

## ANNEX 6 EVALUATION OF ACTION PLAN

**Table A6.1 Estimation of Household Annual Budgets for Producing Rice in Foug Gleita Before and After A/P Implementation**

(UM/household/year, unless otherwise specified)

		Current	After A/P implementation	Difference	Remark
Area (ha/household/year)		0.75	0.75	0.00	1
Revenue	Yield (paddy, kg/ha)	1,600	5,000	3,400	2
	Production (paddy, kg)	1,200	3,750	2,550	
	Price (Paddy, UM/kg)	47	83	36	3
	<b>Value of production</b>	<b>56,400</b>	<b>311,250</b>	<b>254,850</b>	
Seeds	Quantity (kg/ha)	38	50	12	
	Price (UM/kg)	109	0		4
	Cost	3,107	0	-3,107	
Urea	Quantity (kg/ha)	198	300	102	5
	Price (UM/kg)	200	200		
	Cost	29,700	45,000	15,300	
TSP	Quantity (kg/ha)	11	100	89	5
	Price (UM/kg)	160	160		
	Cost	1,320	12,000	10,680	
Agricultural chemicals	Quantity (kg/ha)	0	9,000	9,000	6
	Water	0	12,375	12,375	7
Bags	Quantity (bags/ha)		90		
	Price (UM/kg)		120		
	Cost	2,799	8,100	5,301	
Machinery rental	0	27,000	27,000	8	
Transport	Quantity (bag/ha)		89		
	Price (UM/kg)		175		9
	Cost	4,286	11,681	7,396	
<b>Total cost excluding labor</b>		<b>41,211</b>	<b>125,156</b>	<b>83,945</b>	
<b>Profit excluding labor</b>		<b>15,189</b>	<b>186,094</b>	<b>170,905</b>	

Source: Agricultural household survey, conducted by the JICA study team (2009), unless otherwise specified

1. The median value among the respondents in Foug Gleita was 1.0 ha for the annual area of rice cultivation. However, to make the comparison between the situation before and after A/P implementation, the current area was set to be the same as the target area after A/P implementation (i.e., 0.75 ha [0.50 ha in rainy season + 0.25 ha in hot dry season]).
2. According to a CNRADA expert, the rice yield in the Senegal river basin is expected to be 5 ton/ha, if appropriate techniques are used.
3. The median value of the selling price of paddy was 83 UM/kg among the three respondents in Lexeiba. This value was set as the target price in Foug Gleita after A/P implementation.
4. In Lexeiba, the respondents did not buy rice seeds but used a part of their previous year's harvest that they saved. This is expected to be a situation in Foug Gleita after A/P implementation.
5. In Foug Gleita, it is recommended to use 300 kg/ha of urea and 100 kg/ha of TSP.
6. Estimated based on the data collected from the respondents in Lexeiba.
7. The current irrigation water fee of 16,500 UM/ha was assumed not to change after A/P implementation.
8. It was estimated that a farmer would hire once a year in rainy season a tractor (12,000 UM/ha) and a combine harvester (24,000 UM/ha).
9. [Transport cost from farm to storage place] + [Transport cost from storage to Foug Gletia market].

**Table A6.2 Estimation of Household Annual Budgets for Producing Onions in Foug Gleita Before and After A/P Implementation**

(UM/household/year, unless otherwise specified)

	Current	After A/P implementation	Difference	Remark	
Area (ha/household/year)	0.092	0.125	0.033	1	
Revenue	Yield (kg/ha)	8,508	15,000	6,492	2
	Production (kg)	421	1,875	1,454	
	Price (UM/kg)	80	109	29	3
	<b>Value of production</b>	<b>35,000</b>	<b>204,375</b>	<b>169,375</b>	4
Seeds	Quantity (kg/ha)		4	5	
	Price (UM/kg)		12,000		
	Cost	2,400	6,000	3,600	
Urea	Quantity (kg/ha)		250	5	
	Price (UM/kg)		200		
	Cost	708	6,250	5,542	
TSP	Quantity (kg/ha)		300	5	
	Price (UM/kg)		160		
	Cost	220	6,000	5,780	
Agricultural chemicals	0	7,375	7,375	6	
Water	0	0	0		
Bags	Quantity (bags/ha)		261		
	Price (UM/kg)		120		
	Cost	878	3,915	3,037	
Transport	Quantity (bag/ha)		261		
	Price (UM/kg)		175	7	
	Cost	1,280	5,709	4,429	
<b>Total cost excluding labor</b>	<b>5,486</b>	<b>35,249</b>	<b>29,763</b>		
<b>Profit excluding labor</b>	<b>29,514</b>	<b>169,126</b>	<b>139,612</b>		

Source: Agricultural household survey, conducted by the JICA study team (2009), unless otherwise specified

1. The cultivated area after A/P implementation (0.125 ha) is a targeted rather than estimated value.
2. The yield after A/P implementation was estimated based on the yield of onions obtained in the verification trials, conducted by the JICA study team.
3. Many farmers reported that the selling price of vegetables fluctuated much. Of the data collected from 23 respondents in Foug Gleita, the representative prices were as follows: (1) minimum: 30 UM/kg; (2) lower quartile: 68 UM/kg; (3) median: 80 UM/kg; (4) upper quartile: 109 UM/kg; and (5) maximum: 175 UM/kg. Based on this information and the time series price data of onions in major markets of Mauritania, obtained from the VISA (Valorisation de l'Irrigué pour la Souveraineté Alimentaire) project (conducted by the Spanish Agency for International Development Cooperation), it was estimated that after A/P implementation, the average selling price of onions among Foug Gleita farmers could reach the level of the current upper quartile (i.e., 109 UM/kg).
4. For the current revenue, area cultivated times yield times price does not equal value of production, because each of these values are the median for each variable among the respondents and the number of respondents who provided viable answers were different across the variables.
5. The data source is CNRADA.
6. The data source is CNRADA (potassium sulfate [200 kg/ha × 120 UM/kg] + herbicide [6 l/ha × 5,000 UM/l] + insecticide [0.5 l/ha × 5,000 UM/l] + pesticides [0.5 l/ha × 5,000 UM/l]).
7. [Transport cost from farm to storage place] + [Transport cost from storage to Foug Gletia market].

**Table A6.3 Estimation of Household Annual Budgets for Producing Cabbages in Foug Gleita Before and After A/P Implementation**

(UM/household/year, unless otherwise specified)

		Current	After A/P implementation	Difference	Remark
Area (ha/household/year)		0.063	0.050	-0.013	1
Revenue	Yield (kg/ha)	10,120	20,000	9,880	2
	Production (kg)	308	1,000	692	
	Price (UM/kg)	76	125	49	3
	<b>Value of production</b>	<b>37,500</b>	<b>125,000</b>	<b>87,500</b>	4
Seeds	Quantity (kg/ha)		2		5
	Price (UM/kg)	7,000	7,000		
	Cost	575	700	125	
Urea	Quantity (kg/ha)		150		5
	Price (UM/kg)		200		
	Cost	860	1,500	640	
TSP	Quantity (kg/ha)		300		6
	Price (UM/kg)		160		
	Cost	490	2,400	1,910	
Agricultural chemicals		0	2,950	2,950	6
Water		0	0	0	
Bags	Quantity (bags/ha)		348		
	Price (UM/kg)		120		
	Cost	643	2,088	1,445	
Transport	Quantity (bag/ha)		348		
	Price (UM/kg)		175		7
	Cost	938	3,045	2,107	
<b>Total cost excluding labor</b>		<b>3,506</b>	<b>12,683</b>	<b>9,177</b>	
<b>Profit excluding labor</b>		<b>33,994</b>	<b>112,317</b>	<b>78,323</b>	

Source: Agricultural household survey, conducted by the JICA study team (2009), unless otherwise specified

1. The cultivated area after A/P implementation (0.050 ha) is a targeted rather than estimated value.
2. The yield after A/P implementation was estimated based on the yield of cabbages obtained in the verification trials, conducted by the JICA study team.
3. Many farmers reported that the selling price of vegetables fluctuated much. Of the data collected from 17 respondents in Foug Gleita, the representative prices were as follows: (1) minimum: 35 UM/kg; (2) lower quartile: 43 UM/kg; (3) median: 76 UM/kg; (4) upper quartile: 125 UM/kg; and (5) maximum: 400 UM/kg. Based on this information and the time series price data of cabbages in major markets of Mauritania, obtained from the VISA (Valorisation de l'Irrigué pour la Souveraineté Alimentaire) project (conducted by the Spanish Agency for International Development Cooperation), it was estimated that after A/P implementation, the average selling price of cabbages among Foug Gleita farmers could reach the level of the current upper quartile (i.e., 125 UM/kg).
4. For the current revenue, area cultivated times yield times price does not equal value of production, because each of these values are the median for each variable among the respondents and the number of respondents who provided viable answers were different across the variables.
5. The data source is CNRADA.
6. Because of lack of information, it was assumed that cabbages need the same unit quantity of TSP and agricultural chemicals as onions.
7. [Transport cost from farm to storage place] + [Transport cost from storage to Foug Gletia market].

