as a system, but it must be relatively streamlined so as not to make the task tricky for those who are in charge of it; all the more so since it leads to an evaluation in terms of results.

The monitoring-evaluation system currently implemented at the CBNRMP proceeds from a collaboration articulated with two levels of organization: the level of basic communities and that of the PMU. The monitoring of planning activities and that of the project direct interventions is distinguished by a data collection process which is notably incumbent upon the NRMC and the CERP; while the monitoring of other local and national basic data is essentially a matter for providers and the PMU. These roles and responsibilities have recently been specified in the Monitoring-Evaluation Manual (Part one, May 1997); but at least two measures which should theoretically help towards the succes of the system must be emphasized :

- make sure that providers can collect biohysical and socioeconomic data likely to give an account of the evolution of indicators; because, for instance, the degrees of precision are linked to the means put at one's disposal; likewise, the reference data monitoring can affect national production of data (see the «information sub-system» linked to the national reference framework) ;

- make sure that all the data of all the monitoring system components which converge on the PMU can be managed in a well-thought out way to give an account, on request, of the Project contribution to partners'objectives.

At the PMU level, the monitoring which has been conducted to present appears to have been the financial monitoring of actions (trainings and microrealizations). The data collected by the different Project cells are not integrated in a single system accessible to all the team. Regarding the data base, we demonstrated above that currently data is highly compartmentalized in the monitoring sub-systems, at the expense of a synoptic view of the development of different activities.

Within the context of the spread and implementation of NRM sustainable pratices, data acquisition, storage and relay instruments are created. It is a matter of periodic monitoring and evaluation instruments likely to provide information about the evolution of the institutional, socioeconomic and biophysical indicators discussed above. Measurement of indicators permits a view of the results reached within the LUMP excecution. It is first a matter of Intermediate Results which work towards the achievement of Key Intermediate Results.

In the development process of these instruments considerable professional and human means mobilized at the PMU level as well as that of local partners have permitted the conclusion that the monitoring system was "eminently participatory" (See *Monitoring and Evaluation Manual*). That is why subsequently, from a functioning standpoint, the system was not fixed (see *CBNRMP monitoring and information system* + Appendices, SAR 6 and *CBRNMP monitoring and information reinforcement system*, SAR 14). Basically, the LUMP objectives are targeted via a controlled process for its execution. How else shall the correctives be applied in view of the unavoidable inadequancies?

That being the case, the current search for a reporting system responding to the needs of higher authorities is an opportunity to diagnose, even rapidly, the main data collection tools useful to indicator monitoring. Field level interviews have provided new appraisal elements with the benefit of hindsight. More precisely, it is a matter of trying to make tools more flexible without harming overall coherence. In fact, "problem" sheets are listed as originally worded in one of the most recent project working documents (the *Manual* ...), with a minimum of comments or proposals (Table 5). Emphasis is placed on simplification to increase efficiency.

Table 5: Study of monitoring sheets
(only sheets including modifications or proposed deletions are presented)

N° of the corresponding tablein the *Manual*	Sheet titles and agent(s) responsible for its completion	Proposed modifications regarding monitoring and evaluation tools
	Animator (NRMC)	
7	NRMC activity sheet	There is no point in asking for a separate analysis considering requested information on problems, suggestions and lessons.
8	Monthly activity sheet	Here take into account following sheet 9, namely "total presences" according to activities.
9	NRMC member activity and presence sheet	To be deleted, because "total presences" is included in activity sheet 8; the monitoring according to members over a period of three months is also onerous
10	Recapitulative sheet of selected collective submissions	Sheets 10 to 11 can be combined. Consider table no. 10: create in it an "S/R" column (for selected/rejected). Correct by putting "requester".
11	Recapitulative sheet of selected individual submissions.	
12	Recapitulative sheet of rejected submissions	To be kept in order to have records on rejections, but put the small table on the general state of submissions at the botton of the sheet.
13	Execution recapitulative sheet for collective submissions	Execution recapitulative sheets 13 and 14 are to be combined (create column "C/I," for Collective/Individual).
14	Execution recapitulative sheet for individual submissions	
	CERP Chief and agents	
15	Technical monitoring notebook	Analyze "problems" and "recommendations" according to a specification of tasks line-by-line; but by specifying the beginning date and the duration anticipated for each task.
16	CERP quarterly monitoring sheet	Reword information requested for "bibliographic resource" in terms of the corresponding indicator.
18	Microrealization technical monitoring monthly recapitulative sheet	To be retained,by keeping Individual/Collective terms
19	Macrorealization technical monitoring recapitulative sheet	To be eliminated insofar as the monthly monitoring is regularly done.
	PMU agents	
20	PMU activity sheet	No need to request "description" and "impressions" considering the information provided on "problems" and suggestions".
22	Training monthly sheet	Add to the column units in person/days
23	Communication monthly sheet	Create the line "maps" as an excellent means of communication.
27	Monitoring sheet for indicators of the training capacity improvement (no. 1)	Tables 27 et 28 on both sides (of the pages)
28	Monitoring sheet for indicators of the training capacity improvement (no. 2)	

30	Monitoring sheet for indicators of the NRM participation increase	Tables 30 et 31 on both sides (of the pages)
31	Monitoring sheet for indicators of the NRM participation increase	

Thus, improvements to sheets made for effectiveness and convenience in the monitoring system implementation have led to the observation that a relatively restricted number of sheets give some information about strategic indicators (5 exactly). The other sheets respond to implementation considerations of a practical nature on the ground and within the PMU rather than an increase in knowledge of the project contribution to USAID's SO2. Table 6 provides a clear view of the direct links between the defined indicators and the monitoring-evaluation instruments currently in use.

Table 6 : useful sheets for strategic monitoring

Indicator included in the system	**Monitoring sheet**	**Corresponding table number in the monitoring *Manuel***
Percentage of the contribution (financial and in manpower, by person-days) used by producers in microrealizations	Selected submission recapitulative sheet	10
Person/days total training of producers (by gender)	Monitoring sheet for indicators of the training capacity improvement (n° 2)	28
Part of CR budget in public microrealizations	CERP quarterly monitoring sheet	16
Number of technicians (person/days on the ground) available for the project activities (awareness, microrealization, monitoring)	CERP agents' presence and activity sheet	17
Number of cars and motorbikes	Monitoring sheet for indicators of the training capacity improvement (n° 2)	28
Number (by gender) of people who participate in microrealizations	Submission execution recapitulative sheet	13
Costs of material, human and agricultural means used in microrealizations and provided by the project and number of microrealizations by gender	Submission execution recapitulative sheet	13
Percentage of NRM conflicts solved by the CR	CERP quarterly monitoring sheet	16
Number of communication and technical information media contacts	CERP quarterly monitoring sheet	16

One important proposition is the **annual monitoring** of a number of indicators through household surveys. This frequency is justified by the need for the knowledge of indicator changes from one year to be next (what else would assure the notion of "indicator" in these cases?). Also, this annual "Monitoring survey" could allow a "simplification"--a reduction to 1/5 the size of the existing household questionnaire, even including supplementary questions that will allow adequate coverage of the various indicators of the project. The implementation of an annual survey of this type also supposes a substantial reduction in the sample size of the existing collection system.

The sole purpose of the annual monitoring survey will be to obtain sufficient data on strategic indicator variables so that progress toward the relevant SO results framework can be reported to USAID on a timely basis. By collecting this information, of course, the results of this survey will also assist the project in making annual strategic decisions about current performance and any required changes in activities. We stress that this survey is only for the monitoring of strategic indicators. The project should resist the temptation to add additional questions to the survey instrument.

To facilitate development of a survey instrument, the consultant team analyzed the current contents of the household surveys (*enquêtes ménages*) in order to take maximum advantage of the existing questionnaire and the already-field-tested questions. The results of this analysis are presented in Table 7 where we also append at the end of the table the required additionnal information to be collected.

Table 7 : Collection of relevant information on the basis of annual monitoring using household surveys

a. Simplification of the "household survey" questionnaire administered to heads of household and leading wives

Corresponding No. in the questionnaire of heads of household	Corresponding No. in the questionnaire of leading wives	Annual monitoring information
I	**I**	**Locality**
1	1	CR
2	2	Soil zone
3	3	Village
II	**II**	**Identification**
4	4	Number
5	5	Name
6		Sex
11	-	Number of members in the household
IX	**IX**	**Knowledge of natural resource management codes and laws**
39	37	Number (of people) having known NRM codes and laws
X	**X**	**Agricultural and natural resource management**
56	-	Surface of managed (owned) land in the preceding season
57	53	Surface of cultivated land in the preceding season
		Agricultural equipment and material owned or used during the preceding year
63	59	Number owned
		Draft animals owned or used during the preceding year
67	63	Number owned
XI	**XI**	**Knowledge of natural resource management technologies**
70	66	Knowledge level
71	67	Place where knowledge gained
72	68	Technology interest
74	70	Activity or microrealizations

75	71	Non-use of technology
XIII	**XIII**	**Situation of livestock owned**
80	76	Number of heads
XVI	**XVI**	**Credit and investment**
98	92	Preceding year's credit in kind
100	94	Agency for credit in kind
101	95	Cash credit for agriculture
103	97	Agency for cash credit
104	98	Field of investment

b. Relevant additional information for the annual monitoring survey

Heads of household	Leading wives	Annually monitored information (related to the type of results and indicators)
		Institutional capacity
		Percentage (by gender) of producers who consider that the establishment of the NRMC has had a positive impact on the CR functioning
		Availability of technicians for farmers
		Number of producers (by gender) having received at least a single training
		Number of producers (by gender) finding value in the contributions of training agents
		Institution of management and circulation of information related to reinforced legal and institutional frameworks
		Percentage of people recognizing the authority and efficiency of the NRMC, and performance of the NRMC regarding the solution to problems and conflicts linked to NRM
		Legal and institutional framework relating to improved, accepted and approved NRM
		Percentage of people by gender who consider the NRMC as the primary authority in natural resource management matters

It is recommended that the Project seek to minimize the cost of this annual survey by reducing the sample size in each CR. Although it is expected that a consulting firm(s) will conduct the survey in order to minimize PMU time involvement in this activity, other cost minimizing strategies might be tried. For example, interns, the community animators, or CERP staff might be used to conduct the survey in some CRs. A greater number of households surveyed in fewer villages in each CR would also reduce costs. The possibility of this latter, as well as the overall implications of a much reduced sample size, can be evaluated once the current household survey data become available and variances can be calculated. Ultimately, the budget available for monitoring will determine how large and complex the sampling strategy will be. The project should remember that as long as the sample is random, even a much reduced survey's estimates will be unbiased (although confidence intervals will be higher) and project management should be content with the information at this level of confidence. The rather inexact nature of indicators themselves militates against using larger sample surveys.

VII. Training needs

Training targets CERPs, community animators, NRMC members and PMU agents. The training needs related to this study are mainly biophysical. At the level of the communities, reinforcing local skills (technical and monitoring training) permits greater participation on the part of local populations in the analysis and solution to problems which affect them directly. Monitoring must go beyond financial management or microrealization technical execution. It must also enable actors to express opinions on the evolution of their environment and to be able to make choices in view of practices which seem to them more efficient in relation to their specific context. The usefulness of such a monitoring system is to understand the environment as a system. In developing community participation in the monitoring system beneficiairies are put in the position of taking care of themselves, which will reinforce the role of the NRMC as the appropriate agency to make decisions pertaining to NRM in CRs. The project will need consider existing or future collaboration protocols with other institutions so as to guarantee coordination of the training programs aimed at community-based partners.

Monitoring of biophysical indicators will require several types of training:

Table 8 : Training needs

Strategic indicators	Required training	Beneficiary	Insititution
Monitoring	Computerized information handling/network management	PMU	CSE/PMU
Annual yield increase	Training in GPS	CERP/Community animator	CSE
Soil net gain	Training in metal detector installation, use, measurement of chains, measurement of the maximal slope	CERP/Community animator	CSE/ISRA
Data monitoring/collection	Training on the important role of monitoring NRM, data collection techniques, training for filling in monitoring technical sheets	CERP/NRMC	CSE
Planning	Training in project planning and management	NRMC/PMU	To be determined
Monitoring/Evaluation	- Consideration of the environmental system and its monitoring - Interpretation of aerial photos - Study of impacts and environmental evaluation - use and mastery of softwares proposed by the study	PMU PMU/NRMC PMU PMU	CSE CSE CSE CSE/PMU

VIII. Recommendations

1. We recommend that the indicators and the strategic monitoring system proposed in this study be adopted;

2. The methodologies of biophysical and socioeconomic studies should be adopted as follows:

   - the CBNRMP must formalize the referential data base and integrate complementary biophysical and socioeconomic data. This is highly urgent so as to be able to monitor the project impact based on microrealizations. For this, the special studies need to be executed as soon as possible;

   - the project must quickly set up the equipment that will permit data collection at the intervention sites;

   - biophysical variables have to be taken into account in the information collection system. Technical sheets must be revised and simplified so as to include biophysical and socioeconomic variables. The CERP will have to take care of the biophysical data collection. The CERP agents must be trained as well as some leaders or producers so that they can carry out the monitoring and eventually take it over;

   - establishment of collaboration protocols with local institutions is necessary to render less burdensome the monitoring system and to assure the expertise of these structures: this step applies particularly to ISRA, insofar as these protocols exist with the CSE and the CONSERE. The macroeconomic analysis system should be set up with ISRA collaboration.

3. The data base and the management system proposed should be adopted:

   - the software proposed should be purchased;

   - an internal training workshop should be held at the computer scientist's instigation once the tools are set up; this workshop should also address other microcomputer problems encountered by the PMU agents in the management of their data.

4. The CBNRMP should approach the other projects financed by USAID so as to induce the latter to take into account the specificity of each project and corresponding indicators. In addition, it would be judicious for the CBNRMP to ask USAID to produce a glossary defining the various terms that appear in the KIRs and IRs so as to permit a common understanding of the different terms used.

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Annex 1 :

Terms of Reference

COMMUNITY-BASED NATURAL RESOURCES MANAGEMENT PROJECT
USAID 685-0305
DAKAR, SENEGAL

SHORT-TERM TECHNICAL ASSISTANCE

Field: Monitoring system

Objective: Identification of baseline biophysical and economic indicators and establisment of guidelines for their use in a monitoring system

Period: 30 June - 8 August

Consultant team: 2 international experts [one agroeconomist, Dr. Michael Bertelsen (30 June - 8 August) and one expert in NRM, Dr. Naraine Persaud (7 - 25 July) and two Senegalese nationals/CSE [one socio-economist, Mr. Magatte Bâ (30 June - 8 August) and one environmentalist, Mrs. Fatou Kiné Lô Planchon (30 June - 8 August)

Introduction

In June, 1995--exactly two years ago--the first Summary Assistance Report (SAR), entitled *Land Use Management Plan Model and Monitoring System*, was produced by an interdisciplinary team of consultants for the CBNRM project. This report remains the most exploited of the SARs produced for CBNRM, and has substantially contributed to and guided subsequent operationalization of the core concepts and approach of the project.

During the past two years the CBNRM has made substantial progress toward realization of the Land Use Management Plan Model proposed in SAR 1. Five rural community land use plans, based on the participatory approach, are already being executed. Ten land use plans are currently being developed and expected in final form in August of this year. Cartographic work now being completed was also defined in view of the recommendations contained in SAR 1.

Considerable progress has also been achieved in defining and putting into place the monitoring system to measure progress toward the goals of the CBNRM, GOS, USAID and the Rural Communities. Some of the benchmarks of this progress include:

- The CBNRM has developed a draft "results framework" as an exercise toward definition of the indicators to be included in the CBNRM monitoring system.

- Several studies have been realized and documents produced, both internally and with the assistance of external consultants, in the effort to identify appropriate indicators and to structure systems of information collection and flow. Such documents include, *CBNRM Monitoring and Information System* (and Annex 1), SAR 6, February 1996; *Contribution du PGCRN à l'Atteinte des Résultats de l'Objectif Stratégique No.II*, October 1996; *Manuel de Suivi-Evaluation de la Gestion des Ressources Naturelles*, 1996; *Renforcement du système d'information et de suivi du PGCRN*, RAT 14, 1997, *Manuel de Suivi-Evaluation*, Avril 1997, and *Guide de Terrain* (Field Guide), Avril, 1997. In addition, two CSE proposals (September and December 1996) have been prepared

regarding possible baseline studies; both proposals suggest a wide range of biophysical and socioeconomic indicators.

- A number of important data bases are being established that will provide much of the raw material of the CBNRM baseline data defined to provide the reference data against which carefully selected indicators will measure progress toward goals. Such data bases include: those established in the course of the *Knowledge, Attitudes and Practices* (KAP) studies series, the data base to result from the household surveys (designed to be a site-specific version of the national KAP studies) currently underway in the five collaborating rural communities of Diakhao and Médina Sabakh arrondissements; the technical and economic data from the contracts for the NRM activities selected for execution in the five rural communities of Diakhao and Médina Sabakh (this data base will be expanded through regular submission of the completed financial and technical monitoring sheets specified in the *Field Guide*); the biophysical, census and infrastructural data on which the thematic maps (being produced by the CSE) of the same five rural communities are based.

