

**REPUBLIQUE DE CÔTE D'IVOIRE**

*Union – Discipline – Travail*



**MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT**

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**NATIONAL OFFICE OF THE PROMOTION OF RICE DEVELOPMENT**



**IRRIGATION SCHEMES AND WATER MANAGEMENT IN  
COTE D'IVOIRE**

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# OUTLINE

## Overview of Agricultural sector

- Location and climate
- Agriculture
- Hydrography
- Facilities and irrigation

## Intervention methodology in development of irrigation schemes

- Elaboration of irrigation plan
- Role of the actors
- Development of irrigation schemes
- funding

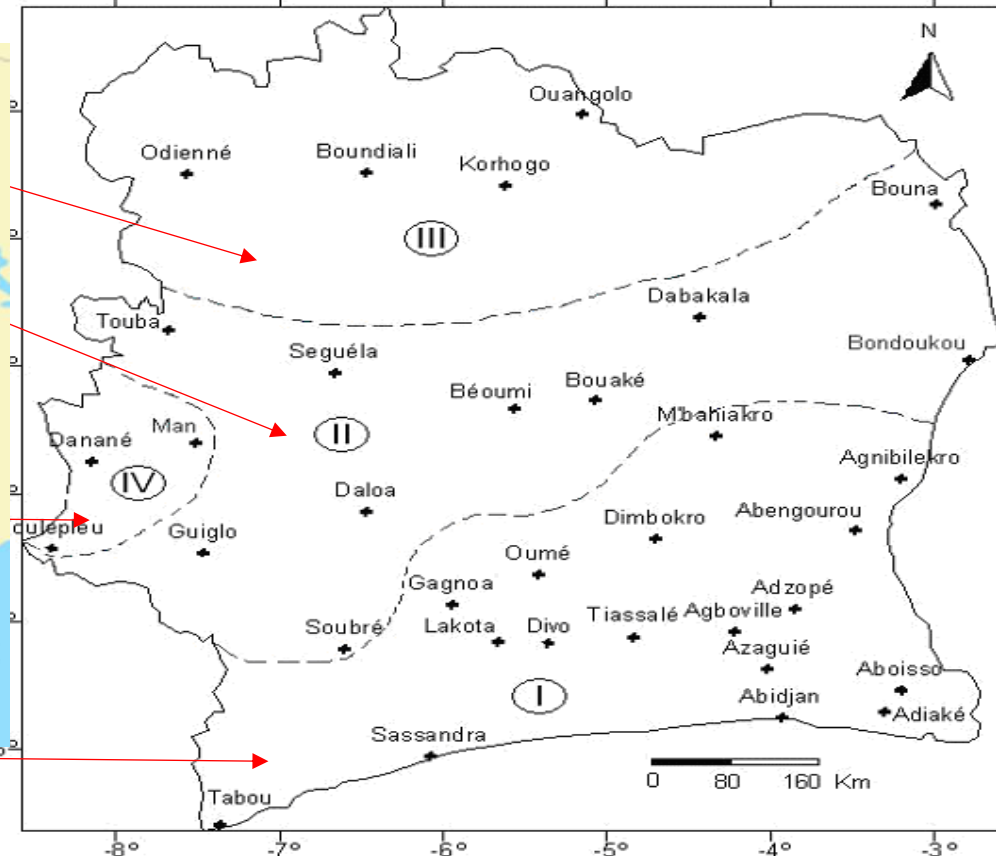
## Exploitation and sustainable management of facilities

- Management committee
- Water management
- Maintenance of the facilities
- Financing the management and the maintenance of the facilities

## Impacts



transition regime  
Precipitation: 1500 mm / year



- Légende**
- ✚ Poste pluviométrique
  - Limite de zone climatique
  - ⓪ Régime équatorial de transition (climat attiéen)
  - Ⓛ Régime équatorial de transition atténué (climat baouléen)
  - Ⓜ Régime tropical de transition (climat soudanais)
  - Ⓨ Régime de montagne

Humid tropical climate very suitable for vegetable cropping

## ■ Agricultural Sector

- Strategic sector of Côte d'Ivoire's economic development since the independence;
- 9.5 million ha cultivated on 24 million cultivable;
- Diversified agriculture (food crops, cash crops, industrial crops);
- provides more than 2/3 of the jobs;
- contributes up to 24% to the Gross Domestic Product (GDP) and;
- accounts for nearly 70% of export earnings, making the country one of the world's leading producers of agricultural raw materials (coffee, cocoa, oil palm, rubber, cashew, yam, plantain, cola, etc.);
- Contribution of the irrigated production to the national GDP: 7% from the export of industrial crops and only 3% from irrigated subsistence agriculture mainly carried by rice and vegetable cropping;
- +90% rainfed agriculture