**Table A6.4 Estimation of Household Annual Budgets for Producing Carrots in Foug Gleita Before and After A/P Implementation**

(UM/household/year, unless otherwise specified)

		Current	After A/P implementation	Difference	Remark
Area (ha/household/year)		0.031	0.025	-0.006	1
Revenue	Yield (kg/ha)	13,352	30,000	16,648	2
	Production (kg)	144	750	606	
	Price (UM/kg)	148	206	58	3
	<b>Value of production</b>	<b>24,703</b>	<b>154,500</b>	<b>129,797</b>	<b>4</b>
Seeds	Quantity (kg/ha)		4		5
	Price (UM/kg)	10,800	10,800		
	Cost	600	1,080	480	
Urea	Quantity (kg/ha)		250		5
	Price (UM/kg)		200		
	Cost	400	1,250	850	
TSP	Quantity (kg/ha)		300		5
	Price (UM/kg)		160		
	Cost	280	1,200	920	
Agricultural chemicals		0	1,475	1,475	5
Water		0	0	0	
Bags	Quantity (bags/ha)		480		
	Price (UM/kg)		120		
	Cost	276	1,440	1,164	
Transport	Quantity (bag/ha)		480		
	Price (UM/kg)		175		6
	Cost	403	2,100	1,698	
<b>Total cost excluding labor</b>		<b>1,959</b>	<b>8,545</b>	<b>6,587</b>	
<b>Profit excluding labor</b>		<b>22,745</b>	<b>145,955</b>	<b>123,210</b>	

Source: Agricultural household survey, conducted by the JICA study team (2009), unless otherwise specified

1. The cultivated area after A/P implementation (0.025 ha) is a targeted rather than estimated value.
2. The yield after A/P implementation was estimated based on the yield of carrots obtained in the verification trials, conducted by the JICA study team.
3. Many farmers reported that the selling price of vegetables fluctuated much. Of the data collected from 20 respondents in Foug Gleita, the representative prices were as follows: (1) minimum: 55 UM/kg; (2) lower quartile: 94 UM/kg; (3) median: 148 UM/kg; (4) upper quartile: 206 UM/kg; and (5) maximum: 500 UM/kg. Based on this information and the time series price data of carrots in major markets of Mauritania, obtained from the VISA (Valorisation de l'Irrigué pour la Souveraineté Alimentaire) project (conducted by the Spanish Agency for International Development Cooperation), it was estimated that after A/P implementation, the average selling price of carrots among the Foug Gleita farmers could reach the level of the current upper quartile (i.e., 206 UM/kg).
4. For the current revenue, area cultivated times yield times price does not equal value of production, because each of these values are the median for each variable among the respondents and the number of respondents who provided viable answers were different across the variables.
5. Because of lack of information, the unit quantities were assumed to be the same as those for onions
6. [Transport cost from farm to storage place] + [Transport cost from storage to Foug Gletia market].

**Table A6.5 Import Parity Price of Rice**

	US\$	UM
Thailand, 100% broken A.1 Super, FOB Bangkok (/ton) *1	477.48	
Ocean freight and insurance *2	+ 52.13	
CIF price at Nouakchott	= 529.61	
UM equivalent (/ kg) (US\$1 = UM265.4)	=	140.56
Port charge, handling, and storage (10%) *2	+ 14.06	
Price at port gate	= 154.62	
Transport (project site – Nouakchott) *2	– 4.66	
Price at farm gate	= 149.96	
Milling charge *3	– 14.29	
Milling efficiency *3	× 0.7	
Price (paddy, /kg)	= 94.97	

Note: All the prices are adjusted to constant prices in 2010, using Consumer Price Indices derived from (1) the website of International Monetary Fund, World Economic Outlook Database, April 2010; and (2) Office National de la Statistique, March 2010.

\*1 World Bank, Commodity price data, average Jan-May 2010

\*2 Based on APD

\*3 Based on data collected during the survey by JICA study team

**Table A6.6 Import Parity Price of Urea**

	US\$	UM
Urea, bulk, spot, FOB Black Sea (/ton) *1	337.37	
Ocean Freight and insurance *2	+ 33.05	
CIF price at Nouakchott	= 370.42	
UM equivalent (/ kg) (US\$1 = UM265.4)	=	98.31
Port charge, handling, and storage (10%) *3	+ 9.83	
Price at port gate	= 108.14	
Transport (project site – Nouakchott) *3	+ 4.66	
Price at farm gate	= 112.8	

Note: All the prices are adjusted to constant prices in 2010 using the Consumer Price Indices derived from (1) the website of International Monetary Fund, World Economic Outlook Database, April 2010; and (2) Office National de la Statistique, March 2010.

\*1 World Bank, Commodity price data, average Jan-May 2010

\*2 Based on APD, including estimation based on the available data

\*3 Based on APD

**Table A6.7 Import Parity Price of TSP**

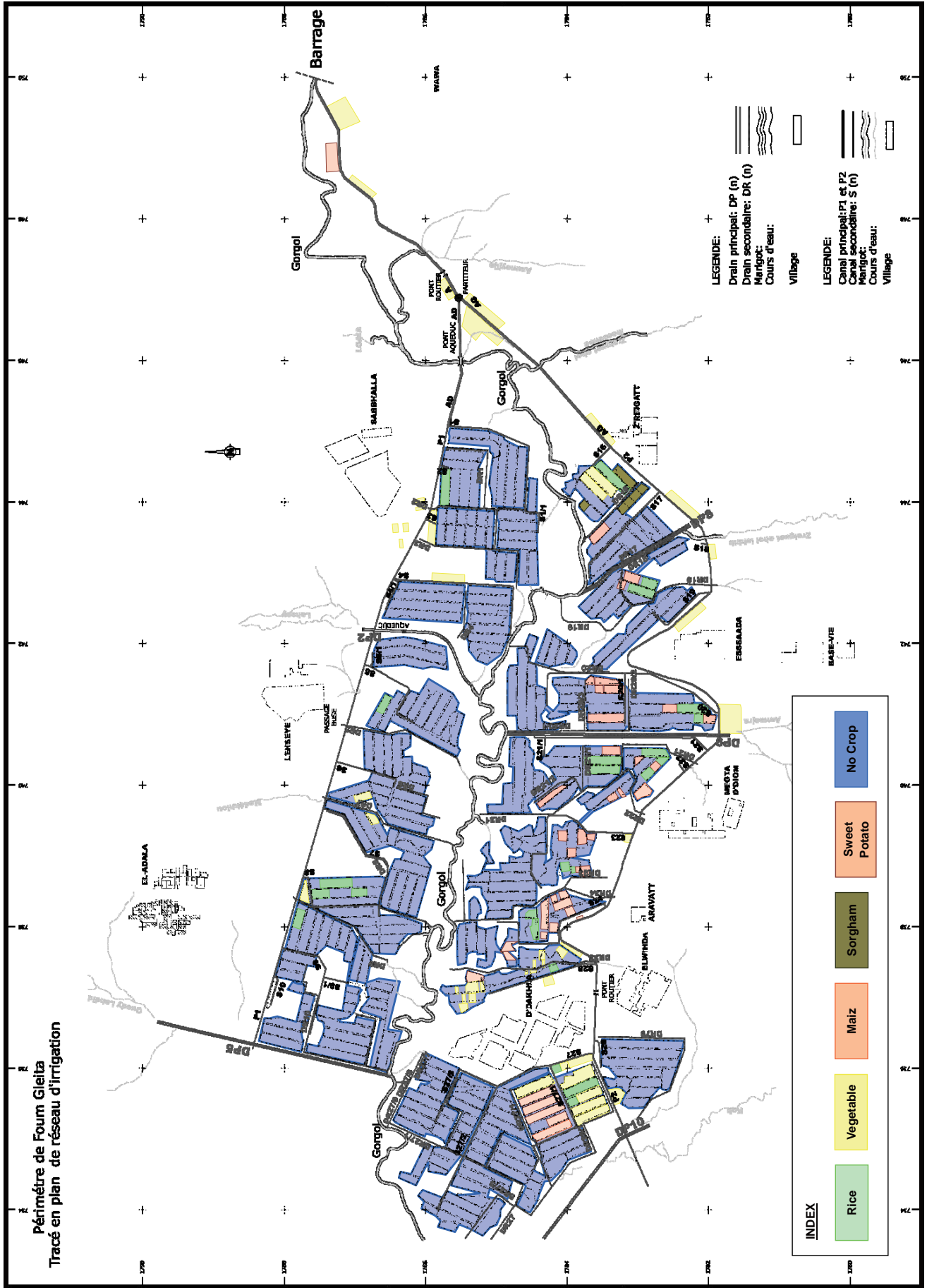
	US\$	UM
TSP, Tunisian, granular, FOB (/ton) *1	426.83	
Ocean Freight and insurance *2	+ 22.52	
CIF price at Nouakchott	= 449.35	
UM equivalent (/kg) (US\$1 = UM265.4)	=	119.26
Port charge, handling, and storage (10%) *3	+ 11.93	
Price at port gate	= 131.19	
Transport (project site – Nouakchott) *3	+ 4.66	
Price at farm gate	= 135.85	