While noting the important achievements cited above, the CBNRM also recognizes that the exact nature and contents of the baseline data and indicators which will reliably and feasibly measure progress toward strategic goals has yet to be defined. This is largely explained by the fact that it has only very recently become possible for the CBNRM to define baseline data on the basis of actual NRM activities (contracts have just been signed for execution of a variety of NRM activities by private entrepreneurs in five rural communities, and rural councils have recently announced their priorities for public sector NRM activities). **The CBNRM currently needs assistance in creating a *strategic* monitoring system that clearly and convincingly links a defined set of baseline data and tracking indicators to the USAID/GOS key and intermediate results defined in Strategic Objective 2.**

The relationship between the substantial body of work already completed toward development of the CBNRM monitoring system and the objectives of the current consultation should be viewed as follows. It is currently envisioned that the strategic monitoring system (the primary object of the current consultation) will constitute a distinct system, as contrasted to the presently-defined CBNRM monitoring system model which is conceptualized on the basis of a mix of operational and strategic needs. This will allow the heretofore-defined system to specialize in operational monitoring needs (see Task 5, below).

A technical assistance team, consisting of two international experts (an agroeconomist and a NRM specialist) and two Senegalese experts (a socioeconomist and an environmentalist) has been identified to address this need. This consultancy will take place over a period of six weeks beginning 30 June 1997. The specific tasks assigned to this team are defined below.

Task 1: Define Baseline Data Needs, Indicators, and Variables related to the Indicators for a Strategic Monitoring System

The primary task of the technical assistance team is to formulate definitive, specific and precise sets of indicators and the corresponding variables to measure progress toward SO2 resulting from CBNRM activities. Sets of indicators will correspond to the key and intermediate results of SO2.

The consultants will find that many indicators have been proposed to track progress toward key and intermediate results, and therefore, a substantial part of this task will consist of evaluating indicators on the basis of such characteristics as validity, feasibility and accessibility. Special consideration should be given to the trade-off between simplicity and validity of indicator sets: both values are of the highest priority in this exercise.

A balance should also be struck between the mix of site-specific indicators (those that directly measure biophysical and economic impact of CBNRM-sponsored activities) and community-wide indicators (such as those based on the data of the KAP household surveys). Both types of indicators will be included in the appropriate strategic mix of indicators, and the interplay between these two types should be carefully analysed. This interplay can be used to advantage when preparing monitoring reports.

Completion of this task is also expected to contribute to USAID's efforts to formulate and refine its own set of indicators for SO2, especially since current thinking is that the USAID SO2 results framework should be the basis for this task rather than the CBNRM-specific draft proposal.

Task 2: Formulation of Collection Methodologies for Baseline Data that Takes Account of Existing Data Sources as well as Field Data yet-to-be collected

The technical assistance team will collect the baseline data to the extent possible, or provide for its timely collection through elaboration of the collection methodologies. In addition, definite guidelines for the future collection of the data relating to indicators will be provided. All parameters of appropriate baseline data sets and tracking indicators will be defined in the course of the consultancy.

The technical assistance team will not be starting from zero regarding information collection. Baseline data for many of the selected indicators of Task 1 (i.e., the defined variable's value at "time 0") will already have been collected and available within one of the data bases referred to above (especially the KAP household surveys) or in alternative information sources (e.g., in the community-wide data base compiled by CSE in preparing community maps, at research institutes or government technical services). Such data is, as noted, community-wide (i.e., at a level at which it is difficult to immediately measure CBNRM impact). Only recently have specific sites and activities of CBNRM-sponsored activities been identified. Therefore, a substantial portion of information remains to be collected at these specific sites of NRM activities. This is particularly true of economic and biophysical baseline data.

Task 3: Information Storage, Management, Manipulation, Analysis and Presentation

The technical assistance team will centralize the baseline data in a format that lends itself to easy access and analysis of the data, as well as to the addition of recurring measurements linked to indicators. The team will propose a system of data management at the level of the PMU in consideration of the complexity of management aspects. Clearly, the less complex the system the greater its accessibility and usefulness.

The team will design a system of comparative data analysis and interpretation relative to each indicator. The methodology should provide for an analysis and interpretation of data that allows

for an accurate assessment of progress toward defined results in the short, medium and long terms.

A model of a periodic (probably annual) report of a data analysis that clearly and concisely articulates progress attributable to CBNRM activities toward SO2 will be provided by the consultants. This model will precisely identify types, analysis, significance and presentation of information.

Task 4: Assessment of Institutional Needs of the Monitoring System

The institutional aspects of the longterm monitoring system must be planned and provided for. What role will CSE, ISRA, SENAGROSOL, CERPs, NRM committees and other partners play in the short, medium and longterms? The CBNRM is committed to reinforcing the sustainability of the strategic monitoring system through partnerships with institutional actors that will remain beyond the timeframe of the CBNRM itself. An additional benefit to this approach is the potential to reinforce the capacities of the institutional partners.

Task 5: Assessment of CBNRM Monitoring System as Currently Defined

The technical assistance team will review the monitoring system as it is currently defined and structured. The roots of the system are found in SAR 1, which contains perhaps the most exhaustive list of proposed indicators (based on a series of "Decision Issues"). RAT 14 provides a comprehensive and more up-to-date proposal for the monitoring system and features a mix of operational and strategic indicators (based on the draft results framework of the CBNRM). The operational strategy for RAT 14 is contained in the current (although incomplete) version of the *Manuel de Suivi-Evaluation* (Part I, April 1997). Additional elements or proposed elements of the system are found in the annexes of the *Guide de Terrain* and the CSE proposals.

Some "streamlining" of the indicators and information needs would be helpful, since the overall impression is that information management will be an overly complicated task in view of the massive amounts of data to be collected, stored, analyzed, synthesized and diffused. One approach might be to design a system exclusively devoted to satisfying the *operational* information needs of the PMU, the CERPs and the NRM committees toward effective administration and management of activities, as contrasted to the *strategic* needs emphasized above regarding SO2.

Task 6: Training

The team will make proposals that will be useful toward elaboration of a training program on the CBNRM monitoring system. Two members of the CBNRM's management unit will participate in this training which will take place at Virginia Tech University for a period of two months.

Consultant responsabilities

The consultant will produce a draft Summary Assistance Report (SAR) in French one week before the end of the consultation. This draft will be circulated and discussed with members of

the PMU before being finalized by the consultant. The final version of the SAR must be delivered upon completion of the TDY. The report will contain a description of assistance provided, highlight significant achievements or problems encountered, resolutions, recommendations and outline immediate and anticipated impact of assistance provided.

Ther report should:

- define the components (indicators) for the baseline data that replies to the biophysical and economic results of USAID's SO2;
- describe the methodology for data collection;
- propose a system for interpretation and comparative analysis of the data;
- provide a model document as specified in task 3.

The report will include an executive summary. The annexes of the report will include a copy of this Terms of Reference, a daily log specifying the list of contacts interviewed, consulted and visited along with their title, and a reliable means of contacting them.

The consultants will work with the PMU and, in particular, with the monitoring unit. The consultants' point of contact throughout the work will be the Chief-of-Party. The work week is six days long. A Project vehicle with a driver will be placed at the disposition of the consultants on an as-needed basis. It should be noted that for non-Senegalese consultants an orientation will be provided in the USA before departure and that all contractual, medical and financial matters pertaining to the consultant will be handled by the respective home office prior to arrival in country. Country clearance requirements will be handled by SECID.

Annex 2 :

Contribution of the CBNRMP to Results Package #2 of USAID's OS2; Justification

ANNEX 2: CONTRIBUTION DU PGCRN AU PAQUET POUR RESULTATS #2 de l'OS2 de l'USAID : JUSTIFICATION - RIC B

Resultats intermédiaires	Indicateurs USAID	Contribution PGCRN	Variables	Justification
B1.0: Accès accru des ruraux aux technologies améliorées de GRN	Nombre de ruraux rapportant leurs connaissances de technologies de GRN améliorées	1)Nombre selon genre de producteurs connaissant au moins un type de techniques (améliorées/\prioritaires) de la GRN et source de connaissance	a) Nombre selon genre et sources de connaissance: -CERP/CG/UGP -Autres projets - Autre producteur - Support d'information (écrit, radio/TV, journal, etc)	L'accès aux technologies est appréhendé ici, sous le seul angle de la connaissance. Mais l'indicateur proposé est plus précis; il se réfère aux types de technologies améliorées et aux sources de connaissance. Cet indicateur est donc davantage ciblé sur les activités du PGCRN.
B2.1: Capacité institutionnelle des organisations renforcées	1)Nombre d'agriculteurs et d'institutions menant des activités avec une assistance extérieure limitée ou sans assistance extérieure 2) Nombre de sessions de formation en direction des agriculteurs	1)Pourcentage de la contre partie et main dóeuvre utilisée (homme/jour) par les producteurs dans les micro-réalisations 2) Homme/jour total de formation des producteurs (selon genre) 3)Pourcentage (selon genre) de personnes qui estiment que la mise en place du CG a eu un impact positif sur le fonctionnement du CR 4) Part du budget du CR dans les microréalisations	a) valeur totale et valeur de la contrepartie (y compris main d'oeuvre) dans les microréalisations a) homme jour total de formation formelle des producteurs selon le genre, planifié et exécuté	- Le renforcement des capacités institutionnelles doit se situer à deux niveaux : au niveau du CG et au niveau de la gestion des relations du CG avec les institutions de l'état. La capacité institutionnelle peut se mesurer par le pouvoir de négociation, de dialogue du CG. C'est aussi l'autonomie des décisions du CG pour la défense des intérêts clairement identifiés des producteurs. Le but ultime est de faire du CG, un partenaire autonome ayant le mandat et les moyens de faire des activités. -le cadre de l'analyse est plus précisassez fin puisqu'il peut montrer le renforcement de la capacité de l'encadrement à planifier et exécuter des sessions de formations - Le renforcement de la capacité institutionnelle des organisation permet de stimuler l'émergence de structures autonomes, capables de se prendre en charge, représentatifs pour défendre les intérêts des producteurs. Les capacités d"auto-organisation sont fondamentales. - mesure le degré d'implication du CR et l'importance qu'il accorde à la GRN

ANNEX 2: CONTRIBUTION DU PGCRN AU PAQUET POUR RESULTATS #2 de l'OS2 de l'USAID : JUSTIFICATION - RIC B

Resultats intermédiaires	Indicateurs USAID	Contribution PGCRN	Variables	Justification
B3.1 : Disponibilité accrue des techniciens pour les ruraux	1) Nombre de techniciens du secteur public et du secteur privé disponible aux agriculteurs	1)Nombre de techniciens (homme/jour sur le terrain) disponible pour les activités du projet (sensibilisation, microréalisation, suivi)	a) Homme/jour de CERP sur le terrain	-Cet indicateur se refère au programme de travail des agents d'appui. On peut l'aborder sous deux angles ; - quantitatif : nombre et fréquences des visites, - qualitatif : thèmes abordés et appréciation. - il pporte plus de précision :le ratio nombre de techniciens/ temps de présence permet de mesurer la disponibilité
	2) Nombre de formateurs formés parmi les agriculteurs locaux	2) Nombre de producteurs selon genre ayant recu au moins une formation	a) nombre selon genre	- Le renforcement des compétences au niveau local permet d'accroître la disponibilité. - La formation des leaders est un moyen d'améliorer les capacités institutionnelles des organisations. C'est par la transmission des outils méthodologiques et des capacités techniques appropriées que les leaders pourront identifier, hiérarchiser les problèmes de GRN et définir des stratégies de mise en valeur - les apprentissages doivent être multiplicateur
	3) Nombre de producteurs rapportant leurs contacts avec des techniciens	3)Pourcentage de producteurs (selon genre) trouvant une valeur aux contributions des agents déncadrement	a)Pourcentage de producteurs (selon genre) trouvant une valeur aux contributions des agents déncadrement	-le travail de formation est par essence difficile à évaluer. Aux critères quantitatifs évoqués plus haut, il faut ajouter des indicateurs d'impact ; de ce point de vue, il est essentiel de voir la facon dont les bénéficiaires appliquent les notions apprises, si elles leur sont utiles et si elles répondent aux objectifs initiaux

ANNEX 2: CONTRIBUTION DU PGCRN AU PAQUET POUR RESULTATS #2 de l'OS2 de l'USAID : JUSTIFICATION - RIC B

Resultats intermédiaires	Indicateurs USAID	Contribution PGCRN	Variables	Justification
B3.2 : Compétences et moyens des techniciens et des producteurs accrus	1)Disponibilité des moyens de transport 2)Nombre de techniciens du secteur public et du secteur privé disponible aux agriculteurs 3) Nombre d'agriculteurs formés 4) Quantité d'intrants utilisés 5)Nombre d'outils agricoles utilisés 6) Disponibilité de per diem 7) disponibilité de matériel de formation en agriculture et GRN	1)Nombre de voitures et de motocyclettes disponibles Voir B3.1 2)Nombre selon genre de personnes qui participent aux microréalisations 3)Coûts et taux (%) des moyens matériels agricoles et humains utilisés dans les microréalisations fournis par le projet et nombre de microréalisation selon le genre 4)Disponibilité de per diem 4) Nombre de contacts de supports d'information techniques et de communication	a) Nombre de voitures b)Nombre de motocyclettes a)Nombre de contacts DC-CERP b) Nombre de supports dínformations techniques c) Nombre de supports de communications	Les indicateurs listés dans ce RI sont des indicateurs d'input. Lever les contraintes matérielles et humaines qui ont géné les agents techniques d'encadrement dans l'accomplissement de leurs fonctions est un moyen de s'assurer de leur participation active dans les activités GRN du PGCRN - c'est une mesure de l'impact de la disponibilité accrue des techniciens -Il est difficile de faire la sommation entre les quantités d'intrants et les nombres d'outils agricoles. Les coûts et taux permettent de mesurer la contribution du projet dans les micro-réalisations. C'est une subvention qui peut favoriser l'adption de pratiques GRN saines. - plus précis

ANNEX 2: CONTRIBUTION DU PGCRN AU PAQUET POUR RESULTATS #2 de l'OS2 de l'USAID : JUSTIFICATION - RIC B

Resultats intermédiaires	Indicateurs USAID	Contribution PGCRN	Variables	Justification
	7) Disponibilité de matériel de formation en agriculture et GRN			

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION RIC A

Resultats intermédiaires	**Indicateurs USAID**	**Contribution PGCRN**	**Variables**	**Justification**

Résultats intermédiaires	Indicateur USAID	Contribution PGCRN	Variables	Justification
A3.1 : Institutions de réglements de problèmes et conflits liés à la GRN renforcées	1)Pourcentage des problèmes et conflits résolus par les institutions locales à différents niveaux 2) Pourcentage de personnes reconnaissant l'autorité, l'efficacité et la performance des institutions en matière de résolution des problèmes et conflits liés à la GRN	1)Pourcentage de conflits GRN résolus par le CR et le CG Voir A3.2	a) Nombre total de conflits b)Nombre de conflits résolus	- l'existence du PAGT peut permettre au CR de prévenir les conflits -l'indicateur est plus ciblé. L'arrété portant la création du CG a été signé par les autorités locales. De plus, la composition du CG lui donne une certaine légitimité - l'augmentation du nombre de conflits résolus peut être un signe d'une plus grande prise en compte de certaine pratique GRN (jachère par exemple) comme étant des formes de mise en valeur
A3.2 : Institutions de gestion et de diffusion des informations relatives au cadre juridique et institutionnel renforcées	1)Pourcentage des problèmes et conflits résolus par les institutions locales à différents niveaux 2) Pourcentage de personnes reconnaissant l'autorité,	1)Pourcentage de personnes connaissant au moins une loi ou un code sur la GRN à travers le PGCRN 2)Pourcentage de personnes selon genre reconnaissant l'autorité, l'efficacité et la	a) Nombre de personnes selon genre connaissant au moins une loi ou un code grâce au PGCRN a)Pourcentage de personnes selon genre reconnaissant l'autorité, l'efficacité et la performance du CG en matière de résolution des	Le libellé du RI A3.2 n'est pas clair. On ne sait pas de quelles institutions il est question ici. L'indicateur que nous proposons est plus ciblé et plus précis. Il s'agit de la vulgarisation du cadre juridique et institutionnel de la GRN permettant aux producteurs de connaitre les dispositions juridiques régissant leur patrimoine foncier. Le PGCRN a beaucoup travaillé pour la vulgarisation du cadre juridique et institutionnel de la GRN. Cela devrait se traduire par une meilleure connaissance des lois et des codes par les populations

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION RIC A

Resultats intermédiaires	Indicateurs USAID	Contribution PGCRN	Variables	Justification
	lefficacité et la performance des institutions en matière de résolution des problèmes et conflits liés à la GRN	performance du CG en matière de résolution des problèmes et conflits liés à la GRN	problèmes et conflits liés à la GRN	- Cet indicateur est plus ciblé : la création d'un cadre de concertation où peuvent se régler d'éventuels conflits exige une bonne connaissance des textes, ce qui est un atout pour des populations qui préfèrent souvent ce mode de réglements car il est le fait de gens en qui ils ont confiance (CG).
A4.0 : Cadre juridique et institutionnel relatif à la GRN amélioré, accepté et approuvé	1)Decrets gouvernementaux signés, publiés et diffusés 2) Cadres de concertation favorisant la participation des agriculteurs mis en place et fonctionnel	1) Pourcentage de personnes selon le genre donnant aux comités de gestion la responsabilité première pour la gestion des RN du terroir	a)Pourcentage de personnes selon le genre donnant aux comités de gestion la responsabilité première pour la gestion des RN du terroir	L'indicateur de l'USAID n'est pas tout à fait satisfaisant. En effet, compte tenu de la régionalisation, il faut se referer non seulement aux décisions prises à l'échelle national, mais auusi, celles qui sont prises au niveau régional ou local. De ce point de vue, l'existence de protocoles d'accord entre le PGCRN et le CR de ses zones d'intervention est une avancée par rapport aux anciennes dispositions relatives aux attributions foncières. - L'opérationnalisation des rôles et des responsabilités des leaders permettra aux membres du CG de jouer pleinement leur rôle dans les cadres de concertation et dans la restitution de l'information aux populations. -Les accords pour la gestion d'une ressource ne sont effectifs que si tous les usagers sont représentés dans les groupes qui prennent des décisions relatives à cette gestion. voir A.3.2