# Hydrographic network and main watersheds

The Côte d'Ivoire hydrographic network includes:

Main watershed	Number of Dam		Storage capacity,	
	Quantity	%	10 <sup>6</sup> m <sup>3</sup>	%
Bandama	10	1,7	8 337,6	21,8
Sassandra	10	1,7	8 337,6	21,8
Small coastal rivers: Tabou, San - Pedro	2	0,3	196	0,5
Nounou, Boubo, Agnéby, Méand	9	1,5	173	0,4
Cavally	1	0,2	-	-
Niger	73	12,6	31,7	0,08
Black Volta	43	7,4	3	-
Branches of the Niger River: Baoulé	2	0,4	969	2,5
Bagoé and Gbanhala	82	14,2	24	0,06
San - Pedro	1	0,2	25	0,06
Small branch of the black Volta river: Kouda.				
<b>TOTAL</b>	<b>578</b>	<b>100</b>	<b>38 223</b>	<b>100</b>



Country have innumerable natural potentialities, including considerable land reserves in lowlands and irrigable plains

## ■ Facilities and irrigation

- 636 retaining structures, for all purpose, of which 362 have an agricultural vocation. Of these 362, there are 184 water reservoirs (dams) and 178 other water works exclusively for agriculture (EPDI, 2003).
- Irrigation techniques
  - Surface irrigation(49,6%);
  - overhead irrigation (44,3% );
  - Localized irrigation (6,1%)



## ■ Facilities and irrigation

- 3 types of irrigation schemes development :

Development by simple diversion from the watercourse



It is an irrigation schemes with partial or complete control of the water.

This type of development is economical, with an estimated cost of works ranging between **3 and 5 million CFA francs per hectare**.



## ■ Facilities and irrigation

facilities with the realization of weir crest



It is an irrigation schemes with partial control of water ; a single crop cycle.

This type of development cost around **3 and 5 millions francs CFA par hectare.**



## ■ Facilities and irrigation

the facilities under dam



It is an irrigation schemes with total control of water and allows to plant large areas and secure two crop cycles per year.

This type of development cost around **20 and 30 millions francs CFA per hectare**

## ■ Facilities and irrigation

Facilities under pumping



It is an irrigation schemes with total control of water and allows to plant large areas and secure two crop cycles per year.

This type of development cost around **15 and 25 millions francs CFA per hectare**

From the technical point of view, any development of irrigation schemes with total control of water must result from an Irrigation Development Plan which itself is realized from an analysis of the technical aspects (soil analysis, rainfall, hydrography ...), sociological, environmental and economic.

***Unfortunately, Côte d'Ivoire does not currently have an Irrigation Development Plan.***

However, a study of the Irrigation Development Plan was initiated by the Ministry in charge of Agriculture and was carried out from 2002 to 2004.

***This study provides guidelines that are used to date as basic principles in irrigation schemes development projects.***

the main guidelines are :

- ❑ the only water sources that can be considered for irrigation are the surface ones given the insufficient flow of the groundwater supply.
- ❑ In the south and west of the country irrigated cultivation can be done in lowlands during rainy periods and in dry periods.
- ❑ In the north and east, subject to longer drought periods, irrigated cultivation can only be done after developing irrigation schemes (including realization of dams and reservoirs).



## ■ Role of the actors

### State and its components

- The development or updating of sub-sectoral operational strategies in line with the global strategic orientations;
- The organization of the consultation with the various actors involved in the development of the rural sector;
- Creating an enabling environment by improving the legislative, regulatory and institutional framework and promoting good governance;
- Mobilization of resources (financial, material and human) necessary for the implementation of operational programs and investment programs;
- Monitoring / evaluation of the process
- Capacity building of the beneficiaries
- Repairs of large works, main canals, electromechanical equipment.

## ■ Role of the actors

### Local communities and grassroots communities.

- Participation in the elaboration and implementation of operational programs and investment programs at the regional level and local development plans
- Participation in the development and management of natural resources
- Involved in the management of project/programs and the resources (human, material and financial) made available by the Government;
- Facilitation of the consultation frameworks of the various actors involved in rural development at regional or local level ;
- Participation in the formulation, implementation and monitoring / evaluation of operational programs and investment projects concerning local communities;
- Promotion of employment and income generating activities;
- Participation in monitoring / evaluation of the process.