Note: All the prices are adjusted to constant prices in 2010 using the Consumer Price Indices derived from (1) the website of International Monetary Fund, World Economic Outlook Database, April 2010; and (2) Office National de la Statistique, March 2010.

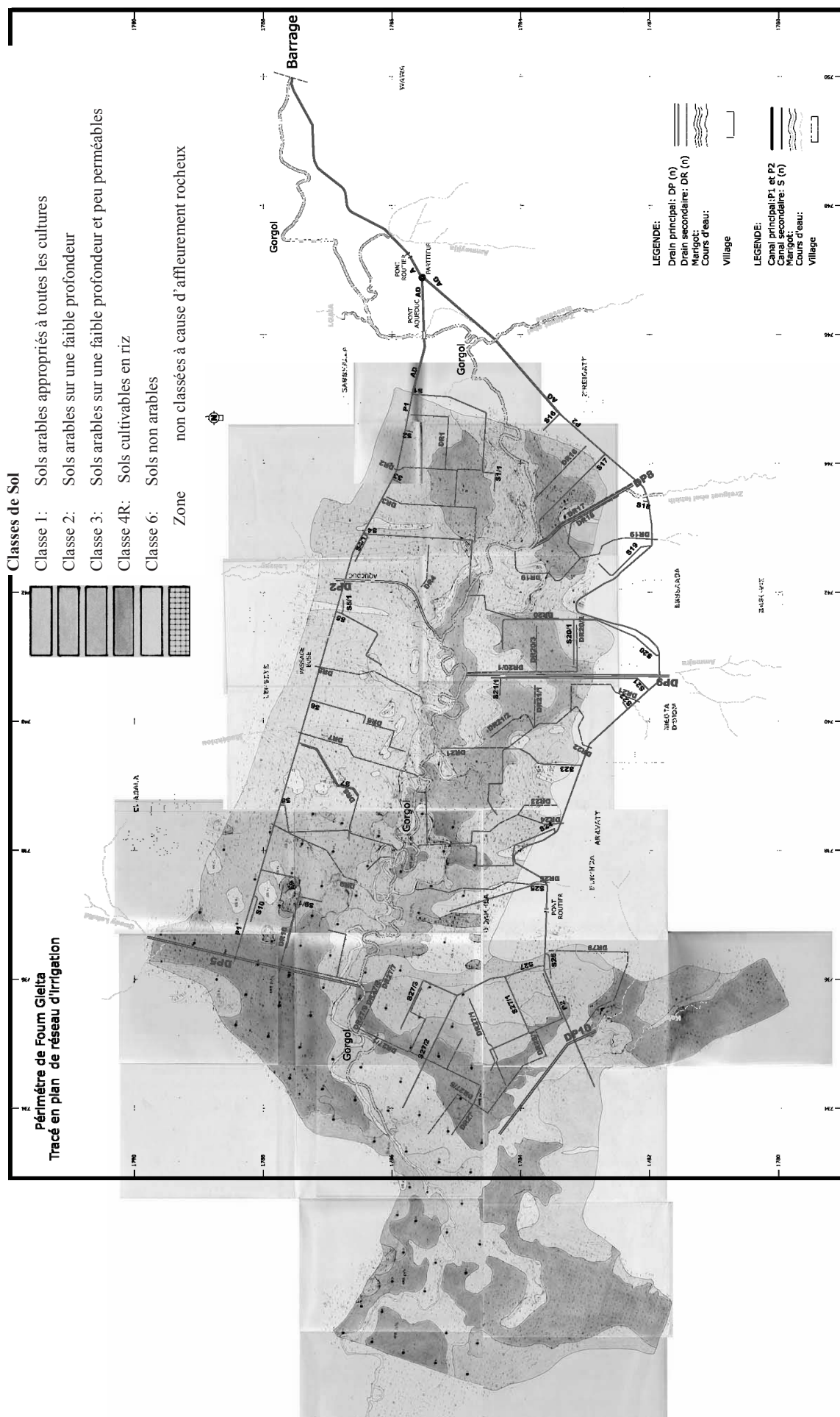
\*1 World Bank, Commodity price data, average Jan-May 2010

\*2 Based on APD, including estimation based on the available data

\*3 Based on APD



ANNEX 7 MAP OF EXISTING CROP CULTIVATION AREA IN FG IN 2007-08



(Ref : Aménagement Hydro-Agricole du Gorgol Noir, Etude Agro-Pédologique, 1977)

## ANNEX 8 SOIL MAP OF THE PROJECT AREA

## ANNEX 9 BUDGET DETAILS OF SONADER

Unit: Million UM

Resource		2007			2008 (Plan)		
Project	Source	Investment	Current	Total	Investment	Current	Total
Various	RIM <sup>*1</sup> -CP <sup>*2</sup>	65	421	486	-	-	0
Various	RIM-CP Projects	922	110	1,032	-	-	0
Various	RIM				50	408	458
Various	Revenue	64	1	65	74	130	204
Various	Revenue from CGEMAT				-	63	63
Various	IDB <sup>*3</sup>	1,597	21	1,618	3,241	26	3,267
Various	IFAD <sup>*4</sup>	1,748	77	1,825	1,385	72	1,457
Various	AFD <sup>*5</sup>	196	48	244	111	1	111
Various	NTF <sup>*6</sup>	390	-	390	701	-	701
PDIAIM	World Bank	748	48	796	835	43	877
	RIM-CP				105	6	111
PAHABO <sup>*7</sup>	AfDB, IDB	16	6	21	17.4	-	17
	RIM-CP				316	1	317
PGIRE <sup>*8</sup>	World Bank	434	-	434	2,405	-	2,405
	OMVS				4	1	5
PRPB <sup>*9</sup>	RIM-CP				76	21	97
PRM	RIM-CP				76	22	98
PACDM <sup>*10</sup> II	RIM-CP				158	5	163
Various	Beneficiaries	13	-	13	26	-	26
Total		6,194	732	6,926	9,579	799	10,378
RIM : Donor		1,596 : 5,330 = 0.30			1,536 : 8,842 = 0.17		

Note ; \*1 Islamic Republic of Mauritania

\*2 Counterpart

\*3 Islamic Development Bank

\*4 International Fund for Agricultural Development

\*5 Arabic Fund for Development

\*6 Nigeria Trust Fund

\*7 West Brakna Irrigation Scheme Project

\*8 Integrated Water Resources Management Program

\*9 Rehabilitation of Small and Medium Irrigation Scheme in Brakna

\*10 Maghama Improved Flood Recession Farming Project

Source: SONADER



## **ANNEX 10 SURVEY RESULTS: WHY THE FARMERS LEFT FARMING IN FG?**

### **A10.1 Introduction**

The dam across the Gorgol River, constructed with funding from a variety of donors in 1984, created a large artificial lake with a normal retention capacity of about 500 MCM of water. This enables gravity irrigation of the land at the downstream side. The distribution of plots of 0.5 ha and construction of some infrastructures for the farmers was a kind of compensation for the damages caused by the construction of the dam, which has flooded some villages and rain-fed farming areas. By 1989, the infrastructure was in place to irrigate 1,950 ha of land for rice cropping. Initially, the yields were reasonable (4.6–5.2 t/ha), but then declined to 2.7–4.6 t/ha in 1992–1996. By 1993, some 237 ha was already been abandoned by farmers. This survey focused on the main reasons why the farmers have abandoned the farms; and in case there is any rehabilitation of the perimeters, if they are ready to come back.