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION - MOYEN ET LONG TERMES

Resultats Moyen et Long Terme	Indicateurs USAID	Contribution PGCRN	Variables	Justification
Impacts socio-économiques de pratiques GRN à moyen terme	1) % d'hommes et de femmes pouvant citer une ou plusieurs pratiques améliorées et /ou de technologie GRN	1)% d'hommes et de femmes connaissant au moins une pratique GRN prioritaire améliorée et/ou une technologie de GRN	Voir B1.0 : accès des ruraux aux technologies de GRN améliorées	- manque de précision - lié directement aux activités du PGCRN
	2) Liste des sources d'information sur les pratiques améliorées et les technologies de GRN	2)Sources d'information sur les pratiques (selon genre) améliorées et les technologies de GRN	Voir B1.0	- manque de précision
	3) % d'hommes et de femmes qui utilisent une ou plusieurs pratiques améliorées et/ ou technologies de GRN	3)% d'hommes et de femmes qui utilisent au moins une pratique améliorée et/ou technologie de GRN	Voir adoption de techniques GRN accrue	- manque de précision
	4) Liste des contraintes et/ou incitations à l'adoption de technologie GRN	4)Liste des contraintes à l'adoption des technologies de GRN	Voir adoption des techniques GRN accrue	- manque de précision
	5)% des ménages qui ont vu leur statut (ou conditon de vie) amélioré du fait d l'utilisation	5)Taux d'adoption des ménages 6)% des ménagesayant des animaux de trait/équipement de traction animale		-adoption liée directement à l'amélioration des conditions de vie

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION - MOYEN ET LONG TERMES

Resultats Moyen et Long Terme	Indicateurs USAID	Contribution PGCRN	Variables	Justification
	de pratiques améliorées et technologies 6)% des ménages ayant des animaux de trait/équipement de traction animale		Ménages ayant des animaux de trait /matériel agricole	
	ayant des animaux de trait/équipement de traction animale 7)% d'hommes et de femmes ayant un (des)crédits pourl'agriculture et la GRN 8)%d'hommes et de femmes indiquant avoir percu un meilleur accès au marché	7) % d'hommes et de femmes ayant un (des)crédits pourl'agriculture et la GRN 8) Voir 2	Nombre d'hommes et de femmes ayant un crédit agricole et de GRN	-trop vague
Indicateur socio-économique à long terme		1)Indicateur micro-économique d'impact : surplus économique, bénefice net social	a) coût de la production pour chaque technologie b)changement moyen du rendement c)Superficie/taux d'adoption e)demande pour les produits agricoles/GRN f)prix des produits	-pour pouvoir calculer le bénefice net social (surplus économique)

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION - MOYEN ET LONG TERMES

Resultats Moyen et Long Terme	Indicateurs USAID	Contribution PGCRN	Variables	Justification
		2)Indicateur macro-économique -Analyse de matrice sociale/analyse des multiplicateurs, PIB, taux d'accroissement - revenu et emploi, accès au marché	a)Matrice entrée-sortie technique pour chaque CR b)répartition des revenus des ménages de CR c)source de revenu pour les ménages de CR	-transition au niveau de l'OS2 - analyse holistique de l'économie des Crs:-analyse de multiplicateurs revenu et emploi - taux d'accroissement du PIB -Accès au marché
Impacts biophysiques à long terme de l'adoption des pratiques de GRN	1)superficie sur lesquelles les pratiques les pratiques et technologies de GRN ont été utilisées et par type de culture 2) Nombre de pratiques améliorées et technologie de GRN utilisées 3)Accroissement des rendements des cultures céréalières et comerciales	1)Surface ou longueur sur lesquelles les pratiques et technologies de GRN ont été utilisées 2)Pratiques améliorées prioritaires en GRN utilisées 3)Accroissement des rendements par pratiques GRN adoptée a) cultures céréalières vivrières et de rente b) reboisement et pâturage	-Volume des fosses compostières (m3) -Superficie et/ou longueur des plantations établies et/ou améiorées (ha, km) - Pratiques GRN utilisées a)Production (kg) b)Superficie (ha) c)Capacité de charge maximale/charge actuelle d) Variables associées	- mesure directe : permet d'estimer la quantité d'éléments nutritifs disponibles dans le compost -mesure directe de la diffusion et de l'efficacité des pratiques - permet de mesurer l'impact des technologies sur le rendement -permet de mesurer l'impact des aménagements améliorés sur les zones de pâturage (exemple, la mise en défens) - permet d'estimer l'accroissement du disponible en bois de chauffe et de service - la quqlité du sol nést pas un indicateur, mais une variable.

ANNEX 2 (suite): CONTRIBUTION DU PGCRN: JUSTIFICATION - MOYEN ET LONG TERMES

Resultats Moyen et Long Terme	Indicateurs USAID	Contribution PGCRN	Variables	Justification
	4) Qualité du sol (pH, matières organiques, biologiques)		- humidité de la récolte -compositions chimique du compost (%/kg de matière sèche) -densité sèche de compost (kg/m3) -type, texture, profondeur du sol -pH -salinité -pluviométrie (mm) -temp. maxi/mini	
			-distance parcourue par le vent -coordonnées géographiques des parcelles	
RIC B. Technologies améliorées de GRN maîtrisées et utilisées par les ruraux		1)% de producteurs (selon le genre) qui ont adopté (utilisé) au moins une technologie améliorée prioritaire pendant l'année précédente une technologie 2)% de producteurs selon genre qui n'ont adopté (utilisé) aucune technologie améliorée prioitaire à cause de : manque de moyens économiques, humains, ou autres raisons	a)nombre total d'adopteurs b) nombre total de producteurs (selon le genre) a-Nombre selon genre qui n'ont pas adopté par raison	L'USAID n'a pas proposé d'indicateurs mesurant l'impact du projet

Annex 3 :

Strategic indicators

Annex 3: Indicateurs Stratégiques: RIC B - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
B1.0 : Accès accru des ruraux aux technologies améliorées de GRN								
Nombre (selon genre) de producteurs connaissant au moins un type de techniques (Améliorées/Prioritaires) de la GRN et Source de connaissance	Nombre (selon genre) source de connaissance: • CERP/CG/UGP • Autre projet • Autre producteur Support d'information (écrit, radio, TV, journal, etc.)	Exploitation enquêtes CAP Enquêtes ménages Enquêtes ménages	Enquêtes CAP	2 ans 3 ans	Echelle nationale Problème de circonspection de la technique GRN et de periodicite	Etablir une liste limitative de pratiques GRN Enquêtes de suivi	annuelle	Banque de données CAP Résultats enquêtes de suivi
B2.1 : Capacité institutionnelle des organisations renforcées								
1) Pourcentage de la contrepartie et main-d'oeuvre utilisée (hommes/jours) par les producteurs dans les microréalisations	a. Valeur totale b. Valeur contrepartie (y compris main-d'oeuvre) des microréalisations	Exploitation des fiches de suivi et Calculs	Fiches recapitulative des soumissions sélectionnées	annuelle ?	Système relativement lourd	Regroupement des fiches récapitulatives de soumissions en une seule	annuelle	Fiche recapitulative unique des soumissions sélectionnées
2) Hommes jours total de formation des producteurs (selon genre)	a. Hommes jours total de formation des producteurs (selon genre)	Exploitation des rapports de formation (CERP et DF) et des fiches de suivi	Rapport de formation Fiche de suvi des indic. de l'amélioration des capacités	mensuelle				

Annex 3: Indicateurs Stratégiques: RIC B - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
			d'encadrement (n° 2)					
3) Pourcentage (selon genre) de producteurs qui estiment que la mise en place du CG a eu un impact positif sur le fonctionnement du CR	a. Nombre total et proportion		*non suivi*			Enquêtes de suivi	annuelle	Résultats d'enquêtes de suivi
4) Part du budget du CR dans les microréalisations à caractère publique	a. Part du budget du CR dans les microréalisations à caractère publique	Exploitation des fiches de suivi	Fiche de suivi trimestrielle des CERP					

B3.1 : Disponibilité accrue des techniciens pour les ruraux

1 Nombre de techniciens (homme/jour sur le terrain) disponibles pour les activités du projet (sensibilisation, micro-réalisation, suivi)	a. Homme/jours de CERP sur le terrain	Exploitation des fiches de suivi CERP et des rapports	Fiches de présence et d'activités et Rapports CERP	mensuelle et trimestrielle				
2 Nombre de producteurs selon genre ayant reçu au moins une formation	a. Nombre selon genre	Exploitation enquêtes ménages	Enquêtes ménages	3 ans	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
3 Pourcentage de producteurs (selon genre) trouvant une valeur aux contributions des agents d'encadrement	a. Nombre de producteurs (selon genre) trouvant une valeur aux contributions des	Exploitation enquêtes ménages	Enquêtes ménages	3 ans	Périodicité non conforme au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi

Annex 3: Indicateurs Stratégiques: RIC B - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
	agents d'encadrement							
B3.2 : Compétences et moyens des techniciens et des producteurs accrus								
1 Nombre de voitures et de motocyclettes disponibles	a. Nombre de voitures b. Nombre de motocyclettes	Exploitation des fiches de suivi	Fiche de suvi des indic. de l'amélioration des capacités d'encadrement (n° 2)	annuelle				
2 Nombre (selon genre) de personnes qui participent aux microréalisations		Exploitation des fiches récapitulatives d'exécution des soumissions collectives et individuelles	Fiches récapitulatives d'exécution des soumissions	mensuelle	Système relativement lourd	Regroupement des fiches récapitulatives d'exécution des soumissions	annuelle	Fiche récapitulative unique d'exécution des soumissions
3 Coûts des moyens matériels et humaines agricoles utilisés dans les microrealisations fournis par le projet et nombre de microrealisations selon le genre	a. Coûts variable du projet dans les microrélaisations selon genre b. Nombre de microréalisation selon genre	Exploitation des fiches réca pitulatives d'exécution des soumissions collectives et individuelles	Fiches réca pitulative d'exécution des soumissions	annuelle		Regroupement des fiches récapitulatives d'exécution des soumissions	annuelle	Fiche récapitulative unique d'exécution des soumissions
4 Nombre de supports d'informations techniques et de communication	a. Nombre de supports d'informations techniques b. Nombre de supports de communication	Comptage ?	-Fiche d'activité -Cahier technique -Fiches de suivi CERP	journalière mensuelle trimestrielle				

Annex 3: Indicateurs Stratégiques: RIC B - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
			-Compte rendu de mission -Fiches de formation et d'administration, etc.					

Annex 3: Indicateurs Stratégiques RIC A - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
A3.1 Institutions de règlement de problèmes et conflits liés à la GRN renforcées								
1) Pourcentage de conflits GRN résolus par le CR	a. Nombre total de conflits B.Nombre de conflits résolus .	Exploitation des fiches d'activités et de suivi technique	Fiche d'activités du CGRN Fiche de suivi trimestrielle du CERP	annuelle trimestrielle				
A3.2 Institutions de gestion et de diffusion des informations relatives au cadre juridique et institutionnel renforces								
1) Pourcentage de personnes connaissant au moins une loi ou un code sur la gestion des ressources naturelles a travers le PGCRN	a. Nombre de personnes (selon genre) connaissant au moins une loi ou un code grâce au PGCRN	Exploitation des enquêtes CAP et des résultats d'enquêtes ménages	Enquêtes CAP Enquêtes ménages	2 ans 3 an	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
2) Pourcentage de personnes (selon genre) reconnaissant l'autorité, l'efficacité et la performance de la CR en matière de résolution des problèmes et conflits liés à la GRN	a. Pourcentage de personnes reconnaissant l'autorité , l'efficacité et la performance du Comité de gestion en matière de résolution des problèmes et conflits liés a la GRN		*non suivi*			Enquêtes de suivi	annuelle	Résultats enquêtes de suivi

Annex 3: Indicateurs Stratégiques RIC A - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
A4.0 Cadre juridique et institutionnel relatif à la GRN améliorée, acceptée et approuvée								
1. Pourcentage de personnes selon genre donnant aux Comités de gestion la responsabilité première pour la gestion des ressources naturelles du terroir	a. Pourcentage de personnes selon genre donnant aux Comités de gestion la responsabilité première pour la gestion des ressources naturelles du terroir		*non suivi*			Enquêtes de suivi	annuelle	Résultats enquêtes de suivi

Annex 3: Indicateurs Stratégiques Moyen et Long Terme - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
Impacts Biophysiques d'Adoption de Pratiques GRN								
1) Surface ou longueur sur lesquelles les pratiques et technologies de GRN ont été utilisées	a. Volume des fosses compostieres (m3) b .Plantantions etablis/amélieorés (ha ou km) c. Nombre de foyers améliorées	Exploitation des fiches mensuelles de suivi techniques des micro-réalisations	Fiches de suivi techniques des micro-réalisations	mensuelle	Non prise en compte des autres technologies	Estimation des volumes des fosses compostes *(cf feuille 1)* Tenir compte de toutes les techniques améliorées	mensuelle	Fiche mensuelle de suvi technique (tenant compte de toutes les techniques améliorées).
2) Pratiques améliorées prioritaires GRN utilisées	a. Pratique GRN	Exploitations des enquêtes CAP et enquêtes ménages	Enquêtes CAP Enquêtes ménages	2 ans 3 ans		*même chose*		
3) Accroissement des rendements par pratique GRN adoptée a. cultures céréalières vivrières et de rente b. reboisement et pâturage	a. Production (kg) b. Superficie (ha/km) c. humidité de récolte (%) **Variable Associées** a. Capacité de charge maximale/charge actuelle b. Composition chimique du compost (% kg matière sèche)		Fiches mensuelles de suivi techniques des micro-réalisations *non suivi*			En plus des fiches de suivi techniques des micro-réalisations faire : - Enquetes - Enquetes *-(cf feuille 2, 4, et 5)* *-(cf feuille 2)* -Enquetes -Etude	mensuelle annuelle *1 fois* *1 fois*	CERP ISRA, ORSTOM. Recherches bibliographiques

Annex 3: Indicateurs Stratégiques Moyen et Long Terme - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
	c. Densité sèche de compost (kg/m3) d. Type, texture, profondeur du sol e. pH f. Salinité g. Pluviométrie .(mm) h. Température Max/Min i. Distance parcourue par le vent j. Coordonnées géographiques des parcelles					bibliographique *(cf feuille 3)* -Etude speciale -Etude speciale -Etude bibliographique *(cf feuille 3)* -Relevés pluviometriques -Anemometre totalisant -GPS	journalière (saison humide)	CGRN
Impacts socio-économiques d'adoption de pratiques GRN à moyen terme								
1. % des hommes et femmes connaissant au moins une pratique GRN prioritaire, améliorées et/ou de technologies de GRN		*(Voir RI B.1.0 - Accès accru des ruraux aux technologies GRN...)*	Enquêtes CAP Enquêtes ménages	3 ans	Echelle nationale Problème de circonspection de la technique GRN et de periodicite	Etablir une liste limitative de pratiques GRN Enquêtes de suivi	annuelle	Banque de données CAP Resultats enquetes de suivi
2. Sources d'information sur les pratiques (selon genre) améliorées et les technologies de GRN		*(Voir RI B.1.0 - Accès accru des ruraux aux technologies GRN...)*	Enquêtes CAP Enquêtes ménages	2 ans 3 ans	Echelle nationale Problème de circonspection de la technique GRN et de periodicite	Etablir une liste limitative de pratiques GRN Enquêtes de suivi	annuelle	Banque de données CAP Resultats enquetes de suivi
3. % d'hommes et de femmes qui utilisent au	a. Nombre total d'hommes et de	*(Voir RIC B Technologies*	Enquêtes ménages	3 ans	Périodicité peu appropriée au	Enquêtes de suivi	annuelle	Résultats enquêtes de

Annex 3: Indicateurs Stratégiques Moyen et Long Terme - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
moins une pratique amélioré et/ou technologie de GRN	femmes ayant adopte b. Nombre total des producteurs	*GRN maitrisee et utilisee...)*			suivi d'indicateurs			suivi
4. Liste des contraintes à l'adoption de technologies de GRN		*(Voir RIC B Technologies GRN maitrisee et utilisee...)*	Enquêtes ménages	3 ans	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
5. Taux d'adoption des ménages	a. Nombre total de menages b. Nombre de menages ayant adopte	Exploitation des résultats enquêtes ménages	Enquêtes ménage	3 ans	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
6. % des ménages ayant des animaux de trait/équipement de traction animale	Ménages ayant des animaux de traite Matériel agricole	Exploitation des résultats enquêtes ménages	Enquêtes ménage	3 ans	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
7. % d'hommes et de femmes ayant un(des) crédit(s) pour l'agriculture et la GRN	a. Nombre des hommes/femmes ayant crédit agricole et GRN	Exploitation des résultats enquêtes ménages	Enquêtes ménage	3 ans	Périodicité peu appropriée au suivi d'indicateurs	Enquêtes de suivi	annuelle	Résultats enquêtes de suivi
8.Marche (*cf. Indicateur Macro-économique*)								