## ■ Role of the actors

### Professional organizations and private operators

- Participation in the formulation and implementation of operational programs and investment programs;
- Participation in the financing of certain projects (principle of co-financing of investments at the local level);
- Participation in the training and sensitization of the various actors;
- Participation in the consultation of the various actors;
- Involved in the implementation of programs and projects;
- Participation in the monitoring / evaluation of the process

## ■ Role of the actors

### Donors

- Participation in the political dialogue with the government;
- Participation in the consultation with the various actors;
- Support for the development of sub-sectoral operational strategies;
- Support for the formulation and implementation of operational programs and investment programs;
- Providing technical assistance for strengthening the institutional and operational capacities of the administration and professional organizations;
- Participation in mobilizing the necessary resources for the formulation, implementation and monitoring / evaluation of development programs and projects;
- Participation in the monitoring / evaluation of the process



## Development of the irrigation schemes

### **NEED REHABILITATION OR DEVELOPMENT OF NEW IRRIGATION SCHEMES**

- The State initiates (seize sub-tutelary or dedicated structures as the case may be) or
- the beneficiaries make a request (addressed to the local authorities, the ministry or the dedicated structures)

### **CONDUCTING RELEVANT STUDIES**

#### **IDENTIFICATION OF THE SITES**

**TECHNICO-ECONOMIC FEASIBILITY STUDY** : socio-Economic,  
*the environmental and social impact, the land aspects,*  
preliminary study on the project, Detailed design study. IPR $\geq$ 10%

### **DEVELOPMENT OF IRRIGATION SCHEMES**

*Execution study*

**Control and monitoring of the works**

**Environmental Management**

**Land management**

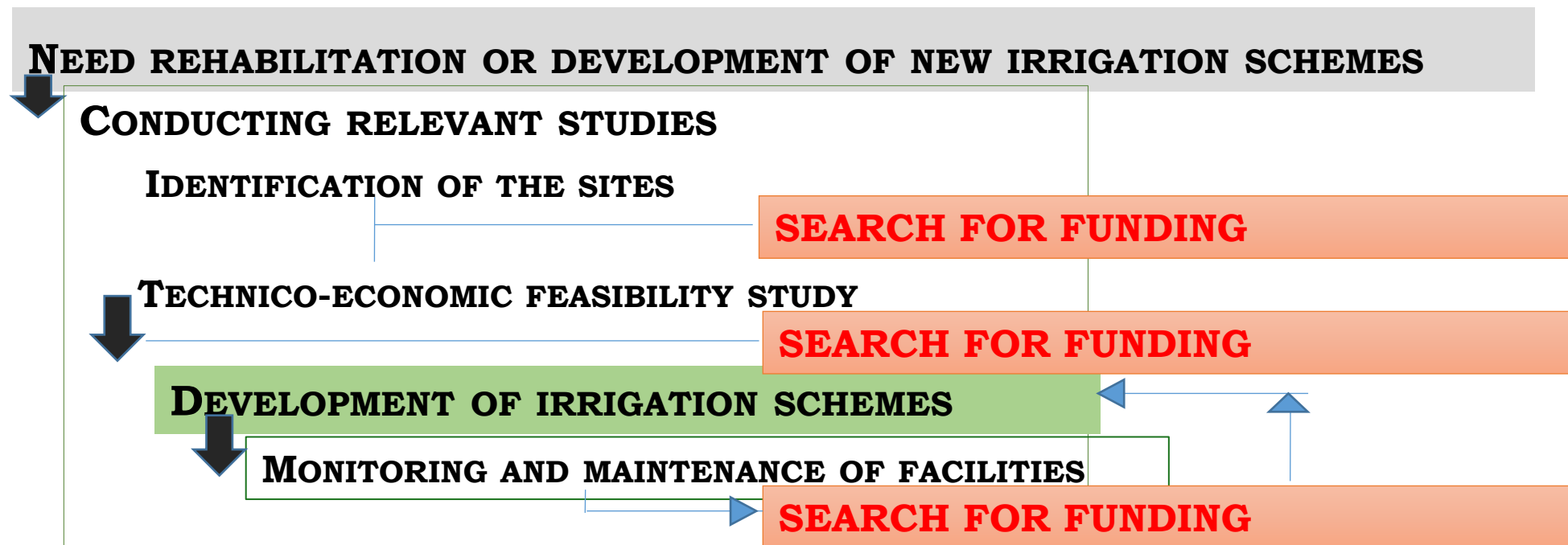
### **MONITORING AND MAINTENANCE OF FACILITIES**

## ■ Financing the development of irrigation schemes

**The financing of the development of the irrigation schemes** is to date made by the Government alone and in several forms :

- ❑ With bilateral donors, especially for major projects,
- ❑ Counterpart funds obtained through the sale of equipment (KR / Japanese Cooperation) or cereals (KR and PL 480 / US cooperation),
- ❑ National budget.