### **A10.2 Questionnaire Survey**

A questionnaire survey was conducted in three phases: the identification of key persons to be interviewed, the constitution of areas to be surveyed and the interview of the identified farmers.

#### **(1) Identifying of Key Persons**

This phase has consisted on identifying the persons to be interviewed. Mainly two essential information was considered: the names of the farmers who left, and their actual villages. To these two main information, the name of the cooperatives they belong to and the number of their vannettes (area) were added. The above information was collected through discussion with the presidents of cooperatives, notabilities and extension workers. Through these discussion, the database including the name of the farmer, his actual village, the number of his vannette and the name of his cooperative was established. Interviews with extension workers and especially the presidents of cooperatives were very helpful, since they know very well of the farmers present conditions.

#### **(2) Areas to be Surveyed**

Based on the information from the farmers and extension workers, the areas to be surveyed were divided into three according to the same geographical area. The idea was to make it easier for the trip survey and at the same time to save my time. The three areas are the villages located in the Southern area (P2), those located in the Northern area (P1) and those located in N'Bout area. Unfortunately, the Northern area could not be surveyed, because of flood, and all the accesses were locked. However, during the survey in M'Bout, it was fortunate to meet some farmers who were supposed to be met in the Northern area. However, only a few villages around the dam side were visited, and some farmers were interviewed.

#### **(3) Interview of Key Persons**

After the identification of key persons, the interviews were held with farmers of different villages. During that interviews, all the farmers identified as key persons could not be found. Some farmers were just absent or have moved to another village. It was necessary to start another identification survey on the spot to replace the missing ones.

The approach was simple, and consisted on establishing an atmosphere of confidence in order to be sure that they will give us right answers. Before starting any interview, the purpose of our survey was

explained so that the farmers understand that the purpose of the survey. Totally, 30 farmers were interviewed.

The interview took about 1 hour for one farmer according to his capacity to understand the questions or to give accurate answers. Sometimes, the same question has to be asked many times and in various ways in order to allow the farmer to understand. In order to be sure that the same answers caused by group influence during the interview, individual interview was made by visiting the farmers in their living places.

### **A10.3 Results of the questionnaire survey**

The following results were attained from the survey:

#### **(1) Reasons why they left irrigated perimeters of Foum Gleita**

Concerning the reasons why they left the rice growing project area of Foum Gleita, the processing of the data revealed three main reasons. The reasons are mentioned below by order of importance:

- Payment of fix fee
- Rice growing is no more profitable with low yields
- Lack of water

Besides those three main reasons, the farmers expressed some other reasons. Those reasons are birds attacks, invasion of Typha and Indigo fera, bad management of SONADER and UCAF and one of the farmers even mentioned about Guinea worm disease as the main reason why he left Foum Gleita. The chart below shows clearly the number and the percentage for the main reasons.

**Table A10.1 Reasons for Leaving Foum Gleita Project**

<b>Reasons</b>	<b>Number</b>	<b>percentage</b>
Payment of fixed fees	15	50%
Rice growing is not profitable	07	23.33%
Lack of water	06	20%
Because of Guinea worm disease	01	3.33%
Plot taken from him by SONADER	01	3.33%

Note: these numbers and percentages are based on a sample of 30 farmers.

#### **(2) Going back after rehabilitation**

To this question, almost all the farmers are ready to go back after rehabilitation you will find in the chart below the number and the percentage

**Table A10.2 Possibility of Returning Back to Foum Gleita Project**

<b>Answers</b>	<b>Number</b>	<b>percentage</b>
Of course	22	73.33%
Possible	07	23.33%
If main reason cleared	01	03.03%
Probably not	00	0%
Never	00	0%

Note: these numbers and percentages are based on a sample of 30 farmers.

#### **(3) Land certificate**

Land certificate is a sensitive matter to discuss. Nevertheless, the big majority of the interviewed farmers said that they still have land certificate, which was the right to cultivate. The chart below shows the number and the percentage

**Table A10.3 The number and the percentage of land certificate holders**

Answers	Number	Percentage
Yes	16	55.33%
No	04	13.33%
Not sure	10	33.33%

Note: these numbers and percentages are based on a sample of 30 farmers.

#### **A10.4 Analysis of the results**

##### **(1) Reason why they left Foun Gleita**

###### **a) Fixed fee**

When did they start to pay the fixed fee? Nobody was able to give to me the right answer. Some farmers said that it was just after their first rice growing campaign that was around 1985- 1986; the other said that it was just after the two rice growing campaigns of 1987-1988. These different answers are understandable as the settlement of the perimeters started from 1984 up to 1989. The fixed fee was introduced by SONADER during those different settlements.

By introducing fixed fees, SONADER was thinking about the creation of maintenance fund. Indeed, the maintenance of the infrastructures in the perimeters was a crucial issue for the sustainability of the perimeters for rice growing.

The farmers were asked to create cooperatives, and then SONADER has decided that each farmer should pay 8,350 UM for one vannette (1 plot of 0,5ha). As they were doing two campaigns, the total amount was 16,700UM. That money should be collected by the responsible of cooperatives and paid to SONADER. That fund would be used to pay maintenance work. Everything was working properly up to years 90's when the farmers started to abandon the plots because of fixed fee. If some farmers left because of fixed fee, then the motivations were not the same, and there were three categories.

- Those who left just after the introduction of fixed fee, were not real farmers (breeders, traders and even civil servants), and they just wanted to take benefit from the advantages made by SONADER and the World Bank to settle the farmers in the project area.

Those advantages were:

- SONADER was providing seeds, fertiliser and water for free during 1 or 2 years
- World Bank was providing 4bags of millet, 1 carton of bottle of milk, 10kgs of powder milk and 15l of cooking oil for each farmer (1 vannette). During the survey, it was noticed that sometimes a whole family was registered and each of the family members has a vannette which that means a big amount of food for the same family.

This category of farmers has left the perimeters in proportion as the Work Bank stopped its program and SONADER stopped its no-charge service mainly from 1986 up to 1989. And these category of farmers left Foun Gleita at this period.

- Those who left because their plots were taken by SONADER due to the fact that they did not pay the fixed fee. This category left from 1991 to 1994. The mentioned periods are very important to understand why farmers left FG farming.
  - In 1991, SONADER Director was strict regarding the payment of fixed fee. The farmer had to pay the fixed fee or his plot would be taken from him. 1991 is also the beginning of low production after five years of rice growing. The farmers were not using basic fertilizer (TSP) or the recommended amounts of top fertilizers. SONADER was insisting on the importance of using TSP but only few of us were using it. So they could not get a good production. In addition to that, some areas were stony to make a good ploughing and as a result they could not have good

production as a consequence, they could not pay the fixed fee and other expenses related to rice production.

- The year 1994 was marked by two major events: the flood and the invasion of rats. The farmers have lost all their production. Many of them were ruined, and unfortunately they could not pay the fixed fee.
- Those who left because they were forced by SONADER to pay the fixed fee for the entire members of the cooperative. SONADER stopped the water even if some farmers paid their fix fees. During the interview, the farmers explained that they could not understand why they have to suffer from the bad behaviour of those you did not pay the fixed fee. The farmers asked SONADER to close the intakes of those who did not pay the fix fee, as one of SONADER Director was doing (1991-1992). SONADER refused and as a result, the production was decreasing year after years, and the farmers could not pay the fixed fees regularly and finally they left (1997-2003). From 1997 to 2003 they suffered from another flood and the deterioration of the canals (big break in 2003). This category was composed of good farmers and they were not happy with SONADER and UCAF management. They were ready to pay fixed fee and they understand the importance, but they need guarantees for its proper management.

#### **(b) No benefit from rice growing**

The second reason mentioned by the farmers is that rice growing was not a good business, as they could not have good benefit. They explained that the rice growing at the beginning was good, and they had profits even though the price of the “Moud” (unit of measurement use by the farmer, and 1 “Moud” is equal to 4kg of paddy) was 25 to 60UM, they had enough yield (4t to 5t) to pay all the other expenditures (seeds, fertiliser, fixed fee) related to rice growing. Unfortunately, those expenditures were increasing every year and at the same time, the production was decreasing (see chart annexed).