Impacts socio-économique d'adoption de pratiques GRN à long terme

1. Indicateur Micro-économique - Surplus Economique, Benefice Net Social	a. Coût de production pour chaque technologie b. Changement moyen du rendement C. Superficie/taux		*non suivi*			Etudes de cas - Bureaux d'étude *(voir Section II)*	Fin du projet	DER

Annex 3: Indicateurs Stratégiques Moyen et Long Terme - Methodologies

Indicateurs PGCRN	Variables	Méthode de collecte préexistante				Méthodologie proposee		Source de données
		Méthode	Instrument de suivi	Périodicité	Méthode	Périodicité		
	d'adoption d. Demande pour les produits agricole/GRN e. Prix des produits							
2. Indicateur Macro-économique - Analyses de matrice sociale/ analyses de multiplicateurs, PIB, taux d'accroissement - revenu et emploi, accès au marché	a. Maîtrise entrée-sortie technique pour chaque CR b. Répartition de revenu des ménages de CR c. Sources de revenue pour les ménages de CR		*non suivi*			Etudes de cas - UGP/ISRA/VT/ « CRSP Arachide » *(voir Section II)*	1 fois par CR	DER/ISRA

Annex 4 :

Biophysical indicators reference sheets

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

FEUILLE NO 0

Liste des études spéciales nécessaires pour avoir des données et / ou informations sur les indicateurs d'impacts biophysiques des pratiques GRN retenues

Titre des études spéciales	Objectif de l'étude	Moyens et méthodes
Composition chimique et densité sèche du compost au Sénégal	(i)obtenir les valeurs relatives moyennes (en %) de Na, P, Na, Ca et Mg du compost sec (ii)obtenir les valeurs de la densité du volume sec de compost	Recherche bibliographique
Caractéristiques physico-chimiques des principaux types de sol du Sénégal	Obtenir les valeurs moyennes du contenu en matière organique, phosphore, potassium, calcium et magnésium des principaux sols du Sénégal et la texture de ces sols	Recherche bibliographique
Evolution du rendement moyen des différentes cultures dans les Crs ciblées par le PGCRN	Obtenir les valeurs de rendements moyens pour la plus longue série chronologique possible et pour le maximum de spéculations possibles estimée	(i)Données des archives de la Direction des Statistiques Agricoles et du Projet DIAPER du CILSS (ii) Enquête auprès des producteurs
Threshing percentage et contenu en humidité à la récolte des différentes cultures au Sénégal	Obtenir des valeurs moyennes sur threshing percentage et humidité à la récolte le maximum de spéculations possibles au Sénégal	Données des archives de l'ISRA et dáutres instituts scientifiques comme l'ICRISAT, l'ORSTOM, l'ADRAO, etc.
Evaluation d'un pluviomètre de fabrication locale	Comparer les relevés provenant d'au moins 10 pluviomètres de fabrication locale avec ceux d'au moins 2 pluviomètres standard	Collaborer avec le Service de la Météorologie Nationale pour conception et le test d'un pluviomètre local

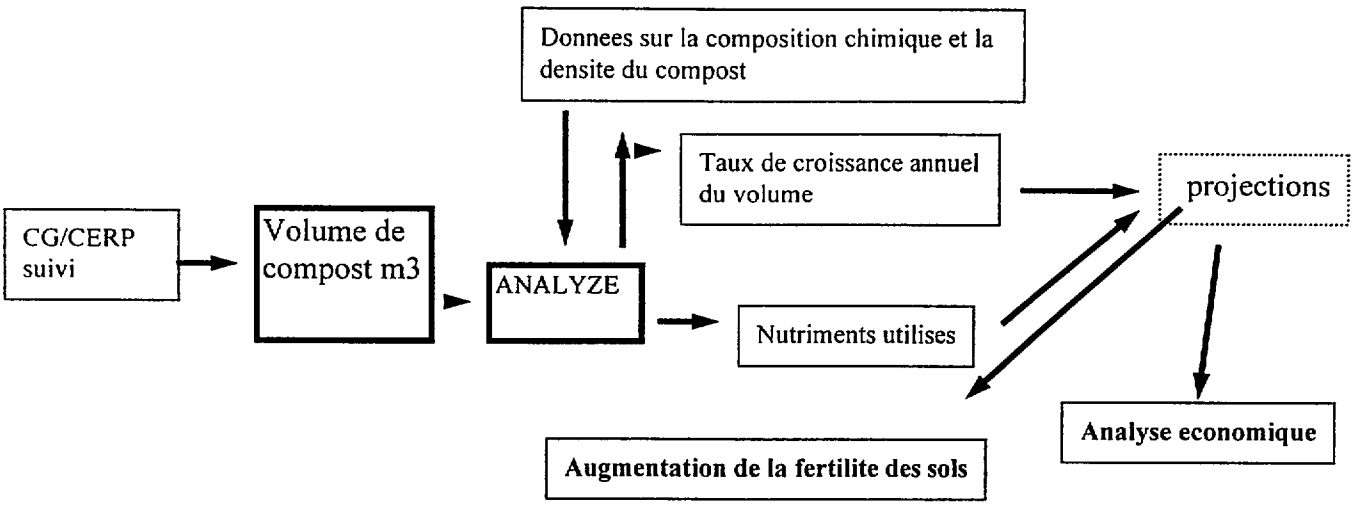
ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

FEUILLE NO 1

EFFET	Accroissement de la fertilite des sols
INDICATOR	Volume des fosses compostieres(m3)
VARIABLES EXPLICATIVES	(i) Composition chimique du compost (% matiere seche) (ii) Densite seche du volume de compost(kg m-3)
Justification	(a) La fabrication de compost est une actvite GRN dans les 5 Crs ciblees par le PGCRN. Le volume de compost represente : 105 m3 a Diaoule 80 m3a Mbellacadiao 16 m3 a Medina Sabakh 192 m3 a Kayemour 36 m3 a Ngayene - (b) La fabrication du compost n'est pas standardisee. Certaines fosses sont cimentees avec ous sans fond.Le volume de compost fabrique et la qualite du compost sont tres variables. Les materiaux utilises (paille, fumier, amendements chimiques, cendre, eau) sont variables.Pour estimer l'impact de l'adoption de cette technologie, le volume produit, et la qualite du compost etre mesures. Les valeurs moyennes sont recherchees puisqu'il ne serait pas couteux d'effectuer un echantillonnage et de mesurer les fosses individuelles des beneficiaires.
Methodologie/ Etude speciale	Le volume peut etre evalue annuellement sur les sites par le suivi effectue par le Comoite de gestion/CERP a travers les fiche de suivi technique (Cf Annexe 5 du Guide de terrain provisoire du PGCRN). Pour analyser l'impact du compost sur la fertilite du sol, une etude speciale doit etre menee 9Cf liste des etudes speciales). La figure F1 ci-dessous schematise les differentes etape d'une telle etude.
Equipement special et formation	6 ruban de 5 m par CG pour mesurer le volume des fosses Formation pour remplir les fiches de suivi Technique
Liaisons institutionnelles	PGCRN -ISRA- Universite de Dakar

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

A.Figure F1 - Schema de l'analyse de l'impact du compost sur la fertilite du sol



B.Exemple de tableau récapitulatif des donnees:

Table xx. Quantite d'éléments majeurs accumules et appliques comme compost par les producteurs des microrealisations ciblees par le PGCRN

Communaute Rurale	Volume total de compost (m3)	Quantite d'éléments majeurs				
		Azote (kg)	Phosphore (kg)	Potassium (kg)	Calcium (kg)	Magnesium (kg)
Mbellacadio	xxxxxx	xxxxx	xxxxx	xxxx	xxxx	xxxx

Note :
1)Volume des fosses compostières x densité de matières sèches = poids brut (kg)
2)Poids brut x contenu (% de poids) des éléments majeurs = quantité d'éléments majeurs

C. Donnees requises et sources

Donnees	Source
Volume des fosses compostieres	Fiche de suivi technique des microrealisations : Annexe 5 du "Guide de Terrain "
Analyse chimiques de compost	Archives de l'ISRA

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

Densite seche de compost	Etude speciale (voir liste Feuill 0)

D. Autres notes

1. Le schema d'analyse propose dans le A ci-dessus devra permettre :

a. aider a l'analyse ulterieure de l'indicateur de production

b Couplee avec l'enquete menage biennale, elle donnerait une idee du taux de diffusion du compost

c. Une stabilisation (tassement) du taux de croissance ou une diminution alertera le comite de gestion qu'on a atteint le seuil. Les apports (intrants) pour le compost ne sont pas illimites et servent a d'autres usages (les tiges de mil sont utilises pour la cloture ou les toits par exemple ; les residus de recolte sont souvent donnes aux animaux). Il peut aussi servir a alerter le PGCRN sur un changement de conditions socio-economique puisque le compostage demande beaucoup de temps (ramassage de la paille, puisage de l'eau, enlevement et transport du compost). Cela pose le probleme du cout d'opportunite de la technologie car le temps consacre au compostage est souvent pris au detriment d'autres activites.

2. Il est a noter que, les effets du compostage peuvent être limités pour plusieurs raisons:
a. Le recyclage des detritus dans les zones saheliennes et soudano-saheliennes est le fait des termites et non les microbes
Le systeme des artropodes ne genere pas les acides humiques necessaires pour accroitre l'effet tampon de la matière organique qui serait bénéfique aux Alfisols saheliens.
b. Le compostage n'apporte aucun intrant nouveau (a moins que des apports exterieurs soient utilises). En general, il s'agit d'une collecte des nutriments disperses qui sont remis dans un meme endroit. Il s'agit donc d'une redistribution de nutriments existants et de ce fait risque d'atteindre un seuil qu'on ne pourra pas dépasser. La disponibilité du compost est un facteur limitant.

c.Il est connu que la matiere organique fait partie du cycle naturel du carbone et elle finit par atteindre un etat d'equilibre stable au fil du temps, dans un contexte climatique et de pratique fonciere determine.Aussitot generee, la matiere organique est eclatee de nouveau en dioxyde de carbone.D'un point de vue phenomenologique, le taux de ces reactions de flux et de reflux de la matiere organique atteint un equilibre donne dans les sols dependant du climat et des pratiques foncieres. Theoriquement, si le taux de la reaction de reflux etait 0, tout le dioxyde de carbone serait eventuellement sequestre dans le sol.Comme le taux approche de l'infini (tres rapidement), la matiere organique serait proche de 0.Dans les Alfisols saheliens, la matiere organique est faible car elle ne peut pas s'accumuler.

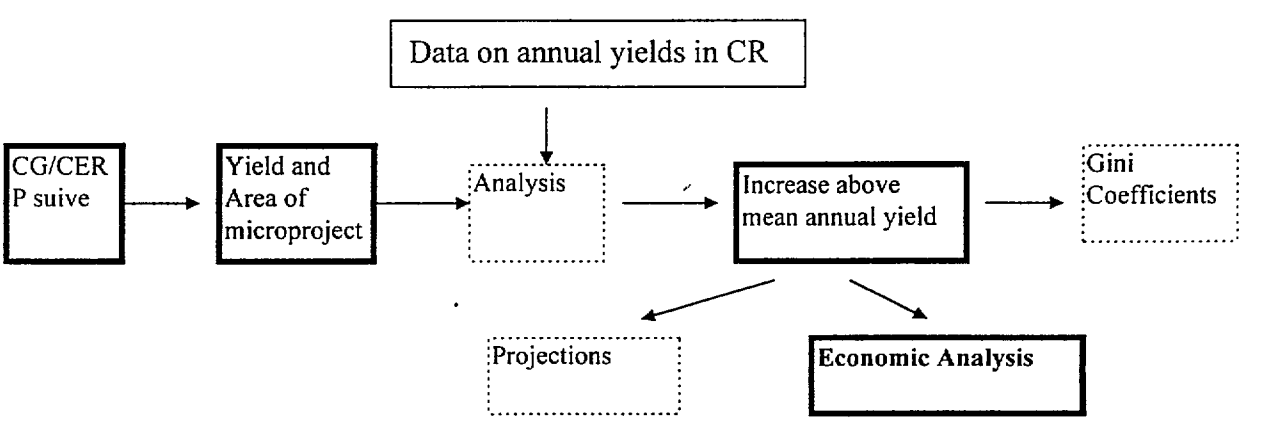
FEUILLE DE REFERENCE POUR LES INDICATEURS
FEUILLE NO 2

EFFET	Augmentation de la production agricole
INDICATEUR	Augmentation du rendement moyen annuel (kg ha-1)
VARIABLES EXPLICATIVES	(i) Pluviometrie(mm) (ii) Temp maximum minimum .(oC) (iii) Distance parcourue par le vent (km) (iv) Coordonnes geographiques des parcelles (GPS) (v) Type, texture, et profondeur (cm) du sol (vi) Humidité caractéristique de la récolte et indice d'humidité (fraction)

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

	(vii) Superficie concernée (ha)
Justification	La production agricole dépend d'un ensemble de facteurs biotiques (plante) et abiotiques (climat et sol) aussi bien que des pratiques agricoles. Quand on spécifie ces facteurs la production moyenne resterait constante. La production agricole moyenne des cultures vivrières et commerciales est calculée annuellement à l'échelle de la région. C'est une des variables suivies par le système de suivi de la production nationale et de la sécurite alimentaire au Sénégal. Ces mesures peuvent servir de valeur de référence pour évaluer l'impact des pratiques GRN avec une certaine rigueur. Les variables explicatives listées ci-dessus seront nécessaires pour pouvoir faire les analyses.
Methodologie/Etude speciale	a Collaborer étroitement avec la DSApour obtenir les données collectées dans les Crs. b. Géoreferencer(GPS) les sites de pratiques GRN dans la CR. c. Obtenir la production et la superficie utilisée par contact direct avec les bénéfeciaires d. Classifier les résultats utilisant les variables explicatives et commenter e. Faire une representation graphique des resultats pour les comparer avec les taux d'accroissement moyen annuels observés dans la CR.
Equipement special et formation	GPS de poche pour touver les coordonnées géographiques des parcelles 6 jalons (ils peuvent être fabriqués localement) pluviomètres standardisés Thermometres maxi/mini (1pour 25 km 2) Anémomètre totalisant (1 pour 50 km2) Formation pour le remplissage des Fiches de Suivi Technique Formation pour l'utilisation du GPS
Relais institutionnels	PGCRN -ISRA-Division de l'Agriculture- CSE-Universite de Dakar

A.Figure F1 - Schema de l'analyse de l'impact des pratiques GRN sur la production



B.Exemple de tableau récapitulatif annuel:

Table xx. Effet des pratiques GRN sur l'augmentation de la production dse différentes cultures dans les Crs ciblees par le PGCRN

Communauté	Prod	Rendement	Rendement moyen annuel dans les parcelles avec pratiques GRN (kg

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

Rurale	uctio n	moyen annuelle (kg ha-1)	ha-1				
			Pratique1	Pratique2	Pratique 3	Pratique 4	Pratique 5
Mbellacadio	A	xxxxxx	xxxxx	xxxxx	xxxx	xxxx	xxxx

Notes :
(i) Les diagrammes pour cette donnee peuvent etre faits à partir de la production, de la pratique GRN et de la CR pour une rapide presentation visuelle
(ii) Une analyse multivariée est possible pour évaluer l'effet des facteurs climatiques et pédologiques sur le rendement selon les pratiques GRN.
(iii) Apres plusieurs années, le coefficient de **Gini** (la différence de la distribution des rendements avec ou sans pratique GRN)) peut etre calculé
(iv) Avec les cartes géoréférencées et les analyses spatiales utilisant le SIG (ARC-INFO est disponible au CSE) on peut montrer les tendances de l'adoption et les impacts des pratiques GRN(après quelques années de pratiques GRN)

C. Données requises et sources

Données	Source
Production moyenne annuelle de la CR	Archives Division d'Agricole, Autres projets comme, DIAPER, KAED, OFPEP
Sols, superficies, coordonnées géographiques, évolution des rendements sur les deux dernières années au moins	Fiche "Etude techniqued'emplacement" de l'Annexe 1.3 du "Guide de Terrain "
Humidité caracteristique de la récolte et indice d'humidité	Archives de l'ISRA
Production annuelle et superficie dans les parcelles ciblees	Fiche de suivi technique des microrealisations de l'Annexe 5 du"Guide de Terrain "

D. Autres notes
1. Cet indicateur est certainement le plus important pour toute évaluation du PGCRN. Il est de ce fait essentiel que les données puissent être collectées avec une très grande fiabilité

2. Les analyses préconisées nécessiteront la formation du CERP si le besoin se fait sentir

3. Plusieurs études spéciales (Cf Liste des études spéciales) seraient nécessaires pour assurer les mesures de cet indicateur.

Le contenu en eau de certaines plantes
En sortant du champ, les cultures contiennent beaucoup d'eau et la production obtenue est le poids frais de la récolte. Après séchage, on peut obtenir le poids sec.
Le tableau ci-dessous donne le contenu en hmudité et la matière sèche par Kg pour quelques produits agricoles.

