PN-ABA 193
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SENEGAL IRRIGATION MASTER PLAN

FOR THE SRB LEFT BANK, MIDDLE VALLEY

BY GERSAR, MARCH 1981

ADDENDUM

This note provides some complementary information on the GERSAR irrigation master plan for the left bank of the Senegal River, is concerning data that is included in full report in french, but not clearly repeated in the English version of the summary and conclusions. The summary is the only part of the report available in English.

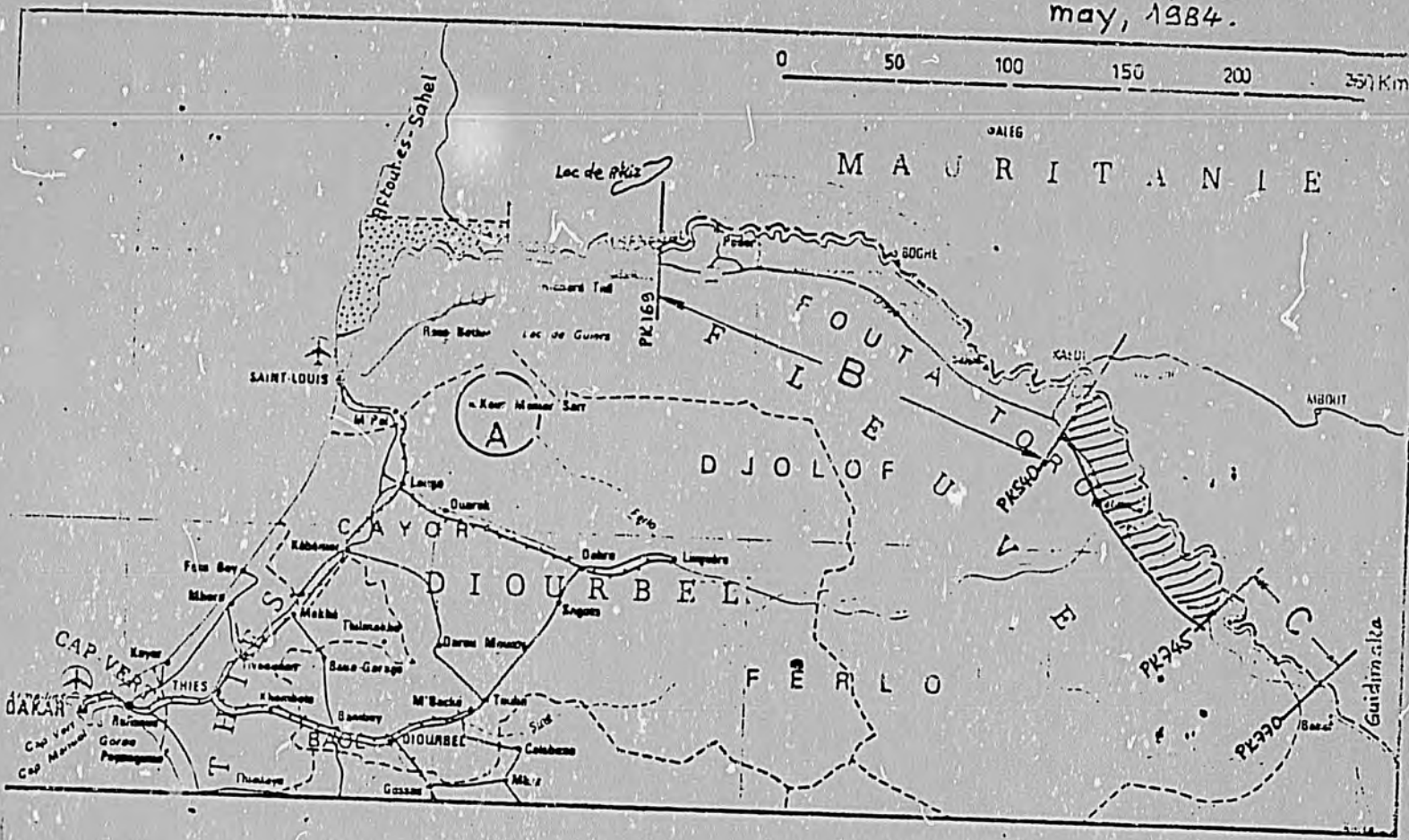
The English summary contains a presentaton of the conditions and general philosophy of development in the valley, the proposed agricultural development scheme, production structures, equipment options, and finally a short presentation of two pilot development schemes: Podor and Salde Wala. It does not present the technical analysis, nor the multicriteria analysis used to guide priority irrigation site selection. This information is briefly summarized in the addendum.