Some farmers did not want to give up hoping that the situation will improve. They used their savings and even sold their livestock in order to continue rice growing. But the situation worsened and they were forced to leave:

- flood (1994-1999-2007),
- damages of the irrigation infrastructures ( from 2003 up to now)

During the survey, another group of farmers was found. They were not landowners, but they were growing rice and after harvesting, they have to give nearly 60% of the production to the landowner. With the remaining 40%, they have to pay back seeds, fertiliser, fix fee and feed their family. So, it means that it was impossible for them to have some profit from rice growing even with 40% of production.

The farmers explained that some of them were ruined by the system called “Thalasse”. That system consisted on borrowing money from someone (generally traders) to start rice-growing campaign and after harvesting, the entire production needs to be sold to that person at a very low price comparing to the normal one. Sometimes, the production was very good, but because of the low price, the farmers could not have any profit.

For the farmers, the conjunction of all those constraints (the high price of inputs, the bad practices of some landowners and traders, the bad maintenance of irrigation infrastructures...) have made rice growing as not a lucrative activity.

#### **(c) Lack of water**

Farmers mentioned that the lack of water is one of the main reasons why the farmers left Foug Gleita. The lack of water does not mean there is no water but water is not coming up to their plot or even if it is reaching their plot, the amount is not sufficient enough to irrigate properly.

Here the core problem is the maintenance of the irrigation canals which after many years of bad maintenance are not able to irrigate properly to the whole perimeter.

Concerning the maintenance, the farmers said they were paying regularly fixed fee, when SONADER was taking care of it, and everything was working properly. But, when SONADER has decided to hand over to UCAF all collapsed. “We were paying the fixed fees, the canals were not maintained and SONADER was not saying anything to UCAF about its bad management” said one farmer. Some of the farmers believe that UCAF and SONADER were using their money for their personal comfort.

## (2) Coming Back after Rehabilitation

All the interviewed farmers are interested to return back after rehabilitation. But, it needs to be understood that the motivations are not the same.

The farmers will return back, because they are now doing rain-fed farming, which deeply depends on rain. But, when they were cultivating within Foug Gleita perimeters, water was available at anytime. And, they could cultivate for two seasons, which is not possible in rain-fed farming. Hence, these farmers will come back after rehabilitation and they will stay.

The other group will come mainly not for cultivating rice but they have the feeling that the plots belong to them.

## (3) Conclusion

When the reason for the farmers leaving Foug Gleita farming was analyzed, there was only one main key word: bad management of the project area. Who to blame? The farmers who were not able to manage properly their plot (bad knowledge of rice growing, neglect of their own irrigation canal which has led to their deterioration)? UCAF which were not prepared and properly trained to manage the cooperatives and as a result it spoiled everything. SONADER did not monitor properly on UCAF management of the cooperatives. The farmers are ready to come back but they need guarantees that UCAF and SONADER management will be improved and transparent.

### Fluctuation of paddy yield in Foug Gleita

Source: Framers and Extension Workers  
September 2009

The unit of measurement is 1Moud  
(1Moud is equal to 4kg).

- In 1984 the yield was interesting (4.8 t/ha) because it was the beginning and everything was working properly.

- In 1994, the perimeters were flooded and invaded by rats; the production was almost lost. Some farmers had 0kg

- In 2008, UNCACEM has reactivated its loan and the farmers could have seeds, and fertilizers on time, and the production was good.

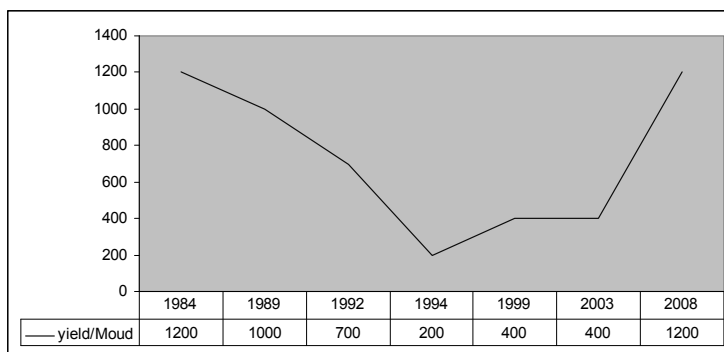


Fig.A10.1 Paddy yield in Foug Gleita

### Fluctuation of paddy price in Foug Gleita

Source: Framers and Extension Workers

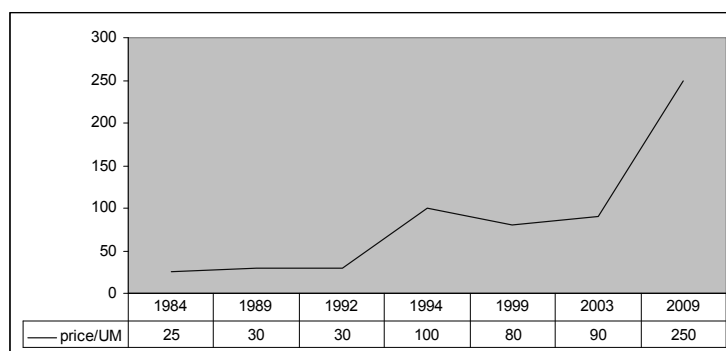
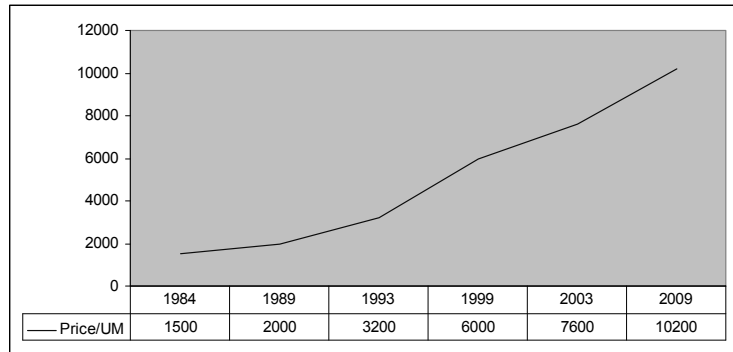


Fig.A10.2 Paddy price in Foug Gleita

In the beginning in order to encourage farmers, the Food Security Office and SONIMEX (National Company for Import and Export) were buying the production of the farmers at a very interesting price: 12.5UM/kg X4kg= 50UM/Moud instead of 30UM in the market. The farmers said they stopped suddenly; may be due to lack of budget.

### Increasing Trend of the price of fertilizer

Source: Framers and Extension Workers



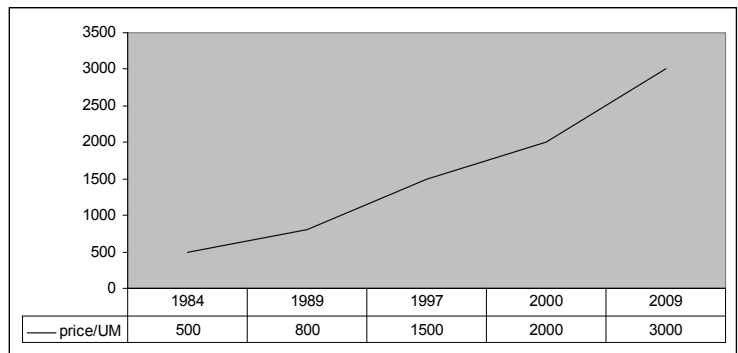
**Fig.A10.3 Price of Fertilizer**

### Increasing of the price of labor in Foug Gleita

Source: Framers and Extension Workers  
September 2009

The plot of 0.5ha is divided into 6 small plots and the prices are mainly for 1 small plot. That is to say for example: ploughing is 2,000UM, transplanting 2,000UM and weeding 2,000UM.

The price suddenly increased in 1997-1998, because of the reinsertion program of young trained agronomist in the Foug Gleita project. At that time, the state was injecting a lot of money.



**Fig.A10.4 Price of Labor**

Note: The numbers used might not be accurate, they are not far from the reality, and the shape of the curves reflects the true situation of rice growing in Foug Gleita.