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

Humidité et matière sèche dans quelques produits agricoles. Ce tableau est extrait des "tables de composition des aliments pour l'usage international"C.Chatfield, 1949, FAO

produits	humidité du produit sortant du champ en %	% de matière sèche
mil	11	89
arachide	13	87
sorgho	15	85
mais	16	84

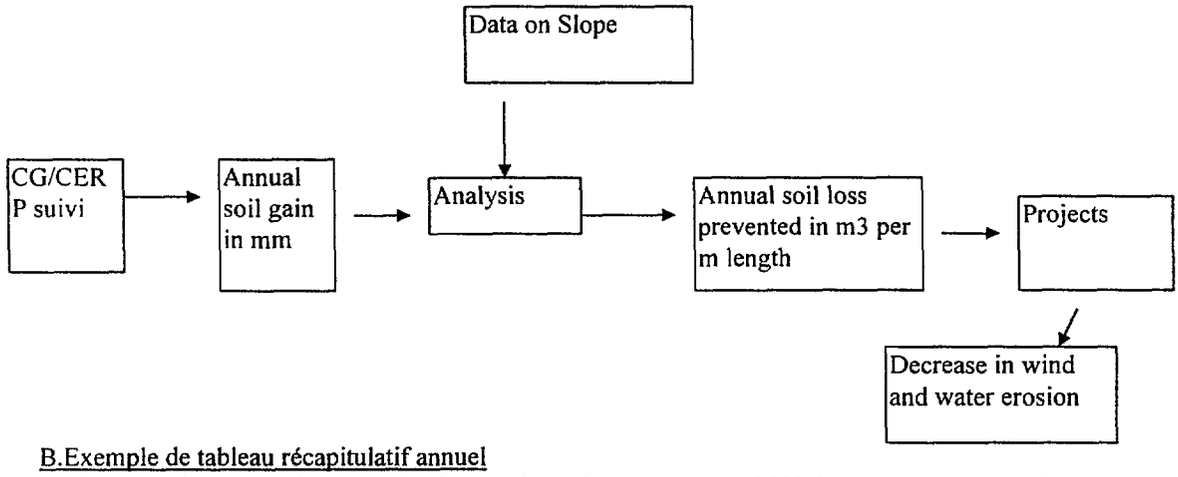
FEUILLE DE REFERENCE POUR LES INDICATEURS
FEUILLE NO 3

EFFET	Diminution de l'érosion éolienne et hydrique
INDICATEUR	gain net en sol (mm an-1)
VARIABLES EXPLICATIVES	(i) Pluviométrie(mm) (ii) Distance parcourue par le vent (km) (iii) Coordonnées géographiques de la parcelle GPS (iv) Type, texture, et profondeur (cm) du sol (v) Surface concernée (ha) ou longueur (m) de haie vive, cordons pierreux, brise-vent
Justification	(a) La conservation du sol est ciblée comme activite GRN dans 3 des 5 Crs encadrées par le PGCRN : Diaoule - 400 m haie vive; Medina Sabakh -500 m cordons pierreux; Kayemor -818 m cordons pierreux (b) L'effet majeur des pratiques visant la conservation du sol est de prevenir les pertes en sols dans des zones où une telle ressource est limitée.La lutte contre les pertes de sols dépend de la pente, du type de sol, de la pluviométrie, etc.Le meilleur indicateur de l'impact des pratiques GRN est la quantité totale de sol recupérée.
Methodologie Etude speciale	Des appareils fabriqués localement (picquet et chaine) permettent de mesurer pour chaque site où les pratiques de conservation de sols sont effectuées. les pertes/gains de sol .Ces appareils sont dejà decrits dans le RAT 1 du PGCRN. 5 picqets et chaînes d'arpenteurs devraient être installés immédiatement au dessus du versant (le long de la ligne de plus grande pente) de haie vive, cordon pierreux, ou brise vent à un intervalle de 5 mètres. Au moins, 3 séries devraient être installées pour chaque microréalisation concernée. Les coordonnées géographiques du site devraient être enregistrées au moment de l'installation. La pente maximale au moment de l'installation devrait être mesurée en utilisant une cordelette et une nivelle qui sera attachée à la cordelette. Un detecteur de métal sera nécessaire pour localiser les chaines. La longueur des chaines devrait être mesurée immédiatement après l'installation et au début et à la fin de chaque saison pluvieuse.

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

Equipement special et formation	Règle métallique de 1m, 10 m de cordelettes, 6 nivelles par CG 3 détecteurs de métal par CR Formation en installation, utilisation de detecteur de metal, mesure des chaines, mesure de la pente maximale avec une nivelle, formation pour remplir les fiches de suivi technique du PGCRN
Relais institutionnels	PGCRN -ISRA- Université de Dakar

A.Figure F1 - Schema d'analyse de l'impact des pratiques GRN de conservation du sol sur le gain en sol



B.Exemple de tableau récapitulatif annuel

Table xx. Volume de so's gagné (m3) grâce à quelques pratiques GRN de conservation du sol

Communaute Rurale	Pratique GRN	Longueur concernee (m)	Gain de sol m3 par m longueur mesure	Volume total de sol recupéré par an m3	Cumul du volume total de sol gagné m3
Mbellacadio	A	xxxxxx	xxxx	xxxx	xxx

Note

(i)Pour calculer le volume gagné en m3 par m de longueur, on convertit le gain mesuré (différence entre la longueur de chaine au moment de l'installation et la longueur de la chaîne au moment de la mesure future) en m en divisant par 1000. Confronter ces valeurs(sur l'axe des Y) avec les distances (sur láxe des Y) dans un papier millimétré et tracer une droite passant par les 5 points (0, 5, 10, 15, 20). Extrapoler la droite et déterminer le point où elle croise l'axe des X (par exemple, pour Y = 0). Marquer cette valeur de X à Y = 0 (origine de la droite). Marquer aussi la valeur de Y à X = 0.Calculer l'intégrale de cette droite = 0.5 x (la valeur de X à Y = 0) x (la valeur de Y à X = 0). Le résultat est une une approximation du volume de sol gagné en m3 par mètre de longuer (un plus grand degré de précision nécessiterait des calculs plus fastidieux).

(ii) La perte cummulée est le cumul annuel des volumes gagnés depuis l'installation du dispositif de mesure

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(iii) Une valeur de densité sèche du sol permettrait de convertir le gain de m3 en kg.

C. Données requises et sources

Données	Source
Longueur concernée dans la microréalisation (m)	Fiche de suivi technique des microréalisations
Variation de l'épaisseur de sol (mm)	Fiche de suivi technique des microréalisations
Densité sèche du sol (kg m-3)	Archives de l'ISRA ou ORSTOM

D. Autres notes

L'ORSTOM, en collaboration avec l'ISRA a fait des recherches detaillées sur la conservation du sol à Kaymor (une des Crs ciblée par le PGCRN) pendant près de 10 ans. Il serait bénéfique d'utiliser les résultats de cette recherche pour obtenir une estimation des gains de sols ecomptés.

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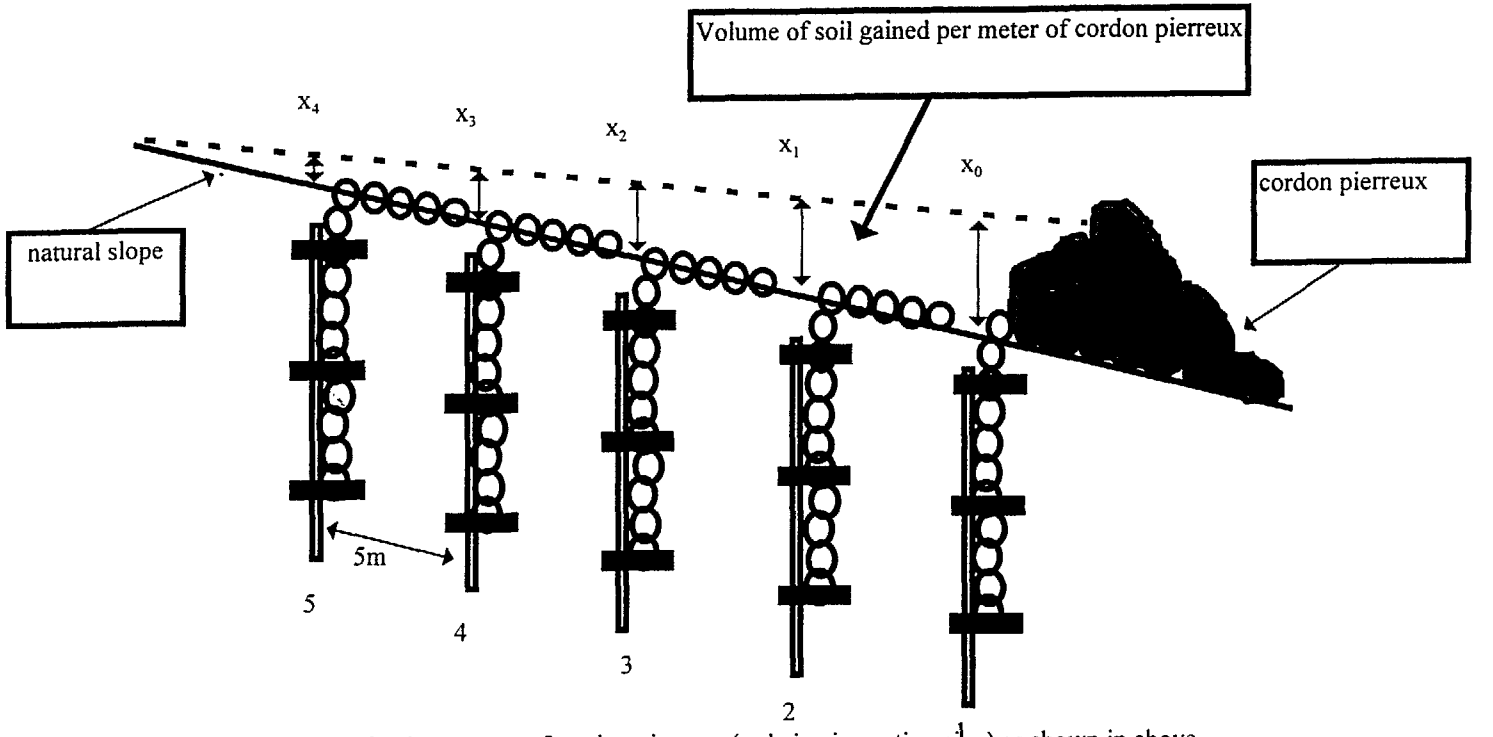
Field layout of the stake and chain devices for measuring the net soil gain as a result of soil conservation type GRNs (cordons pierreux et haie vives antierosive)

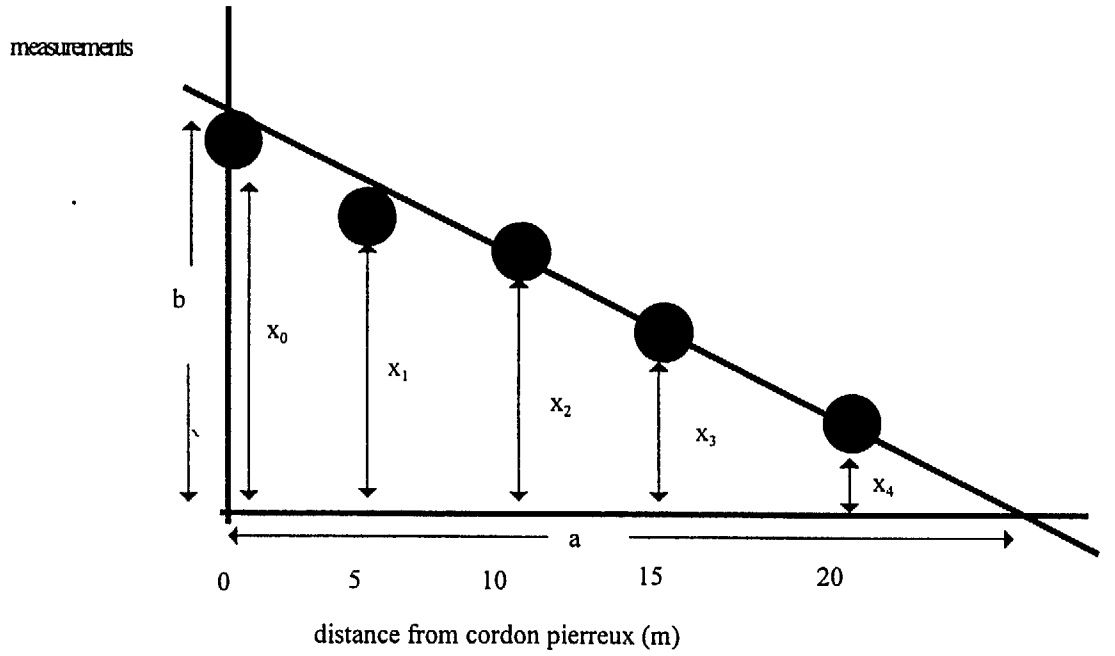


Procedure for obtaining the volume of soil gained per meter of cordon pierreux (or haie vive antierosive) as shown in above.

1. The objective is to calculate the area of the triangle shown in the Figure below. Although this is not a right angled triangle it can be assumed to be right angled if the natural slope is not too large. This is a reasonable assumption in most cases.

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

2. To find the area use the measurements x_0, x_1, x_2, x_3, x_4, and x_5 in meters from the stake and chain devices. Plot these as illustrated below and fit best line. Extrapolate the line to the x-axis as shown and determine the intercepts a and b. Calculate 0.5 x a x b. The result is a good estimate of the soil gain per meter of cordon pierreus or haie vive.



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FEUILLE DE REFERENCE POUR LES INDICATEURS
FEUILLE NO 4

EFFET	Augmentation de la disponibilité en bois de chauffe et bois de service
INDICATEUR	a. Superficie plantée (ha) b. Nombre de foyers ameliores
VARIABLES EXPLICATIVES	a. (i) Rendement de bois a la récolte (coupe b. (i)Efficacité des foyers ameliorés
Justification	(a) Les plantations en bloc sont ciblées comme activités GRN dans les 5 CRs suivies par le PGCRN . Les superficies concernées sont : Diaoule - 10 ha; Mbellakadio -27.5 ha; Medina Sabakh -18.5 ha; Kayemour -21 ha; Ngayene - 27 ha. L'essentiel de ces plantations est destiné à la production de bois de chauffe et bois de service. (b)En plus des activités de reboisement, le PGCRN peut aider aussi à la promotion de l'utilisation des foyers ameliorés. La valeur du bois dépend aussi bien de la quantité disponible que de l'efficacité avec laquelle il est utilisé.
Methodologie et etudes speciales	La superficie et le nombre d'arbres plantés par le PGCRN à travers les microréalisations peut être estimé annuellement grâce aux relevés du CG/CERP dans la Fiche de Suivi Technique (Cf annexe 5 du Guide provisoire de terrain du PGCRN). Pour analyser l'impact de la disponibilité en bois de chauffe et de service, les données recherchées sont le volume de la récolte selon les différentes espèces plantées arrivant a maturité, le taux de croissance de l'utilisation des foyers ameliorés, la quantité de bois economisée à travers l'utilisation des foyers ameliorés. Ces informations peuvent être obtenues à partir d'études spéciales relatives aux données sur la production des différentes espèces forestières et sur l'efficacité des foyers ameliorés(Cf liste des études spéciales, Table xx)
Equipement special et formation	Pas d'équipement spécial Formation pour le remplissage des informations dans la Fiche de suivi technique
Relais institutionnels	PGCRN - Université de Dakar

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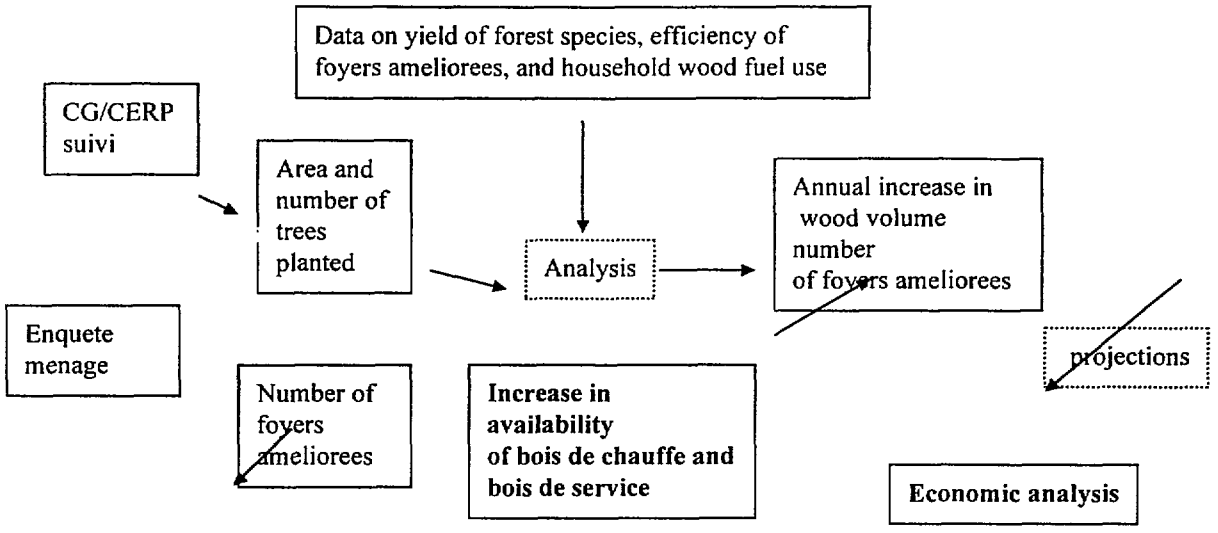
A.Figure F1 - Schema de l'analyse de l'impac des plantations en bloc dans la disponibilite des bois de chauffe et bois de service.



B.Exemple de tableau récapitulatif annuel:

Table xx(a). Accroissement annuel de la disponibilité en bois de chauffe et bois de service grâce aux plantations en bloc réalisées par les microréalisations depuis 1997.