River Basin Development Office
USAID/Senegal
June 1984.

IRRIGATION MASTER PLANNING in the SRB

JLB / USAID / RBDO

may, 1984.



* Senegal.

"GERSAR" IRRIGATION MASTER PLAN (1981) - IBRD financing. Zones A. Band C.

"SATEC-SCET-SONED" IRRIGATION MASTER PLAN (1983). FAC + CCCE financing.

"BCEOM" IRRIGATION MASTER PLAN for the Delta (1983-84). FAC financing.

* Mauritania.

"GERSAR" MASTER PLAN for IRRIGATION Right Bank (1980). FAC financing. from Rosso to Goureye, including the Gorgol valley.

Feasibility study of 284 small perimeters (4,717 ha) between Rosso and Selibaby by SATEC (1980). FAC. financing.

Master plan of the delta financed by FAC [illegible]

TABLE 2

List of "Natural Irrigable Units"
Included in the Irrigation Master Plan

Reference	Department	Principal Location	Geographic Surface (ha)
N G 2	Podor	Fanaye-Tiangaye	3 575
N G 3	Podor	Thille Boubacar	8 434
N G 4	Podor	Ndiandane-Nianga	13 935
			23 944
M O 1	Podor	Podor	2 705
M O 2	Podor	Mboyo-Guede Village	8 260
M O 3	Podor	Halvar-Ndioum	16 165
M O 4	Podor	Danbe-Diamal	3 995
M O 5	Podor	Wa-Wa	3 733
M O 6	Podor	Diamandou-Marda	2 245
M O 7	Podor	Pate Gallo	8 920
M O 8	Podor	Dara-Belli Tiovi	3 355
M O 9	Podor	Demetr-Ndioum	8 697
M O 10	Podor	Walalde	3 823
M O 11	Podor	Sioure	11 973
M O 12	Podor	Tolde Tila-Kaskas	7 105
M O 13	Podor	Madina Ndiatebes (Morphil)	4 878
M O 14	Podor	Dounguel-Aioude Diabe	5 385
M O 15	Podor	Tioubalel-Abdallah	4 750
M O 16	Podor	Wala	2 348
M O 17	Podor	Salde	2 037
M O 18	Podor	Toufounde Gande	2 125
			103 499
D O 1	Podor	Aere-Lao Doumga	7 295
D O 2	Podor	Aram	2 640
D O 3	Podor	Ngoui	1 577
			11 512
O T 1	Podor-Matam	Mbolo Mbirane-Diorbivol	9 757
O T 2	Matam	Orofonde-Thilogne	14 640
O T 4	Matam	Belyinde	8 440
			32 837
D E 1	Matam	Gourel Dara-Lobali	4 150
D E 2	Matam	Adabere	2 410
D E 3	Bakel	Mouderi-Gande	2 645
			9 205
		Lake de Guiers	3 600
		Total (ha)	184 597

1.0. AREA COVERED BY THE GERSAR STUDY

The study includes 3 zones as indicated on the following map (Table 1):

- Zone A: comprising one plain 1/ laying upstream from the Keur Momar Sar dam (lake de Guiers).
- Zone B: comprising 27 plains between Fanaye and Thilogne. PK 169 to PK 540 2/.
- Zone C: comprising 3 plains upstream from Gourel Dara. PK 745 to PK 770.

The following table 2 gives the number, location and importance of each of the 31 units, covering a total of 184,000 hectares gross.

The area excludes the plains of Matam department which has been studied by a joint venture, French/Senegalese consortium, SATEC-SCET-SONED, under financing from FAC and the French Caisse Centrale.

2.0. CONTENTS OF THE DOSSIER PREPARED BY GERSAR (2nd edition 1981) 3/

Introduction 5 pages

Title 1: Specifications.

Volume 1.1.	Basic data for rural development	(220 pages)
Volume 1.2.	Specifications for agronomy	(200 pages)
Volume 1.3.	Design specifications	(230 pages).

Title 2: Pilot-Schemes for Podor and Salde Wala.