## ANNEX 11 ACTIVITY OF WOMEN'S COOPERATIVE IN FOUM GLEITA IRRIGATION SCHEME

<b>1. Objective of Survey</b>
<p>Some women have started vegetable growing in some part of the scheme, since it was established. SONADER had organized women's cooperatives, eventually, 49 cooperatives were established.</p> <p>When irrigation scheme was functioned, cooperative's field was inside (some of the cooperatives paid land fee or irrigation fee). Once irrigation facilities were not functioned, cooperatives looked for other fields which could get enough water and they have been growing vegetables.</p> <p>Rice yield in dry and rainy season has been going down due to water shortage, vegetable growing is placed as a valuable income.</p> <p>The cooperatives have a lot of problems on low yield and low income because of providing a very few support on procurement of input, growing techniques and marketing, etc.</p> <p>Then interview was conducted the following contents to grasp problems and issues.</p> <ul style="list-style-type: none"> <li>●Activities of Women's cooperatives in the scheme</li> <li>●Seeing Relations between UNION and SONADER's activities through women's cooperatives</li> </ul>
<b>2. Methodology</b>
<p>Presidents of women's cooperatives and members were selected at random in P1 and P2 site, interviewed about reason for vegetable growing, relation with SONADER and UNION, etc.(Table 1)</p>
<b>3. Results (Selected 28women in 25cooperatives)</b>
<b>1) Land acquisition</b>
<p>Most of cooperative which had own field inside of the scheme at the beginning had give up growing, then moved to outside. Accordingly, there were following problems; canals damage caused water shortage and encroaching live stocks in the field.</p> <p>On acquiring a field of outside, farmers borrowed abandoned field inside or outside field with water. In case, inside of a field, farmers paid irrigation fee or land lease charge, when canals were functioning. Being lost function, farmers stopped payment.</p> <p>Average field size of a cooperative was 3.2ha, maximum was 20ha, and minimum was 0.5ha. Not only cultivated all area, but cultivated area is changed by participants and condition of input quantity every year. (Figure 1)</p>
<p>Remarks: Farmers weren't awareness of land right and location of their fields, then they don't remember clearly past condition.</p> <p>It seems that SONADER permitted or kept quiet about land lease issue.</p>
<b>2) Purpose of vegetable growing</b>
<p>More than half answered about vegetable growing to get better income. Others answered about it to get into vegetable growing with trained by SONADER or activities by NGO. And they changed their original jobs (ex. rice production, daily) into vegetable growing. Some were influenced neighbors and then began growing vegetable. As a result, vegetable growing is known for an important source of income for farmers. Moreover, they realized that vegetable brings better income than rice.</p> <p>Average growing experiences have been for around 16years, maximum 25years. Vegetable growing already started, since scheme had completed.(Figure 2)</p>
<p>Remarks: Farmers didn't have any opportunity to get new knowledge and technology; consequently, their technical level hasn't been improved though they have been lots of experience.</p>
<b>3) Farming technology</b>
<p>Vegetables are cultivated mainly in cold dry season. Many cooperatives cultivate almost same varieties of vegetables, such as Onion, Cabbage and carrot. Onion is the most popular in this area, which have well for preservation.</p>

<p>On the other hand, in rainy season, each cooperative has a different activity, some cultivate sweet potato, okra and pumpkin, etc, and the others don't cultivate anything and concentrate on cereal production. And remains take enough rest. The reason why they don't cultivate in rainy season, live stocks grazed get in their fields, flooding, and help husband to cultivate cereals.</p>	
<p>Remarks: The reasons why farmers avoid growing vegetable in rainy season are caused issues in the scheme such as to get live stocks in the field and flooding.</p> <p>Taking a rest who answered means that women's work impact is bigger than man's (Women do all housekeeping, childcare, dry season farming, and rainy season as well). It is thought that livelihood improvement and farm work improvement are necessary for women.</p> <p>Asked variety name of vegetables to farmers, they grew them without knowing their variety name.</p> <p>Technology on onion they trained at past training was adapted widely in the scheme, and most of cooperatives multiplied seed at their field.</p> <p>It seems that cultivation technology and skills are same levels in interviewed cooperatives.</p>	
<p>M'bout, Fom Gleita, Kaedi and Selibaby are main markets. Problems are low producer price due to a concentration on production. There is no profit, selling in Fom Gleita, Kaedi and Lexseiba. Buyers sometimes come and purchase production at F.G.</p>	
<p>Remarks: Farmers sell most of productions, but as self consumption, they eat a little.</p> <p>They don't have transportation to markets. And their income is reduced with delivery cost and labor fee.</p>	
<p><b>4) Cooperative activities</b></p>	
<p>More than a half cooperatives established 10years ago, and there are over 30 members each cooperative, some are more than 100 members.</p> <p>Most of answers are the followings; purposes of establishment of cooperative are to advice from SONADER or to follow other cooperatives. Others responded that they expected advantage of organizing cooperative and realized effectiveness of communal work.</p> <p>Their activities are the following; vegetable growing is main activity, if cooperatives have excess cost (running cost), they try to do activities with expenses, like dyeing, stitch work(included in craft work), grocery shop management. SONADER conducted some activities, dyeing, and stitch work at some selected villages in first settlement. But most of villages gave up dyeing activity because of lack of materials (they were not available in their villages) and money.</p>	
<p>Remarks: Currently, dyeing activity has launched in part of villages as aid program. Some stitch works and crafts are sold in Fom Greita and M'bout.</p> <p>It is necessary to establish implementation system which is able to continue these activities.</p>	
<p>Cooperatives collect membership fee (for common fund) from each member of 90%. Common fund is spent for input purchasing for group, running cost of grocery shop management and personal loan. There are different systems about loan, one is to prohibit personal input loan, the other is to restart personal loan with reducing income.</p> <p>Concerning payback period and method, many of cooperatives consider personal matters, but when no payback without any reasons, penalty (withdraw a cooperative) set up in each cooperative.</p>	<p>Collection form:</p> <ol style="list-style-type: none"> <li>1. at participation</li> <li>2. at copping season only</li> <li>3. at regularly</li> <li>4. at participation and cropping season</li> <li>5. at participation and regularly</li> <li>6. at cropping season and regularly</li> </ol>
<p>Input (Seed, fertilizer, fencing) is purchased as follows procedures.</p> <ul style="list-style-type: none"> <li>• Person in charge will purchase; prepare money by each, then cooperative arrange them.</li> <li>• Person in charge will purchase; using loan by each, then cooperative arrange them.</li> <li>• Person in charge will purchase; prepare money from common fund.</li> </ul> <p>Person in charge go and buy to Kaedi, then she needs some expenses like travel cost, etc other than input.</p> <p>Most of the cooperatives answered that input is expensive and they don't have enough cost of input. Some of them answered they can't get input adequate time, being no stocks in a shop</p>	



occasionally.
Loan system of SONADER: Farmers didn't notice loan for vegetable growing, but some of them knew it. It wasn't clear whether cooperatives (women) got some benefit through loan or not. Women's cooperatives originally received only few input support compared with men's.
<b>5) Relation between cooperatives and SONADER</b>
<p>It seemed that SONADER promised basic infrastructures, like building clinic and school, housing (and field), drinking water, and for production activities like farm field, input support. But mainly activities were the following; provided lands, foods, agricultural training for some selected farmers, livelihood improving training for women. Only the part of village might be conducted high priority project, establishment of clinic and school and drinking water facility.</p> <p>Decreasing capacity of SONADER and facilities, SONADER lost farmer's trust and interest. Some farmers answered positively AVB gave them advices and sold them some seeds and visit regularly.</p>
Remarks: It seemed that SONADER implemented easier and lower cost programs such as training, food distribution.
<p>Farmer's obligation to SONADER (or Irrigation facility) is realized by farmers as payment of irrigation fee. Irrigation fee was paid on inside of fields (rice and partly vegetable fields), before broken canals. There are some gaps among interviewed farmers; farmers stopped payment around in 2000 with damaged canals heavily.</p> <p>Concerning the question we asked farmers if canals will be rehabilitated in the future, they are going to pay irrigation fee with some conditions, for example being rehabilitated and being improved yield, etc.</p>
Remarks: Farmers recognized that payment of irrigation fee meant inside of rice field only. For vegetable field, cooperatives which didn't pay irrigation fee were more than did.
<b>6) Relation between UNION and cooperatives</b>
<p>2Unions have established for women's cooperatives same as men's so far.</p> <p>Out of one cooperative which doesn't participate in and 2 others (unknown for their condition) are participated in the Union.</p> <p>Farmers answered reasons for participation were on obligation of belonging to the Union, advice from SONADER, request from the Union, etc.</p> <p>Cooperatives paid membership fee at participation, but price was difference of each cooperatives.</p> <p>President of cooperatives relatively knew what roles of the Union are, they expected the Union to give them benefit (useful information, etc), loan and input providing.</p> <p>Many cooperatives answered they didn't get any benefit; however, few cooperatives received input in low price and input distribution service, though others received input and food distribution services. It means that the Union changed their handling.</p> <p>Cooperatives which answered there were no advantages to them had complaining to the Union and concerned cooperatives receiving some benefits.</p> <p>Union's activities are included in the followings; Income generation activity for the Union such as cereals (rice and millet) sales and instructive activities like consultation to cooperatives.</p>
Remarks: Many of inputs provide before are aid supply assisted directly by NGO and International organization.
Most cooperative feels that the Union isn't functioning well and not return any benefit to them. Accordingly, it is necessary to strengthen the Union's capacity building same as men's (rice).
<b>7) Technology extension</b>
<p>Most of the trainings which were provided at completion of the scheme are divided two types, one is contents of agricultural technology, and the other is out of farming income activities.</p> <p>AVBs are providing some training and advices irregularly on agricultural practices, but training of dyeing and stitch work is not conducted these days.</p> <p>Dyeing activity is much requested from women, it took cost for materials, and most cooperative couldn't continue this after training.</p> <p>Elder women had training experiences more than youth relatively. Young women have very few</p>