CommunautéRurale	Plantation annuelle d'arbres				Accroissement annuel de la disponibilité en bois de chauffe et de service										
	espèces/ maturité (yr)	Superficie ha	Nombre per ha	Volume estimé à la maturité (m3)	années après la plantation et accroissement annuel du volume										Total
					1	2	3	4	5	6	7	8	9	10	
Mbellacadio	A/xx	xx	xx	xx											xx
					x	x	x	x	x	x	x	x	x	x	
Diaoule	A/xx	xx	xx	xx											xx
					x	x	x	x	x	x	x	x	x	x	

Note (i) Estimation de la production à la maturité = superficie (ha) x densité (no par ha) x volume estimé selon les espèces en m3
(ii) Accroissement annuel pour une quelconque année après la plantation = la valeur de la production x (le nombre d'années consécutives à la

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

plantation
(iii)
(iv) divisée par la période de maturité)
(iii) chaque année, la valeur de la production estimée à la maturité est déplacée d'un rang

Table xx(a) Estimation de l'augmentation de la disponibilté en bois de chauffe et de service grâce aux micro-réalisations et aux foyers améliorés

Communaute Rurale	Augmentation du nombre de foyers améliorés			Accroissement annuel de la disponibilité en bois de chauffe et de service	
	Nombre durant l'année passée (précédente)	Nombre durant l'année en cours	Accroissement	Volume moyen annuel de bois / ménage m3 par an	Volume sauvegardé
Mbellacadio	xx	xx	xx	xx	xx

Note Le volume gagné = l'augmentation x volume moyen annuel de bois utilisé / ménage x l'augmentation de l'efficacité

C Données requises et sources

Données	Source
Superficie annuelle et nombre d'arbres plantés pour chaque espèce	Fiche de suivi technique des microrealisation
Augmentation annuelle du nombre de foyers ameliorés	Enquete de suivi annuelle
Durée de la croissance et production à la maturité	Archives de la Division des Eaux et Foretsl, Archives de l'ISRA

D Autres notes

1. l'accroissement de la disponibilite en bois de chauffe et bois de service apparait comme prioritaire dans les Crs visitees.Le fait est que les demandes de reboisement et l'introduction des foyers ameliores augmenteront au fur et à mesure que les activités du PGCRN s'étendront dans les Crs.
2. L'accroissement annuel de la production de bois est consideree comme constante jusqu'a la maturite des especes plantees. Il s'agit là d'une simplification. L'analyse permettant d'avoir une estimation plus fiable demanderait de prendre en compte les parametres de taux de croissance et serait tres fastidise.

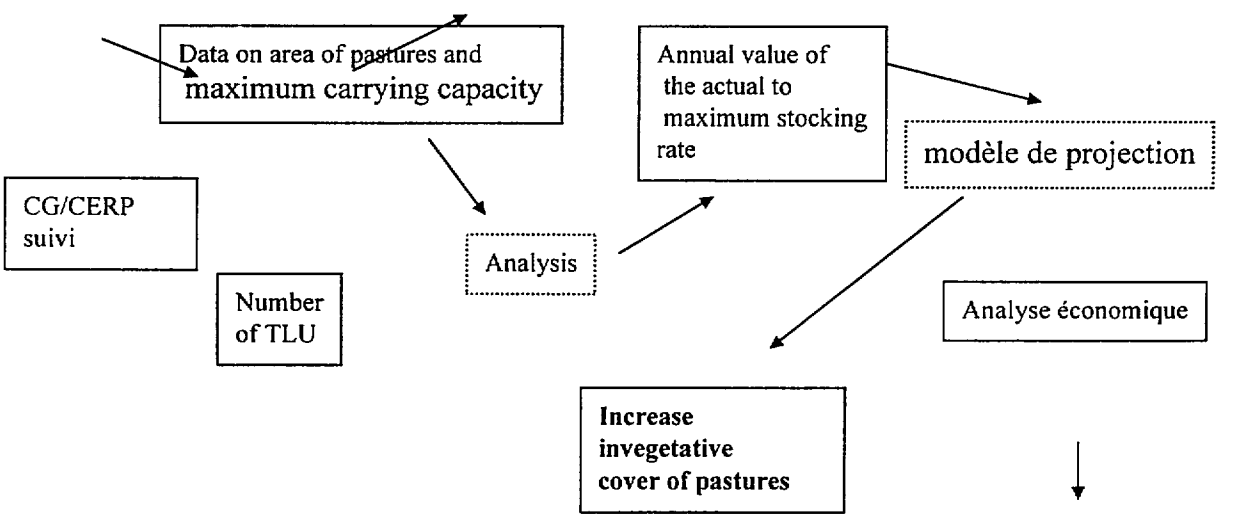
FEUILLE DE REFERENCE POUR LES INDICATEURS
FEUILLE NO 5

EFFET	Amélioration de la couverture végétale et des paturages
INDICATOR	T ıux de charge actuel et capacité de charge maximale dans les zones de pâturage
VARIABLES EXPLICATIVES	(i) Superficie des parcours (ha) (ii) capacité de charge maximale (TLU ha-1) (iii) cheptel total sur les parcours(TLU) (iv) Pluviométrie(mm) (v) Type, texture, et profondeur (cm) du sol des zones de parcours
Justification	(a) L'élevage occupe une grande place dans la gestion des terroirs des CRs ciblées par le PGCRN . On sait que le surpâturage est la cause principale de dégradation de ces ressources. Les zones de terre incultes sont souvent utilisées dans les Crs comme parcours. Leur capacité de charge est faible et dans la plupart des cas, la charge actuelle excède la

ANNEX 4: FEUILLES DE REFERENCE POUR LES INDICATEURS BIOPHYSIQUES

	capacité de charge maximale. (b) Beaucoup d'études ont montré que la dégradation de ces parcours n'est pas irréversible et que si le taux de charge est proche de 0 (mise en défens), la végétation peut se régénérer. C'est l'indicateur de choix pour mesurer la relation état/pression des parcours naturels.
Methodologie/Etude spéciale	Le cheptel total dans une zone donnée peut être obtenue en utilisant les relevés des campagnes de vaccinations de la Division de l 'Elevage, ou en utilisant les données provenant des enquêtes Ménages du PGCRN. Ces valeurs sont mieux exprimées en Unité Bétail Tropical (UBT)défined as a liveweight of 250 kg and requiring close to 7 kg dry matter per day. La superficie des pâturages peut être estimée à partir des cartes établies par le CSE ou par photographie aérienne.La capacité de charge maximale peut être obtenue par la recherche bibliographique (document de l'ISRA ou de la Division de l'Elevage).
Equipement special/Formation	Formation pour rentrer les données dans la Fiche de suivi technique
Relais institutionnels	PGCRN -ISRA-CSE

A.Figure F1 - Schema de l'étude de l'impact des pratiques GRN sur la couverture vegetale et les pâturages



B.Exemple de tableau rcapitulatif annuel:

Table xx.Valeurs annuelles du ratio Charge actuelle/charge maximale dans les parcours touchés par les interventions du PGCRN

Communauté Rurale	Village	Cheptel total en UBT	Estimation du cheptel	Superficie des parcours ha	Taux de charge actuel	Taux de charge maximal	Chargeactuelle/ charge

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			sur les parcours (UBT)		UBT ha-1	UBT ha-1	maximale
Mbellacadio	A	xx	xx	xxxxx		xxxxx	

C. Données requises et sources

Données	Source
Cheptel total en UBT	Programme de vaccination annuel, Division de l'Elevage Estimations annuelles , PGCRN enquête ménage
Estimation du cheptel sur les parcours en UBT	PGCRN Enquête Ménage
Superficie des parcours	Fiche de Suivi Technique des Microrealisations
Capacité de charge maximale	Etude spéciale : recherche bibliographie a effectuer à partir des archives de l'ISRA ou de la Division de l'Élevage/ Données de base (carte d'occupation/utilisation du sol)

D. Autres notes

1.Il est connu que la première cause de dégradation des sols est la perte de la couverture végétale en raison de la surcharge et du surpâturage. L'amélioration des zones de pâturage est peut - être du domaine des réalisations a caractère public. Cependant, avec l'extension des activités du PGCR, cet indicateur serait d'une grande utilité pour évaluer l'impact du projet sur la régénération de ces zones.

Annex 5 :

Biophysiques and socioeconomic impacts

ANNEX 5: ASSESSING THE MACRO AND SOCIOECONOMIC AND BIOPHYSICAL IMPACTS OF THE CBNRM PROJECT AT THE COMMUNAUTE RURALE LEVEL

A Joint CBNRM (Virginia Tech)/ISRA-Kaolack Proposal
Preliminary Draft[1]

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Research Program Orientation and Background

Natural resource management (NRM) problems are by their nature multi-dimensional; a single disciplinary approach cannot hope to provide the scope necessary to fully describe, understand, and offer comprehensive policy prescriptions to improve regional-level NRM practices. This broad nature of NRM reinforces the need for collaboration among development partners. Development researchers and practitioners in the field both need comprehensive NRM information. Projects, such as USAID's Community Based Natural Resource Management Project (CBNRM) need comprehensive strategic information in order to report on how the project is progressing. To do this, such projects depend upon the scientific community to provide the knowledge base for their comprehensive measures of progress and success. However when this information is lacking, an important opportunity for collaboration between research institutions and projects presents itself. Because effective research programs are demand driven, the information

[1] Although ISRA-Koalack is in agreement in principle with this general research approach, they have not had sufficient time to review this proposal and offer detailed comments and suggestions. Because they will lead the socioeconomic (qualitative) and biophysical components, their input is particularly crucial. A final version of this proposal including these elements will be submitted at a later date.

needs of a development partner such as a project automatically become a high priority for development research institutions such as ISRA and Virginia Tech. By sharing limited resources, the partners may together be able to do what is required.

Presently, CBNRM is developing comprehensive indicators to measure economic and biophysical changes within the CRs where it intervenes. Although much of the science-based knowledge necessary to define and trace the relevant indicators is available, much remains to be developed. Particularly in the macroeconomic area where qualitative socioeconomic and biophysical factors impact the economies and condition sustainable macroeconomic changes, science-based knowledge is lacking and cannot currently provide sufficient guidance to the Project.

This proposal seeks to redress this situation by teaming the researchers and resources of ISRA and Virginia Tech with the CBNRM Project in order to study and propose science-based and comprehensive macroeconomic indicators to measure strategic progress towards achievement of USAID's strategic objectives. This collaboration will build upon the experiences and results of a recently launched collaborative research effort involving Virginia Tech and ISRA-Kaolack through the Peanut CRSP (Collaborative Research Support Program). This Peanut CRSP collaboration will attempt to test on a pilot CR basis the SAM methodology discussed below. Although this collaboration is independent of the CBNRM Project and USAID/Senegal Mission strategy, it is being carried out in the spirit of fostering collaboration on a larger scale and with the recognition that only such broad and integrated collaboration among projects will provide the resources necessary to solve our common problems.

Objectives, Justification, and Review of Literature

Problem Statement. Estimating benefits stemming from natural resource management (NRM) projects is problematic for two principal reasons. First of all, the estimates of benefits from NRM interventions are themselves difficult to obtain due to the complex nature of natural resources.[2] These complexities lead to natural resources interventions that:

- are generally long-term, with relatively high initial investment costs and a benefit stream lasting over many years. As a consequence, not only must the cost and benefit streams be estimated, but an appropriate discount rate must also be used in order to calculate the net present values necessary to make appropriate comparisons. Also because the effects are long-term, the same interventions may over time affect many different agricultural sectors (crop, animal, agro-forestry), complicating still further the analysis.
- may affect many different groups of people (e.g., women, children, rich, poor) in different ways in different locations. To the extent that these 'externality' or spill-over effects exist, analyses of interventions may be further complicated.

[2] See, for example, Ouédraogo and Bertelsen.

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The second reason estimates of economic impact may be problematic for projects is that they may not provide the information needed to demonstrate project-level economic impact in the short term. Conventional impact analysis employs a partial equilibrium, economic surplus approach that provides a snapshot of the consequences (with vs. without) of demand and supply curve shifts resulting from different interventions.[3] However, to analyze and demonstrate economic feasibility, such analyses virtually always must project the interventions' costs and benefits well beyond the geographic and time limits of the project. As a consequence, although they provide valuable measures of economic efficiency and impact for society in general, they may not provide a very good indicator of the success and economic sustainability of the activities within the project area. The interventions' long-term impact upon the dynamics of the project area's economy and society will ultimately determine economic sustainability and simple estimates of economic surplus cannot capture this. Also, measures of economic surplus:

- cannot describe the interactions among economy's endogenous sectors and resultant paths of adjustment within the project area that are followed as the result of economic stimuli.
- cannot quantify the total value of economic activity resulting from the adoption of interventions and the consequent spread of effects among the different production factors, activities, and institutions within the project area and the rest of the world.

In other words, measures of economic surplus cannot provide the 'holistic' view of economic impact many times needed by a project not only for helping to guide management decisions within the project, but also for communicating project impacts to other stakeholders, particularly donors.

Project Purpose. The purpose of this research is to provide a holistic economic impact assessment for the target communaute rurales (CRs) of the CBNRM Project. The Social Analysis Matrix (SAM) approach described herein will provide this holistic view as well as provide the data and the structure to provide a comprehensive package of economic information about CRs and the Project. The SAM approach will involve the development of SAM models of the CR economies through an accumulation of available secondary socioeconomic data and a series of comprehensive household income-expenditure surveys. This monitoring activity will build upon the existing SAM methodology to provide a dynamic structure necessary for analyzing the comprehensive and differential economic impacts of NRM interventions on CR institutions (e.g., household types, genders) for all major endogenous economic sectors (e.g. crops, livestock, agro-forestry, commerce, manufacturing, and services) and as well as exogenous sectors (government, rest of the world, the CBNRM Project).

[3] See, for example, Alston, et. al. for a comprehensive methodological description and discussion..

ANNEX 5: ASSESSING THE MACRO AND SOCIOECONOMIC AND BIOPHYSICAL IMPACTS OF THE CBNRM PROJECT AT THE COMMUNAUTE RURALE LEVEL

Justification. This proposed monitoring activity leading to the measuring of project and CR-level impact is highly compatible with the research goals and objectives of ISRA which has identified NRM as a national priority.

Research on these integrated NRM themes will greatly benefit from the integrated and comprehensive indicators of economic impact and sustainability such as those promised as a result of this research.

This proposed monitoring activity and associated research is also highly complementary to and compatible with the monitoring purposes of the CBNRM Project as it seeks to assess its contribution to the accomplishment of its Project goals and the attainment of USAID's current Strategic Objective (SO) 2, 'increasing production through improved NRM' and future SOs, assisting the GOS in decentralization and increasing employment. The proposed methodology is holistic and comprehensive, promoting interdisciplinary (bio-physical, socioeconomic) research and involving the collaboration of CBNRM partner institutions (CES, CERP, CGs). It will also involve village-level partners in data gathering and information sharing. Additionally, this activity will greatly assist the Project in:

- measuring key indicators of sustainability through the integration of changing bio-physical and socioeconomic components.
- developing and evaluating strategies permitting improvements in NRM, informing policy makers, and reinforcing institutions' positive impacts on sustainability
- developing an important body of knowledge on NRM and the Project that will serve as a major source of material for scientific journal articles, seminars, workshops, and other means of scientific and popular communication.

SAM Description. A SAM is basically a double entry economic accounting system presented in the form of a square matrix. Economic sectors are arranged in the matrix in paired columns and rows by production activity (the input-output sub-matrix), by factors of production, by institution, and by exogenous demand sector. By convention, receipts (incoming value added) to a sector are listed in the rows; expenditures (outgoing value added) are listed in the columns(see Table A: Example). As a result of this arrangement, each entry into the matrix is the quantity of money describing receipts to the row sector from the column sector. Consequently, the sum over each row equals the total income to a sector. Alternatively, the sum of each column represents the total expenditures from a sector. Because these entries represent flows in a general equilibrium model, the receipts and expenditures for each sector (except for the exogenous sectors) must be equal for any given time period considered, usually one year.

The advantages of the SAM approach are many and include:

- it is holistic, recognizing the interrelatedness of sectors irrespective of an economy's size or complexity. A SAM for a CR is as relevant as a SAM for a country.

ANNEX 5: ASSESSING THE MACRO AND SOCIOECONOMIC AND BIOPHYSICAL IMPACTS OF THE CBNRM PROJECT AT THE COMMUNAUTE RURALE LEVEL

Unambiguous and familiar economic indicators (e.g., CR-1 level GNP; sector growth, income, and employment multipliers) of village and project progress and impact result from a SAM analysis.