Volume 2.1.	Narrative	(110 pages)
Volume 2.2.	Maps.	

1/ In the original french documents the plains are called "UNE" (Unité Naturelle d'Equipement), Natural Unit for Development, due to M. Juton of OMVS who made the first definition and delimitation of the "UNE".

2/ PK: Point kilometer, measuring the lenght of the river, starting from St. Louis (PK 00 is the Faidherber bridge of St. Louis).

3/ The third edition (1983) has a different presentation (available in French):

Title 1: Synthesis
Title 2: Specifications
- 2.1. Basic Data
- 2.2. Specifications for Agronomy - Agricultural development scheme
- 2.3. Design specifications

Title 3: Irrigation Master Plan
- 3.1. General Presentation
- 3.2. Data Shetts for the 31 Natural Units
- 3.3. Maps.

Title 3: Master Plan

Volume 3.1. Presentation of the master plan (125 pages)
Volume 3.2. Data sheets for each identified site (natural unit). 31 sites (data sheet + drawings + map).
Volume 3.3. Maps (6 sheets).

3.0. HYPOTHESIS FOR THE PROPOSED MASTER PLAN

The development hypothesis are presented in the first part of Volume 3.1. A summary is given in chapters 1 to 4 of the English document "Irrigation Master Plan: summary and conclusions".

Four scenarios are proposed concerning various rates of the population growth, and various rates of labour availability.

4.0. MULTICRITERIA ANALYSIS

The multicriteria analysis uses a methodology with 2 phases:

Phase 1: identification of natural units which present difficulties for irrigation development.

Phase 2: classification of the other natural units.

Each phase is broken itself into 3 steps:

Step 1: evaluation of each natural unit, for its irrigable quality as a function of the set of criteria.

Step 2: classification of the natural units for short-term development, or medium term development based on the evaluation.

Step 3: critical analysis of the classifications.

4.1. The criteria used

* Criteria for irrigation: A

A1: intensity of demand for irrigated land
A2: shortage in irrigated land before the first generation of development
A3: negative effects linked to local conditions.

* Criteria for the quality of the location: E

E1: criteria of accessibility to the plain
E2: proximity of markets.

* Criteria of suitability of the plains for development Objectives: O

  O1: priority to light soils
  O2: proximity villages/perimeters
  O3: possibility of flood recessional agriculture during the 2 first phases of development.

* Criteria for costs of projects: C

  C1: cost of diking
  C2: cost of pumping stations
  C3: cost of main canals and main drains
  C4: cost of hydraulic plot development.

* Criteria for double cropping system.

4.2. Results of the multicriteria analysis

Among the 31 plains (natural units), 14 were eliminated from further consideration during the first phase analysis.

The 17 plains remaining are classified in two classifications A and B.

A: optimistic position concerning the respect of timing for the completion of Diama and Manantali dams.

B: pessimistic position. Priority is given to the sites having the best conditions and guaranties for water.

The following table gives the 2 classifications, and also a specific selection done by SAED after the preliminary studies of the GERSAR Master Plan:

Classification A		Classification B		SAED Selection		
				Natural Units		S(ha)
1. Podor	(MO 1)	1. Podor	(MO 1)	Podor	(MO 1)	2 705
2. Mouderi	(DE 3)	2. Dara	(MO 8)	(Guede)	(MO 2)	(800)
Guiters		3. Guiters		(Ndioum)	(MO 3)	(3 600)
4. Ngoui	(DO 3)	Nouderi	(DE 3)	Diomandou	(MO 6)	2 245
5. Thilogne	(OT 2)	5. Aoure Seme	(DE 1)	Dara	(MO 8)	3 355
6. Aoure Seme	(DE 1)	Aram	(DO 2)	Dounguel	(MO 14)	5 385
Aram	(DO 2)	7. Dioumandou	(MO 6)	Tioubalel	(MO 15)	4 750
8. Aere Lao	(DO 1)	Mbolo Birane	(OT 1)	Salde	(MO 17)	2 037
Salde	(MO 17)	9. Ngoui	(DO 3)	Wala	(MO 16)	2 348
Wala	(MO 16)	10. Aere Lao	(DO 1)	Thilogne	(OT 2)	14 640
Tioubalel	(MO 15)	Salde	(MO 17)	Aere Lao	(DO 1)	7 295
Dounguel	(MO 14)	Wala	(MO 16)	Aram	(DO 2)	2 640
Madina	(MO 13)	Tioubalel	(MO 15)	Ngoui	(DO 3)	1 577
14. Dara	(MO 8)	Dounguel	(MO 14)	Aoure	(DE 1)	4 150
15. Diomandou	(MO 6)	Madina	(MO 13)	Mouderi	(DE 3)	2 645
Mbolo Birane	(OT 1)	16. Thilogne	(OT 2)	Guiers		800
17. Belyinde	(OT 4)	17. Belyinde	(OT 4)			
						60 972
nc (Guede)	(MO 2)	nc (Guede)	(MO 2			
nc (Ndioum)	(MO 3)	nc (Ndioum)	(MO 3			