Funding by donors or counterpart funds is granted after requests.



In order to allow the good exploitation and management of infrastructures and equipments realized by the Government → Systematic implementation of a **Management Committee of the facilities** (MCF) for each of the developed perimeters which has for principal tools :

- Rules of procedure
- A water management guide
- An infrastructure maintenance guide

A MCF must be put in place by the farmers for each perimeter.

**Role:**

The MCF is responsible for managing production factors (water, inputs, agricultural machinery) and perimeter infrastructures.

To do this, MCF ensures the application of a water policy concerning preventive maintenance and reparation of the perimeter and its works.

The internal regulations define the rules of the water management of the irrigation in the plot.

These rules of procedure must be accepted by all rice farmers and their application is therefore binding on all.

**Financial resources obtained through membership dues and harvest levy is used for the operation and financing of the facilities**



Responsible	Role	Objective to reach	Actions to be done
President	Guarantor of the internal regulations of the perimeter	Effective and equitable management of the water resource ; A good level of maintenance of the facilities	Schedule maintenance work
Secretary	Assist the president in his task	Good management of the "water" resource by farmers ; Un bon niveau d'entretien du périmètre.	Inform farmers about maintenance work ;
treasurer	Ensure the financial management of the perimeter	Ensure a good evaluation of the specifications of the technical works Ensure compliance with the fees	Ensure a good evaluation of the work specifications ;
statutory auditor	Control the financial management of the perimeter	Establish transparent financial management at the perimeter level	Check the financial movement; Check the accuracy of the accounting documents
Responsible for valve, pump	Provide hydraulic management at the perimeter	Have a fair water distribution	ensure equitable water distribution; Check the flow at the exit of the valves, the duration of the irrigations and the height of the thresholds in the canal; Organize meetings for adoption of the irrigation program
Chief or irrigation unit	Responsible for water management at the irrigation unit level; In charge of the maintenance at the level of the irrigation unit	Ensure the supply of water; Supervise maintenance work	Report to the MCF any anomaly in the supply of water at plot level; Set the threshold to the required height; Close the box after irrigation and check for leaks; Ensure the free passage of water in the downstream canal;
Rice producer	Exploiting one's plot	Good hydraulic management of the plot and the entire perimeter Good level of maintenance of its plot and perimeter Good exploitation of his plot	Maintain the plot and the perimeter; Avoid any waste of water; Learn about the adopted irrigation schedule and respect it

## ■ Water Management Guide

The development of any perimeter and the achievement of a good performance require an **efficient management of the water resource**. It is based on the following principles:

- At the dam, or the water mobilization structure,  
**good water management = good performance of water-retaining structure,**
- In the main canals and between plots,  
**good water management= efficient irrigation of plots**
- In the rice boxes,  
**good management of water= planed plots**

**To date, the water charge is not applied. Reflections are underway for its implementation.**

## ■ Perimeter Maintenance Guide

### **Maintenance of the water mobilization work :**

- Dam:** Excavation of the dike, digging of the foot ditch, clearing of the threshold, cleaning the chute, lubricating the valve, draining the valve chamber....
- Pumping Station:** Maintenance of the surroundings and valve chambers .....
- Surface irrigation and Threshold:** valves monitoring, strengthening of embankments and the installation of bridge protection structures .....

**Maintenance of the irrigation network :** Regular cleaning of the canals, regular cleaning and reinforcement of the bunds, strengthening of the embankments and the protection around the regulating and setting works, valves monitoring, regular planing of rice pots ...

**Maintenance of the drainage network :** Clearing the bottom and the banks of the drains....

**Reflections are underway to set up a financing mechanism for monitoring and maintenance activities.**

## Farm modernization

- High Performance technical itinerary (SRI)
- Easy and profitable mechanization (use of agricultural machinery in large rice area)

Improved  
productivity

- Increased yields of (1 to 4t / ha)
- Cost savings by economy of scale
- Increasing the number of cycles (1 to 2)
- Mitigating the effects of climate change

Professionalization of  
farmers

- Better organization
- Switching from subsistence rice growing to market rice growing

Stabilization and  
sustainability of land  
holdings

- Fight against itinerant agriculture

Various socio-  
economic impacts

- Job creation, increased income, diversification of activities, drinking water supply...