opportunity of training participation. Some answered that it is necessary to give a chance to have some training for young women.(Figure 3,4)

Remarks: Criteria of selecting were unclear about cooperatives which were conducted training. It is thought that reasons of selection were relative cooperatives, accessibility, well organized cooperatives, etc.

It is difficult to adapt technology and knowledge to farmers without regular training and follow up systems. It is thought that costly activities need not technical matters but management skills.

Concerning agricultural technology, agro processing is more high priority for farmers. It is expected that not only selling fresh vegetables but also increasing income and creating job opportunity with agro processing.

#### **8) Problems**

Farmers concerned seriously the following 4 problems; lack of input, pest and disease control, lack of fence, marketing.

Lack of input (specially purchasing money) is a serious problems included in putting fence facing many cooperatives. Secondly, it is necessary to treat pest and disease control.

Marketing needs to improve price decreasing due to concentrated on sales period and high transportation cost.

Remarks: Lack of input purchasing cost is constrained to get fence materials, pesticide and herbicide. Then expanded disease and live stocks damages cause a factor of low yield.

#### **5. Activity on Women's cooperative in M'bout and Moybrak areas (Results)**

##### **1) Cooperatives:**

As a reason of establishment of cooperative, farmers gave positive answered about it, such as creating work opportunity for women, working at self-standing, and effectiveness of communal work.

International organization and NGO (Red cross and PAM, etc) supported cooperatives to provide useful materials, fence and well at first of establishment.

Their activities are mainly vegetable growing, grocery shop, stitch work (leather craft), and dyeing and incense making as well.

##### **2) Union:**

Farmers expect the Union to arrange input, acquisition of land and instruct to cooperatives. In fact, the Union gives cooperatives only information and not to return any profit to them.

##### **3) Training:**

As for training, making fence, agro processing, sanitation program were conducted. At the same time, farmers requested wide needs, agro-processing, fruits growing, stitch work and dyeing, medical care and barber skills.

They suggested on needs for holding a regular training and a follow up training with their past experiences.

**Table 1 Questionnaire**

Date:	Time:		
Village:	Interviewee:	Age:	Family size:
<b>1. Basic Information</b>			
1) Where is your original place?			
2) How long have you lived here? (When settled)			
3) Which Cooperative do you belong to?			
4) How much field does your family have?      Are      Ha			
5) How about your field. Location of your and cooperative's field (inside of perimeter or not)			
●Family field                      ●Cooperative field			
6) How did you get your land? / When did you get your own land?			
●Family field                      ●Cooperative field			
7) Why do you grow vegetables? How long have you grown vegetables?			
8) What crops do you grow? (crops : Maize, Sorghum, rice, vegetables, etc)			
●Family field                      ●Cooperative field			
9) How many times do you grow crops?			
10) Where do you sell your productions?			
●Family field                      ●Cooperative field			
<b>2. Cooperative you belong to</b>			
1) When did you establish this cooperative? (Only President)			
How many members?			
2) Why did you establish it? (President) / Why did you participate in it? (Member)			
(Purpose of the establishment)			
3) What kind of activities does your cooperative do?			
(ex. Repair and clean the canals, land preparation, etc.)			
4) Are you satisfied with your cooperative? / Do you have any problems in the Cooperative?			
<b>3. SONADER</b>			
1) What supports SONADER did promise you, when you settled here?			
(ex. Ownership of land, Input, infrastructures likes school, clinic, well,)			
2) What activities SONADER conducted before broken perimeters?			
(Collection irrigation fee, canal maintenance, input management, training, etc)			
3) What activities SONADER do conduct currently?			
(Collection irrigation fee, canal maintenance, input management, training, etc)			
4) What is your obligation for SONADER?			
5) Do you pay irrigation fee? / When did you stop paying it? Why did you stop it?			
<b>4. UNION (for Women's)</b>			
1) UNION (your cooperative belongs) is private or under government?			
2) Why does your cooperative participate in UNION?			
3) What is the role of UNION ?			
4) What is the obligation/duty of UNION?      (pay irrigation fee, get input, etc)			
<b>5. Procurement of Input (Agricultural materials: seeds, fertilizer, etc)</b>			
1) How do you get input? (Through UNION, get it by her, get it by cooperative)			
2) In case, you can not return money, who (which organization) support you?			
<b>6. Other questions</b>			
1) About needs and experiences of training			
2) Do you have any problem and constrain ? (Farmer, breeder, etc)			
3) About your life style (about housework, what do you eat?, etc)			
4) Other comments			

**Table 2 In interviewed cooperatives List**

	Site	Existing Field	Cooperative	Members	Village	Ethnic
1	P1	Unknown	Tahar Agweida	80	Agweida	M: 1
2		S4 out	El Wihda	39	Sabhalla	P: 1
3		S2 out	Dar selam1	70	Sabhalla	M: 3
4		Unknown	Lebhga	34	Lehseye	M: 1
5		S5 in	Medeikhlou 1	40	Bagdada	
6		S5 in	Medeikhlou 2	×	Bagdada	
7		S5 in	Medeikhlou 3	×	Bagdada	P: 1
8		Unknown(S7or S8)	Lehseye	50	Bagdada	M: 2
9		S7	Yakare	×	Bagdada	
10		S8 (Same as other 3)	Dentadal yalalem	31	Adala	
11		S8	El hame	72	Adala	P: 1
12		S9? (S8)	Bentalre	62	Adala	M: 2
13		S8	Ghouwa	30	Adala	
14	P2	(S16 or 17 out)	Teissir	55	Zreighat hassen	M: 1
15		?	Nour	75	Zreighat wekech	P: 1
16		S19 out	Wihde Bedr	40	Foum Gleita	P: 1
17		S25 or 26	Weltare	125	Bachat center	M: 2
18		No field	Weltare Boki	145	Bachat center	P: 1
19		S25	Elhamarsidi	30	Bachat center	M: 2
20		S26 ?	El-Vedl	45	Bachat center	
21		S25	El wai 1	45	Bachat sud	
22		S26 out ?	Aridondi	71	Bachat sud	P: 5
23		S26 out ?	Yajende	60	Bachat sud	M: 1
24		S26 out ?	Potal	57	Bachat sud	
25	Other		El-Amelelyedewe	35	M'bout	
26			SAADA	80	M'bout	P: 1
27			Adala	89	M'bout	M: 1
28		Personal field	Gonga (own field in S9,8)	50	Moybrak	P: 1

**Table 3 Basic Information**

Birth place	M'bout	Lesseye	Agweida	Bagdada	Berkeleul	Sabahalla	Bogue	Wekech	Zreigato	Moybrak	Total
P1	6	1	1	2	1	1	1				13
P2	12					1		1	1		15
Others	3									1	4

Age	20's	30's	40's	50's	60's	Unknown	Total
P1	1	4	4	1	3		13
P2	0	2	6	3	3	1	15
Others	0	1	1	0	2		4

Reason for settlement	Befor Dam construction	Settlement program by SONADER	Settlement for doing agriculture	Marriage	Brank	Living in M'bout	Moved from F.G.	Living in Moybrak	Total
P1	5	4	1	1	2				13
P2	0	6	0	2	7				15
Others						2	1	1	4