n.c.: non classées (unclassified). Source: GERSAR table 12. Vol.31.

The following table gives the priorities and characteristics of the selected sites

PRIORITIES AND CHARACTERISTICS OF SELECTED SITES

Designation of selected natural units		Multicriteria classification		Administrative location		Number of villages	Population total (3)	Main villages
Names of the natural unit (1)	Main perimeters (2)	A	B	Depart	Arrondissement			over 1,000 inhab.
MO 1	Podor Podor	1	1	Podor	Ndioum	3	11 500	Podor
MO 2	Mbovo Guédé Guédé	18	18	Podor	Ndioum	5	2 400	Guede**
MO 3	Halvar Ndioum Ndioum - Halvar	18	18	Podor	Ndioum	10	2 900	Ndioum*
MO 8	Dara Beli Tiovi Sintiou Pote Gollo	14	2	Podor	Ndioum	10	4 600	
MO 6	Diomandou Marda Diomandou	15	7	Podor	Ndioum	13	2 400	
OO 1	Aéré Lao - Doumga Aéré Lao + Diaynga	8	10	Podor	Kaskas	30	6 700	Aere Lao
OO 2	Aram Doumgo - Aram + Madina	8	10	Podor	Kaskas	10	4 200	Madina**
MO 14	Doumguel-Dioude Diabé Kaskas Dioudé Diabé	8	10	Podor	Kaskas	8	7 000	Kaskas** Dioube Diabe
MO 15	Tioubalel - Abdallah Tioubalel-Mbouma	8	10	Podor	Salde	19	7 700	Tioubalel** Mbouma****
MO16/17	Salde - Wala Saldé - Wala	8	10	Podor	Salde	20	6 400	
OO 3	Ngoui Pété + Tikité	4	9	Podor	Salde	15	5 700	Pete**
OO 2	Oréfondé - Thilogne Oréfondé - Thilogne	5	16	Matam	Thilogne	60	26 000	Thilogne Orefonde Anjamirlabe Anjam Gou
OE 1	Gourel Dara - Lobali Aouré - Semé	6	5	Matam	Seme	11	9 200	Aoure Adabere Diela Diamounguel
OE 3	Moudéri - Gande Moudéri - Dembakane	2	3	Bakel	Ololdou	8	9 300	Mouderi* Dembakane
--	Guilrs Keur Momar Sarr	2	3	Louga	Keur Momar Sarr	19	2 500	

Source: GERSAR Master Plan, title 3, Vol. 31, table 13.

5.0. THE PODOR PLAIN PROJECT

The natural irrigable unit of the Podor plain received the first rank in the GERSAR multicriteria analysis, and in the SAED selection.

It is the reason why SAED requested GERSAR to establish a pilot scheme for Podor, and also Salde Wala. (See title 2. Volume 21). This pilot scheme was prepared in 1981.

In December 1981, SAED (officially) submitted 3 projects to USAID: Podor, Bakel and Thiagar.

At the donors meeting held in Dakar in March 1982, USAID gave its commitment for Podor and Bakel. Based on this commitment, SAED requested GERSAR to go ahead with feasibility study of the Podor project.

*In November 1982, GERSAR issued a Preliminary feasibility study of the Podor perimeter including:

- a development plan and a preliminary design
- a social inquiry; a soils analysis
- an economic analysis.

*Then, a detailed feasibility study was completed in July 1983, and remitted to AID in December 1983.

*At the request of USAID/RBDO Dakar, GERSAR established in January 1984 an English document with the following title: "Podor Project Area: Synthesis Report", which was remitted to AID/W for the IDP review by the end of January 1984.