- the double entry system allows for two collaborating means of estimating the contents of a cell, from either or both the income and the expenditure sides. As a result, various complementary data gathering schemes may be employed.
- sector definitions are flexible depending on the needs of the analysis. This is particularly advantageous in the case of NRM. Because similarity of input mix may be used as a criterion to define composite, general sectors (e.g., agriculture, livestock, agro-forestry), long-term natural resource intervention analyses may be more meaningful than when dealing with more dissaggregated sectors (e.g., individual crops and animals). Also in the case of this research, the methodology will be extended to allow for dissaggregating specific sector elements involving specific technologies in order to assess impact. This will allow for the assessment of specific interventions within a sector if they give rise to a sufficiently distinct income-expenditure pattern and/or different inter-sector relationships. An example might be the case of zaï. The zaï technique uses more labor (land preparation, composting), more inputs from livestock (manure), and capital (specialized hoe) than other crops but produces significantly more output giving rise to increased consumption/income patterns among households. A SAM model could successfully dissaggregate zaï from the traditional agriculture sector thereby permitting the model to trace the differential village-level impacts caused by this technology, including distinct multipliers for village growth, income, and employment.
- the same data required for a SAM can be analyzed to produce a comprehensive package of economic information for the village, watershed and project. This complementary and valuable information includes:

  1. Microeconomic analyses of the private profitability of specific NRM interventions. Profit is fundamental to technology adoption and sustainability and is a preeminent indicator of both. Unless adoption and use is compelled by government or society, farmers and households will not accept technologies that they perceive will reduce their economic welfare. This fact is self-evident and is universal. However, short-term profits and sustainability are many times in conflict; technologies must be profitable over the long run if they are to be sustainable.
  2. Demand analyses for goods and services in the CRs. Elasticity estimates (price and income) for a potentially large number of goods and services could help to improve economic surplus estimates of future impact studies as well as provide other valuable policy-related information.
  3. Gross and Net Village Product Estimates for the CRs. Comparable to national-level GNP, NNP, and Personal Income estimates, these and other macro-level indicators can be followed over time to produce consistent indicators of CR-level economic changes and well-being.

4. Baseline Consumer Price Index for the CRs. An index of an appropriately weighted market basket of both tradable and non-tradable goods and services for the people of each CR can be developed to permit tracing 'real' economic changes in the village/watershed over time.
5. Baseline for Developing CR Environmental Income Accounts. Similar to efforts at national and international levels, the system of village-level accounts can be used as the basis for developing a system of environmental accounts which combine GNP-like figures for the CRs with measures of changes in the values of natural resource stocks. By making explicit the degradation of the natural resource base, this measure of well-being could more adequately reflect the 'true' well-being of the people of the target CRs. This process is particularly useful for linking the biophysical elements to the economic model.
6. Computable General Equilibrium (CGE) analyses of policy-induced price and fixed resource effects. CGE can largely overcome the theoretical limitations of the SAM approach with respect to these problems by providing analyses that consider the economy-wide (CR) implications of price changes and the effects of resources that are fixed in supply within the village/watershed.

- Surveys undertaken to provide SAM data might be combined with existing data gathering activities of other monitoring activities within the Project and related research activities of ISRA, including qualitative socioeconomic research. Certain economies in data collection and analysis are possible and the ultimate enrichment in the interpretation of results of all monitoring and related research activities is expected.

Review of Literature. The SAM approach traces its distinguished ancestry back to 1758 and the Tableau Economique of famous French economist Quesnay where the circular flow of an economy was first envisioned. In the latter part of the 18th century, another French economist, Léon Walras, added mathematical rigor and expanded the idea into the concept of general equilibrium where all flows of an economy are brought into equilibrium through the actions of markets. Formal and continuous measurement of these equilibrating flows at national levels didn't begin in earnest until after the crash of 1929 when developed countries began to recognize the need to develop a comprehensive system of national accounts to better understand the interrelationships within their economies and to use as the major yardstick for measuring economic progress[4] (GNP, NNP). The economy-wide model implicit in the system of national accounts was taken one big step further by Nobel laureate Wassily Leontief, developer of input-output analysis. Leontief used data from the national income and product accounts for the US to develop and use fixed-price multipliers to analyze consequences of changes in the final demand for the different sectors of the economy. Subsequent to this, input-output models of many developed countries were created and used for similar types of development

[4] See Kuznets, S.

planning. They continue to be a primary tool for regional economic and environmental analyses.[5]

SAM development occurred along side of input-output analysis and built on it by adding factor and institutional endogenous sectors to the analysis matrix. Primary credit for the development of the SAM approach goes to another Nobel Prize laureate, Sir Richard Stone. Stone added economic and social structure that both complemented and completed the production information found in the input-output sectors. By providing a comprehensive, time-exposed snapshot of an entire economy, it also created the statistical foundation for a model of the economy from which interventions could be simulated. It also allowed for significant disaggregation of institutions thereby permitting an analysis of the distributional consequences of policies and other exogenous factors.

SAM frameworks for analysis have been used quite extensively in the development, most notably for planning purposes at the national level[6]. Recently, however, SAM analyses in developing country situations have been conducted at the village level[7]. Village-level SAM models are particularly promising because they are able to bridge the gap between microeconomic household-production models and macro-level national and regional models such as Computable General Equilibrium (CGE) models used extensively in macro policy analysis[8]. A SAM is a particularly complementary framework for CGE since it requires the same data and, at the same time, provides a model which can be used to calibrate the CGE.

Methodology

Objective 1. Background qualitative socioeconomic monitoring and research. March 1998 - April 2001

Actions:

a). Design and undertake qualitative socioeconomic background surveys in targeted CRs

Responsible: ISRA

Objective 2. Data collection for development of the SAM. March 1997 - May 1998.

Actions:

a). Review of available secondary information (project, government, NGO)on household income/expenditures and national accounts for the zones of intervention and Senegal in general.

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[5] See, for example Siegel and Johnson.

[6] See, for example, Pyatt and Roe. Also Pyatt and Round.

[7] Taylor and Adelman.

[8] See, for example, Kehoe.

b). Select a stratified random household sample of 10 compounds (concessions) within three representative villages (poor, medium, rich) in each CR.

c). Begin periodic household income-expenditure surveys. All active household members will be interviewed. These surveys will be the primary means of assembling the data needed to prepare the SAM. Two types of surveys will be used:

1) quarterly surveys of major purchases, income, and production activities for the preceding 3-month period; and,
2) a detailed survey over small purchases, food preparation and consumption, field work and income generating activities over the last week previous to the interview. Both interviews will be conducted at the same time.

Responsible: Virginia Tech with ISRA

Objective 3. SAM Modeling. January 1998 - October1998.

Actions:

a). Develop and refine SAM sectors.
b). Input SAM data.
c). Multiplier analysis
d). Preliminary SAM report

Responsible: Virginia Tech with ISRA

Objective 4. CR Level NRM Assessments. October 1998 - September 1999.

Actions:

a). Identification of NRM Interventions of interest
b). Work with bio-physical scientists and farmers to assess economics of interventions.
c). Incorporate results into SAM analysis
d). Report results

Responsible: Virginia Tech/CBNRM with ISRA

Objective 5. SAM-related economic analyses. January 1998 - April 2001.

Actions:

a). Demand analyses
b). Gross and CR Product Account development
c). Baseline CPI for CRs. Follow-up surveys
d). Baseline CR Environmental Income Accounts.
e). CGE analyses.

Responsible: Responsible: Virginia Tech with ISRA

Objective 6: Biophysical Monitoring within CRs. March 1998 - April 2001.

Actions:

a). Develop and monitor long-term biophysical indicators

Responsible: ISRA with Virginia Tech/CBNRM

Collaboration, Responsibilities, and Internal/External Coordination Mechanisms

ANNEX 5: ASSESSING THE MACRO AND SOCIOECONOMIC AND BIOPHYSICAL IMPACTS OF THE CBNRM PROJECT AT THE COMMUNAUTE RURALE LEVEL

The strict collaboration between ISRA and Virginia Tech that is fundamental to the success of this proposal will be greatly facilitated by the previous experience in joint, long-term collaborative research efforts of the Scientific Coordinators; they are already working closely together in as a team in the Global Bureau's Peanut CRSP Collaborative Research. Effective communication linkages, the primary prerequisite for collaboration, will soon exist and facilitate exchanges between the partners.

Collaboration will extend well beyond the primary partners to other US universities and other countries in the region. As opportunities to assess the microeconomics of specific NRM interventions arise within the CRs in the future, the Scientific Coordinators will seek to collaborate with the other (bio-physical) project principals. Also, since NRM is the theme of the regional InterCRSP, this forum will be actively used to exchange information with other countries and other CRSPs.
Although the determination of specific responsibilities for project objectives will have to await the development of yearly work plans, some general guidelines can be given:

1. All work plans will be jointly developed.
2. Specific tasks will be assigned to individuals but all objectives will be collaboratively achieved and reported (published).
3. Field work will always be the responsibility of ISRA in order to ensure that intra-institutional coordination within Senegal is facilitated.
4. Any student's graduate research committee will have representation from both primary partners.
5. Internal and external coordination of the project will be the responsibilities of the Scientific Coordinators. Within Senegal, ISRA will ensure coordination with other programs, projects, and institutions. Virginia Tech will ensure coordination with international programs, projects, and institutions. Such coordination will be achieved by conventional means including regular communication through telephone, fax, e-mail, meetings, and publication of reports and results.

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ANNEX 5: ASSESSING THE MACRO AND SOCIOECONOMIC AND BIOPHYSICAL IMPACTS OF THE CBNRM PROJECT AT THE COMMUNAUTE RURALE LEVEL

Explanation of Table 1

By convention, expense items (outgoing) from SAM categories are presented in the columns and receipts (incoming) to categories are presented in rows. For convenience, the matrix presented in Table 1 is abbreviated in column detail; only the general column headings are given (e.g., Activities, Factors, etc.). In the actual matrix, each row entry has a counterpart entry as a column. Consequently, the matrix defined by the SAM is square - the same numbers of rows and columns. Furthermore, the symmetry of the SAM extends to the total values in the last column and row. That is, total sales are equal to total payments; total value added is equal to total factor payments; institution payments and receipts are equal as are investment and savings. Only total exports and imports may be unequal in this CR example depending on whether a given CR is being subsidized or acting as a net exporter of goods and services. All expenses and receipts are represented as monetized values, actual or imputed.

Production **Activities** receive income (rows) derived from the demand for their outputs. Demands for activity outputs include intermediate demands when their utilization is within their own or other production activities and final demand when used to satisfy consumer and governmental demand, investment, and exportation. Activities must pay (columns) for the factors of production they use, indirect taxes, depreciation of capital, and for production inputs imported into the CR.

Factors of production are paid to the institutions (households, government) that provide them. Total **institution** income for households includes these factor payments plus (net) migrant payments, and net government payments (transfers minus local taxes). The institution of local government receives income equal to all taxes (indirect plus direct) minus net transfers. Institutions also provide for investment (public and private) and pay for all imported consumption goods and services.

The **capital** (physical formation) account is broken out separately to facilitate SAM analyses of CBNRM interventions. Separate multipliers will be calculated for this important determinant of economic growth. This sector may also include human capital if desired.

The **Rest of the World** includes all economic activities going to or coming from sectors exterior to the CRs. Thus it includes all exports, imports, and remittances provided by migrant workers.

Annex 6 :

Persons interviewed

ANNEX 6: LISTE DES PERSONNES RENCONTREES PAR L'EQUIPE D'ASSISTANCE TECHNIQUE

DATE	PERSONNES RENCONTREES	INSTITUTION (FONCTION)	OBJET DE LA VISITE	QUESTIONS DEBATUES
01/07	-Sounka Ndiaye -Mamadou Ndiaye -Barro	USAID	Présentation de l'équipe	Questions préliminaires sur es indicateurs
du 02 au 03/		**USAID**	Participation à l'atelier de l'USAID	Planification du suivi et de l'évaluation des activités de l'OS#2
08/07	Madamba Ndiaye Babacar Faye Younouss Ba	ACA	Système de suivi	choix des indicateurs de performance pour la fomation
09/07/1997 à 10H 00	- Massamba Dieng - Bill Roberts - Mme LEGUEDE - Mme BADIANE	***ISRA*** « «	Système de suivi de NRBAR	- Cadre d'intervention de NRBAR par rapport aux autres projets et ONG (il paquet de résultat N°1) - Organisation de l'ISRA en zones agro-écologique - Les technologies et indicateurs - Les autres contacts importants - Les indicateurs pédologiques - Classification des sols au Sénégal - Prise de date de rendez-vous
09/07/1997 à 11H 00	- M Boubacar NIANE	***MEPN*** Directeur de Cabinet	Visite de courtoisie	- Présentation de l'Equipe et de l'objet de la consultation - Le double plan stratégique et politique de la consultation et place du PGCRN - Document de base par rapport à l'Etat
09/07/1997	- Oussouby TOURE	***CONSERE*** Secrétaire permanent	Système de suivi éventuel et documentation	- Collaboration PGCRN-CONSERE - Etape actuelle de travail du CONSERE en

ANNEX 6: LISTE DES PERSONNES RENCONTREES PAR L'EQUIPE D'ASSISTANCE TECHNIQUE

à 12H 40	- Mawade WADE - Mbengue FAYE - L'Economiste	Ingénieur Eaux et Forêts Ingénieur Eaux et Forêts		terme d'actions prioritaires - Les éléments d'analyse disponibles - Le système d'information qui est en vue
9/07	Mme Badiane	ISRA	Discussion sur les indicateurs biophysiques	- choix des meilleurs indicateurs, -possibilités de collaboration avec le PGCRN - discussions sur les méthodes de collecte et les données existantes
10/07/1997 à 10H 00	- Mamadou NDAO - M. KEITA - Ablaye BARRO	***USAID***	Pertinence des indicateurs	- Cadre stratégique général - Liste minimale des indicateurs demandés par l'USAID et informations supplémentaires - Les étapes de consultation et le système de rapportage - L'intérêt nouveau par rapport au suivi-évaluation
10/07/1997 à 15H 30	- Aïfa Fatimata NDOYE	***PASE*** (en BAME de l'ISRA)	Impacts socio-économiques	- Travaux réalisés à l'échelle du terrain agricole - Les systèmes de production et les technologies - Les techniques d'enquête - Modélisation socio-économique
11/07/1997 à 8H 40	- Amadou Moctar NIANG - Assize TOURE - Ndiapaly NDIAYE - Boubacar SOUMARE - Boubacar CAMARA - Samba Laobé NDAO	***CSE*** Directeur Général Directeur Technique Directeur Adm. Financier Agronome Responsable Formation Cartographe	. Visite de courtoisie . Système de suivi environnemental	- Le suivi environnemental au CSE (les programmes) - Les indicateurs les plus appréhendés - Les impacts du Projet
11/07/1997	- Mr SARR - Samba BA - Mbaye FAYE	***DPS*** Chef de Division Bureau des entreprises Comptabilité nationale	Recherche documentaire et méthodologique	- Les données de base existantes - Méthodologie de recherche économique au niveau de la CR (PIB)

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ANNEX 6: LISTE DES PERSONNES RENCONTREES PAR L'EQUIPE D'ASSISTANCE TECHNIQUE

à 10H 00	- Mme DIALLO	Bibliothécaire documentaliste		- Les bilans comptables attribués aux différents responsables de la DPS - Les documents de base à collecter
11/07/1997 à 12H 30	- Maïssa DIENG	*UPA* Documentaliste	Documentation	- Document sur les statistiques agricoles
13/07		CR de Mbellacadiao		
14/07	Bounouma Gueye Fatou Ndiaye Mama Ndiaye	Comité de Gestion des ressources naturelles de Diakhao	Discussion sur les indicateurs et le syst`me de suivi	-discussion sur le système de suivi -discussion sur les connaissances et pratiques en GRN -Discussion sur les connaissances et pratiques GRN
15/07	Pape Sy Directeur	PRECOBA	-Présentation du projet - Base de données	- discussion sur les indicateurs et le système de suivi
15/07	Matar Diop Amath Cissé Sémou Diouf	Membres du Comité de Gestion des Ressources Naturelles de Diaoulé	Discussion sur les micro-réalisations	- Discussions sur les indicateurs -Questions sur les données disponibles et les méthodes de collecte -Discussion sur les connaissances et pratiques GRN - Discussion sur les micro-réalisations
15/07	Modou Sène	ISRA Kaolack	Discussion sur les technologies de GRN	- discussions sur les données existantes -discussions sur les méthodes de collecte des données
15/07	Astou Dakono Dermot Mchugh	AFRICARE/KAED Kaolack	Discussion sur les activités de KAED, son approche	-discussion sur les données existantes - discussion sur le système de suivi - discussion sur les indicateurs - discussions sur les méthodologies de collecte des données -discussions sur l'élaboration de la base de données
16-17	-Madiouf Diouf -Alassane Bathily Sall	Agents CERP	Discussion sur le syst`me de suivi	Discussion sur la collecte des données Discussion sur les données disponibles et les

ANNEX 6: LISTE DES PERSONNES RENCONTREES PAR L'EQUIPE D'ASSISTANCE TECHNIQUE

	-Ensa Faboré -Fara Niang			sources de données
	Pape Thioye Pape Ndary Touré Amath Cissé Mamath Touré Amath Cissé Aida Faye (Jeanine Barget)	Comité de Gestion des ressources naturelles de Médina Sabakh	Discussion sur les micro-réalisations	- Discussions sur les données disponibles, sur les méthodes de collecte et leur pertinence, - Discussion sur le système de suivi

Annex 7 :

Résumé of CBNRMP activities

ANNEX 7: SYNTHESES DES ACTIVITES PGCRN

CARACTERE PRIVE
COMMUNAUTES RURALES DE MEDINA SABAKH, NGAYENE, KAYEMOR, MBELLACADIAO ET DIAOULE

Médina Sabakh

total des activités approuvées par le CGRN: 25

par catégorie

reboisement: 19
compostage: 2
pépinière: 3
cordons pierreux: 1

Ngayène

total des activités approuvées par le CGRN: 41

par catégorie

reboisement: 35
compostage: 4
pépinière: 2

Kayemor

total des activités approuvées par le CGRN: 37

par catégorie

reboisement: 23
compostage: 6
pépinière: 1
cordons pierreux: 7

Mbellacadiao

total des activités approuvées par le CGRN: 23

par catégorie

reboisement: 17

ANNEX 7: SYNTHESES DES ACTIVITES PGCRN

compostage: 5
pépinière: 1

Diaoulé

total des activités approuvées par le CGRN: 18

par catégorie

reboisement: 10
compostage: 8

ACTIVITES A CARACTERE PUBLIC

COMMUNAUTES RURALES DE MEDINA SABAKH, NGAYENE, KAYEMOR, MBELLACADIAO ET DIAOULE

Les priorités articulées au cours du mois de mai, 1997 par les Conseils Ruraux des cinq Communautés Rurales des régions de Kaolack et de Fatick en ce qui concerne les activités GRN à caractère public sont les suivantes:

Médina Sabakh

1. L'installation des digues anti-sel dans la vallée du Baobolong (pour promouvoir les activités maraichères)

2. La délimitation et l'enrichissement des zones de pâturage

3. L'acquisition des équipements par les comités de lutte contre les feux de brousse

Ngayène

1. La matérialisation des parcours et des couloirs de passage de bétail et l'aménagement des mares

2. L'aménagement des bas-fonds (pour appuyer les activités maraichères)

3. Le reboisement de la forêt classée, surtout par des espèces fourragères

ANNEX 7: SYNTHESES DES ACTIVITES PGCRN

Kayemor

1. La lutte contre le ravinement qui menace le village de Kayemor par les cordons pierreux à grande échelle

2. L'aménagement de la vallée du Baobolong, surtout à travers l'installation des digues anti-sel (pour appuyer les activités maraichères)

Mbellacadiao

1. L'aménagement de la Vallée morte du Sine, l'installation des digues anti-sel (pour appuyer les activités maraichères et rizicoles)

2. La délimitation des couloirs de passage de bétail et l'aménagement des mares

3. La récupération (anti-salinisation) des tannes

4. Les plantations le long des axes routiers

Diaoulé

1. L'installation des cuvettes de récupération des eaux dans la Vallée morte du Sine (pour appuyer les activités maraichères)

2. L'aménagement d'un parcours de 8-10 hectares dans la zone A (qui est déjà entouré de fil barbelé) par le reboisement (surtout des espèces fourragères); la délimitation et l'aménagement d'un parcours de 8-10 hectares dans la zone C

Annex 8 :

Proposals for modified monitoring sheets

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Fiche d'activité du CGRN (Tab. 7)

(à remplir pour chaque activité)

Date : .....

Arrondissement de : ..... **CGRN de** : .....

Activité : .....

Catégories : Planification, Sensibilisation, Formation, visite d'échanges, Visites terrain, Examen de soumission, Réunion de coordination CGRN, etc.

Lieu : .....

Catégories : Siège du Conseil Rural ; Siège du CGRN ; Village de ; Zone terroir 1 ; Site de réalisation de; Zone 1 ; Zone terroir 2 ; Site de réalisation de ....., zone 2 ; Site de réalisation de ....., zone 3; Site de réalisation de ....., zone 4

Participants :

Nombre de présents	Populations		CGRN		Conseil Rural		CERP	UGP	Presta-taires	Autres à préciser	**Total**
	H	F	H	F	H	F					

Responsable de l'Activité : .....

Catégories : CGRN ; CERP ; UGP ; Animateur ; Prestataires ; Commission SAV ; Commission GRN ; Comité exécutif ; Comité zone terroir 1 ; Comité zone terroir 2 ;Comité zone terroir 3 ; Comité zone terroir 4 ; Autre (à préciser).

Objectifs : .....

Résultat : Selon les participants, est-ce que l'objectif de l'activité est atteint ? (Oui, Non, à moitié)

.....

.....

Analyse : Description sommaire de l'Activité et de la qualité de la participation :

.....

.....

Problèmes et suggestions :

Problèmes		Suggestions
Logistique		
Participation		
Technique		
Autre:		

Leçons tirées *et participation*:

.....

.....

.....

Nom, qualité et Signature

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Fiche mensuelle d'activités (Tab. 8)

(à remplir par l'Animateur Communautaire à partir des fiches d'activités)

Arrondissement de:..... CGRN de :..... Période/Mois:..... Etablie le :...../...../.....

Activités	Nbre d'acti-vités	Nombre de Participants																Résultats	Problémes	Solutions apportées aux problémes
		Populations		CGRN		Conseil Rural		CERP		UGP		Presta taires		Autres		TOTAUX				
		H	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F			
Planification																				
Formation																				
Visites d'échanges																				
Réunion de Coordination																				
Formulation du PTA																				
Mise en oeuvre des micro-réalisations																				
Suivi des micro-réalisations																				
Autre:.....																				

L'Animateur Communautaire
(Nom et signature)

Le Président du CGRN
(Nom, cachet et signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Cf. fiche mensuelle d'activité (tab. 8)

Fiche de présence et d'activités des membres du CGRN (Tab. 9)

(à tous les 3 mois par l'Animateur Communautaire)

Arrondissement de:..... **CGRN de :**..... **Période/Mois:**..... **Etablie le :**...../...../.....

	Membres	Qualité	Présence pendant les 3 derniers mois (*)			Nombre de Participation aux activités									Observation
						Planification	Sensibilisation	Formation	Visites échanges	Réunion Coordi.	Mise en oeuvre microré.	Suivi microréalisation	Autres	Autres	
	1.														
	2.														
	3.														
	4.														
	5.														
	6.														
	7.														
	n.														

N.B.: (*): Présence: 1 Absence: 0 (préciser le nombre de semaines si nécessaire:1, 2 ou 3 ...) **(**):**Commentaire libre du Président

L'Animateur Communataire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation…)

Fiche récapitulative des soumissions ~~collectives~~ sélectionnées (Tab. 10)

(à remplir par l'Animateur Communautaire)

Créer colonne I/C pour Individuelle/ Collective

Arrondissement de:..... **CGRN de :**..... **Etablie le :**...../.. ..../.....

	Type de micro-réalisations	Nom du bénéficaire (*)	I / C	Nombre de Participants				Prévision/Objectifs		Montant soumission		Observations
				H	F	J	Total	Période	de réalisat°	Part CGRN	Part groupe.	
	1.											
	2.											
	3.											
	4.											
	5.											
	6.											
	7.											
	TOTAL											

N.B.: **(*)** Préciser : Mixte (M) ; Homme (M) ; Femme (F)

L'Animateur Communautaire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

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ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Cf. fiche récap. des soumissions collectives (tab. 10)

Fiche récapitulative des soumissions individuelles sélectionnées (Tab. 11)

(à remplir par l'Animateur Communautaire)

Arrondissement de:..... **CGRN de :**..... **Etablie le :**...../...../.....

	Type de micro-réalisations	Nom du bénéficaire (*)	Nombre de Participants				Prévision/Objectifs		Montant soumission		Observati
			H	F	J	Total	Période	de réalisat°	Part CGRN	Part Bénéficiaire	
	1.										
	2.										
	3.										
	4.										
	5.										
	6.										
	7.										
	8.										
	TOTAL										

N.B : (*) Préciser : Mixte (M) ; Homme (M) ; Femme (F)

L'Animateur Communautaire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Fiches récapitulatives des soumissions rejettées (Tab. 12)

(A remplir par l'Animateur Communautaire)

Arrondissement de :..... **Etablie le** : ...../ ..../ .....

CGRN de :.....

Nombre de demandes de soumissions	Reçues	Présélectionnées	Sélectionnées	taux en %	Rejettées

En bas tableau

Demandes rejettées

Type de microréalisations	Nombre de demandes	Types de demandes	Zones terroirs	Raisons du rejet

L'Animateur Communautaire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Fiche récapitulative d'exécution des soumissions ~~collectives~~ (Tab. 13)

(à remplir par l'Animateur Communautaire à la fin de l'exécution à partir des cahiers de suivi et des fiches de suivi technique CERP)

Créer colonne I/C pour Individuelle/ Collective ..... **CGRN de :**..... **Etablie le :**...../...../.....

ype de micro-éalisations	Nom du bénéficaire (*)	I / C	Nombre de Participants				Objectifs et Réalisations			Réussite	Montant soumission		Observations
			H	F	J	Total	Objectifs	Réalisé	Taux(**)		Part CGRN	Part groupe.	
OTAL													

N.B.: (*) Préciser : Mixte (M) ; Homme (M) ; Femme (F) (**) :c'est égal= Réalisation x 100 / Prévision

L'Animateur Communautaire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

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ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Cf fiche récap d'ex des soumissions collectives (tab. 13)

Fiche récapitulative d'exécution des soumissions individuelles (Tab. 14)

(à remplir par l'Animateur Communautaire à la fin de l'exécution à partir des cahiers de suivi et des fiches de suivi technique CERP)

Arrondissement de:..... **CGRN de :**..... **Etablie le :**...../...../.....

Type de micro-réalisations	Nom du bénéficaire (*)	Nombre de Participants				Objectifs et Réalisations			Réussite	Montant soumission		Observations
		H	F	J	Total	Objectifs	Réalisé	Taux(**)		Part CGRN	Part bénéfic.	
TOTAL												

N.B.: (*) Préciser : Homme (M) ; Femme (F) (**) :c'est égal= Réalisation x 100 / Prévision

L'Animateur Communautaire
(Nom et Signature)

Le Président du CGRN
(Nom, Cachet et Signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Cahier de suivi technique (Tab. 15)

Date : ...../...../ .....

Arrondissement de :..... **CGRN de** :.....
N° du contrat : ..... **Titre du Contrat** :.....
Nom du Bénéficiaire et raison sociale : .....
Adresse (village et sous-zone) : .....
Activités : .....
Objectifs:.....
Approche méthodologique :.....
Moyens : .....

Chronogramme des tâches :

Etapes	1.....	2.....	3.....
Tâches	....	....	....

Problèmes ou contraintes techniques et recommandations

+ Date de début d'exécution et durée prévue

	Problémes ou contraintes techniques	Recommandations
tâche 1 ..	.....	.....
tâche 2...	.....	.....
tâche x ..	.....	.....

Taux de Reprise ou d'avancement :.....

L'exécution est-elle conforme à la description donnée dans la demande de financement et au contrat d'exécution? .....
.....

Autres observations :.....

Le CERP	Le CGRN	Le Bénéficiaire
.....	.....	.....

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Fiche de suivi trimestriel du CERP (Tab. 16)

Arrondissement de : ..... Date : ...../ ...../ .....

Communauté Rurale de : .....

Financement du PAGT par le Conseil Rural

Budget total du C.R.	Part du budget pour les micro-réalisations de GRN (rubriques et montants)	Part du budget pour les autres travaux publics (rubriques et montants)	Changement depuis le dernier rapport
	....	....	....

Etat foncier de la Communauté Rurale

Nombre total d'hectares affectés par le Conseil Rural depuis le dernier rapport : ..... ha

Nombre de conflits sur l'affectation de terre présenté

au Conseil Rural depuis le dernier rapport : manière formelle:..... Informelle:.....

Types de conflits: .....

Nombre de conflits résolus depuis le dernier rapport : .....

Mode de Réglement: Traditionnel:..... Moderne (Loi):..... Autre:.....

Nombre d'hectares désaffectés : ..... ha

Raison des désaffectations :.....

Nombre d'hectares affectés : ..... ha

Raison des affectations : .....

Ressources sur les supports techniques d'information et de communication sur la GRN

Ressources bibliographiques sur la GRN

Nombre : .....Type : .....

.....

Augmentation ou diminution depuis le dernier rapport : + ... - .....

Besoins : .....

.....

Anecdotes sur l'utilisation des acquis du PGCRN dans la Communauté Rurale :

.....

Le Chef de CERP

(Nom, Cachet et Signature)

ANNEX 8: PROPOSITION DES MODIFICATIONS DES FICHES

(les numeros de tableau sont ceux de manual de suivi-evaluation...)

Individuelle/ Collective

Fiche mensuelle de suivi technique des micro-réalisations (Tab. 18)

Arrondissement de :..... **Communauté Rurale de :** ..... **Date :** ...../...../.....

Micro-réalisation	Personnes/ groupements	Technologie utilisée	Objectifs	Début d'exécution	Fin prévue	Etat d'exécution	Ressources humaines	Contraintes			Observations
								Physiques	Matérielles	Autres	
1.											
2.											
3.											
4.											
5.											
n											

Le Président du CGRN
(Nom, Cachet et Signature)

Le Chef de CERP
(Nom, Cachet et Signature)

Fiche mensuelle de formation (Tab. 22)

Période:.....

Communauté Rurale	Modules de Formation	CGRN		CERP		UGP		Autres	
	En hommes/jours	H	F	H	F	H	F	H	F
Médina Sabakh									
Ngayenne									
Kayemor									
Sous-total 1									
Mbellacadio									
Diaoulé									
Sous-total 2									
Gabou									
Moudéry									
Ballou									
Sous-total 3									
Bandafassi									
Tomboronkoto									
Sous-total 4									
Sansamba									
Bemet Bidjini									
Sous-total 5									
Pata									
Ndorna									
Fafacourou									
Sous-total 6									
TOTAL									

Le Responsable du Volet Formation

Fiche Mensuelle de Communication-Animation (Tab. 23)

Actions de Communications	Niveau de Diffusion					Sollicitations
	Régional				National	
	Kaolack	Fatick	Tambacounda	Kolda		
Réunions/Ateliers/Fora						
Livrets/Fiche Technique						
Documents du PGCRN						
Emissions Radio						
Emissions Télévisées/vidéo						
Cartes et autres représentations analogiques						

Annex 9 :

Strategic monitoring - CBNRMP

ANNEX 9

Suivi Stratégique - PGCRN

(Modèle Type)

- Indicateurs de RIC B
- Indicateurs deImpacts Socio-Economiques
- Indicateurs de Impacts Bio-Physiques
- Indicateurs deAutres Résultats Intermédiares Clés

Suivi Stratégique - PGCRN

Résultats Intermediaires: RIC B

RI	Indicateur	1997	1998	1999
B.0 Adoption techniques GRN accrue	1) Pourcentage de producteurs(selon genre) qui ont adopté (utilisé) au moins une technologie améliorée prioritaire pendant l'année precedente	Hommes - 10%, Femmes - 6%		
	2) Pourcentage de producteurs (selon genre) qui n'ont adopté (utilise) aucune technologie améliorée prioritaire à cause de: * manque de moyens economiques * manque de moyens humains * autre	Hommes: 30%, 25%, 40%; Femmes - 50%, 30%, 20%		
B1.0 : Accès accru des ruraux aux technologies améliorées de GRN	1) Nombre (selon genre) de producteurs connaisant au moins un type de techniques (Améliorées/Prioitaires) de la GRN et Source de connaisance	Hommes - 15%, Femmes - 16%		
B2.1 : Capacité institutionnelle des organisations renforcées	1) Pourcentage de la contrepartie et main-d'oeuvre utilisée (hommes/jours) des populations dans les microréalisations	67%		
	2) Hommes jours total de formation des agriculteurs (selon genre)	1050		
	3) Pourcentage (selon genre) de personnes qui estiment que la mise en place du CG a eu un impact positif sur le fonctionnement du CR	Hommes - 24%; Femmes -35%		

Pourcentage de producteurs variables -

a) Nombre total des adopteurs (selon genre);

b) Nombre total des producteurs (selon genre).

Methode de calcule/collecte - (producteur (male) adopteur/producteur (male) total), (producteur (female) adopteur/producteur (female) total).

Enquette annual de suivi.

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Système de Suivi Stratégique - PGCRN

Impacts Socio-Economiques

RI	Indicateur	1997	1998	1999
B Impacts Socio-Economiques d'Adoption de pratiques GRN a court terme	1. % des hommes et femmes connaisant au moins une praticque GRN prioritaire, amélioées et/ou de technologies de GRN	Hommes - 20%, Femmes - 12%		
	2. Sources d'information sur les pratiques (selon genre) améliorées et les technologies de GRN * CERP/CG/UGP (Projet) * Autre projet * Autre producteur * Support d'information (ecrit, radio/TV/journal, etc) * Autre	Hommes: 10%, 14%, 40%, 12%, 9%; Femmes - 5%, 16%, 20%, 2%, 5%		
	3. % d'hommes et de femmes qui utilisent au moins une pratique amélioré et/ou technologie de GRN	Hommes - 15%, Femmes - 16%		

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Système de Suivi Stratégique - PGCRN

Impacts Bio-Physique

RI	Indicateur	1997	1998	1999
B.0 Impacts Biophysiques d'Adoption de Pratiques GRN	1) Surface ou longueur sur lesquelles les pratiques et technologies de GRN ont été utilisées	Superficie - 200 ha, Kilometrage - 3,000		
	2) Pratiques améliorées prioritaires GRN utilisées	* Compostage - 200 * Haie Vive - 50 * Cordon de pierre - 35		
	3) Accroissement des rendements par pratique GRN adoptee	Compostage - 20%, Haie vive - 5%, Cordon de pierre - 10%		

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Système de Suivi Stratégique - PGCRN

Autres Indicateurs

RI	Indicateur	1997	1998	1999
A3.1 Institutions de réglement de problèms et conflits liés à la GRN renforcées	1) Pourcentage de conflits GRN resolus par le CR	25%		
A.3.2 Institutions de gestion et de diffusion des informations relatives au cadre juridique et institutionnel renforces	1) Pourcentage de personnes connaissant au moins une loi ou un code sur la gestion des ressources naturelles a travers le PGCRN	Hommes: 30; Femmes - 15%		
	2) Pourcentage de personnes (selon genre) reconnaissant l'autorité, l'efficacité et la performance de la CR en matière de résolution des problèmes et conflits liés à la GRN	Hommes - 12%, Femmes - 10%		

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