Residence year	10~20years	21~40years	More than 41 years	Unknown	Brank	Less than 10 years	More than 11 years	Total
P1	3	5	3		2			13
P2	0	13	0	1	1			15
Others						1	3	4

**Table 4 Activity on Women's cooperative in Foum Gleita Irrigation schem (Results)**

Question No	Question & Answer	No. of Answers	Remarks
1-4	Field size of family	Blank	Abandoned field
		Used to have own field	
		Nothing	
		No idea	
		0.25ha	
		0.5ha	
		1ha	
1-4	Location of Family field	Blank	S10, S9 S1, S2, S7, S9, S16, S25
		Abandonment field(Inside)	
		Inside	
		Inside ( Location is unknown)	

1-2	Advice/support from SONADER or	Blank	12	
		Advice from SONADER	5	Only training and advice : No fund support
		Support from NGOs	4	NGO in Kaedi, funding, training
		Support from Other cooperatives	2	Woman's cooperative in Kaedi (fencing), Advice from Mauritania woman's
		Others	1	Advice from friends
1-3	Activity	Vegetable growing	28	
		Grocery shop	5	Meat sales, etc
		Stitch work	9	Craft (matt, pillow)
		Dyeing	5	Do activities in village Center
2-3	Activity on Vegetable growing (Check all that apply)	Blank	3	
		Holding a meeting before campaigning	23	Discussion of starting date, varieties of vegetables, quantity of input, input buyer,
		Putting fence	7	Fence preparation, materials purchase
		Cleaning canals	3	Only inside of a field and around a field
		Hire a labor	5	300UM/person, 4,000UM, 6,500UM (depend on works)
2-3	Membership fee	Blank	1	
		Payment only at participation	11	50UM, 500UM, 1,000UM
		Payment at participation and	4	
		Payment at campaigning at beginning or end	14	150UM, 300UM, 400UM, 600UM, 1,000UM, 1500UM
		Payment at regularly	10	20UM, 50UM, 100UM, 200UM, 500UM/3months,
		Before and after campaigning and	5	
		At participation and regularly	2	
		Stopped regular collection	2	Stopped regular collection, sales was decreased
2-3	With/Without Common fund	Blank	8	
		With	19	
		Without	1	
2-3	Management of Common fund	Running cost for Grocery shop	4	
		Procurement cost of input	4	
2-3	Loan system on Common fund	Blank	10	
		Loan acceptable	14	
		Emergency case only	2	
		impossible	2	
	(payback)	Payback from own sales	5	To raise amount of money by own, Payback money within 3months
		Release a debt if there are obvious reason like sickness	1	
5-1	Place to purchase	Blank	20	
		F.G.	2	
		Kaedi	6	
		Nouakchott	2	
		Seed production (Onion)	1	Produced seed by themselves (onion, okra, etc)
5-1	Loan system by SONADER /UNION	Blank	23	
		By UNION	1	Provided input, fertilizer, etc irregularly
		Loan (Seed, Fertilizer)	2	Collected loan by president of cooperative, then return it to SONADER Collected loan by AVB, managed by SONADER Lona, 6kg of seed, 7-10bags of fertilizer : SONADER made a decision of program
		Sold fertilizer	1	Don't know
		No loan activities	2	
5-1	In charge of input buying	Blank	12	
		Purchase by own	11	
		Purchase by cooperatives	5	Included in only cooperative's input
5-1	Problem on input procurement	Blank	22	
		Lack of fund causes of delaying to buy	5	
		No stock in Kaedi	1	
2-3	Bylaw (cooperative)	Payback about loan	4	Without reasons, to have to leave cooperative. Stop water to the field.
		Absence of activities	9	100UM, 200UM, 400UM, 500UM, 1200UM
2-3	Contribution of members	Blank	14	
		No problem	10	Good cooperation with mixed ethnic.
		To be broken regulation	2	Problems have been improved to participate in trial plot.
		Member's incentive	1	Few participants at the trial plot
		Shared work (Quantity of work)	1	To solved problems with discussion
2-4	Problems facing cooperatives on	Member's incentive	1	Some members join in cooperative's activities, but don't join in trial plot.
3-1	Condition, pledges at the settlement (Check all that apply)	Blank	1	
		Irrigation water	5	
		Input	7	
		Siphon (pipe)	1	
		Fence making	1	
		Tractor / Storage	6	
		Livestock for plough	1	
		Allocation of AVB	1	
		Training	1	
		Land distribution	8	
		Drinking water	7	
		Clinic / Hospital	12	
		School	13	
		Means of transportation	2	
		Electricity	1	
		Housing materials / tent	4	
		Don't know	1	
3-2	Performance of SONADER before broken canals (Check all that apply)	Blank	1	
		Irrigation water distribution	4	
		Training (vegetables)	5	
		Training (land preparation)	1	
		Training (Bird scaring)	1	
		Siphon (pipe) distribution	2	
		Seed distribution	1	
		Input loan	2	
		Maintenance of canals	1	
		Land distribution	8	Ivanet, Depend on the family size
		Food distribution	6	Distributed food aid from NGO after broken canals. Millet and oil for 2years, or 1 year, period was unclear.
		School	1	
		Clinic (by NGO)	2	
		Drinking water (by NGO)	2	Established by NGO, Water supply track
		Training (soup, stitch work, etc)	5	
		Nothing	6	
3-3	Performance on SONADER of current years	Blank	8	
		Irrigation water distribution	1	
		Nothing	19	
3-3	Performance on AVB	Blank	14	
		Instruction, advice at fields	11	Sometimes, Regularly (each campaigning), Conducted training, Seeds sales
		Never visited	3	

1-2	Advice/support from SONADER or	Blank	12	
		Advice from SONADER	5	Only training and advice : No fund support
		Support from NGOs	4	NGO in Kaedi, funding, training
		Support from Other cooperatives	2	Woman's cooperative in Kaedi (fencing), Advice from Mauritania woman's
		Others	1	Advice from friends
1-3	Activity	Vegetable growing	28	
		Grocery shop	5	Meat sales, etc
		Stitch work	9	Craft (matt, pillow)
		Dyeing	5	Do activities in village Center
2-3	Activity on Vegetable growing (Check all that apply)	Blank	3	
		Holding a meeting before campaigning	23	Discussion of starting date, varieties of vegetables, quantity of input, input buyer,
		Putting fence	7	Fence preparation, materials purchase
		Cleaning canals	3	Only inside of a field and around a field
2-3	Membership fee	Hire a labor	5	300UM/person, 4,000UM, 6,500UM (depend on works)
		Blank	1	
		Payment only at participation	11	50UM, 500UM, 1,000UM
		Payment at participation and	4	
		Payment at campaigning at beginning or end	14	150UM, 300UM, 400UM, 600UM, 1,000UM, 1500UM
		Payment at regularly	10	20UM, 50UM, 100UM, 200UM, 500UM/3months,
		Before and after campaigning and	5	
At participation and regularly	2			
2-3	With/Without Common fund	Stopped regular collection	2	Stopped regular collection, sales was decreased
		Blank	8	
		With	19	
2-3	Management of Common fund	Without	1	
		Running cost for Grocery shop	4	
2-3	Loan system on Common fund	Procurement cost of input	4	
		Blank	10	
2-3	(payback)	Loan acceptable	14	
		Emergency case only	2	
		impossible	2	
		Payback from own sales	5	To raise amount of money by own, Payback money within 3months
		Release a debt if there are obvious reason like sickness	1	
5-1	Place to purchase	Blank	20	
		F.G.	2	
		Kaedi	6	
		Nouakchott	2	
		Seed production (Onion)	1	Produced seed by themselves (onion, okra, etc)
5-1	Loan system by SONADER /UNION	Blank	23	
		By UNION	1	Provided input, fertilizer, etc irregularly
		Loan (Seed, Fertilizer)	2	Collected loan by president of cooperative, then return it to SONADER Collected loan by AVB, managed by SONADER
		Sold fertilizer	1	Lona, 6kg of seed, 7-10bags of fertilizer : SONADER made a decision of program
5-1	In charge of input buying	No loan activities	2	Don't know
		Blank	12	
		Purchase by own	11	
		Purchase by cooperatives	5	Included in only cooperative's input
5-1	Problem on input procurement	Blank	22	
		Lack of fund causes of delaying to buy	5	
		No stock in Kaedi	1	
2-3	Bylaw (cooperative)	Payback about loan	4	Without reasons, to have to leave cooperative. Stop water to the field.
		Absence of activities	9	100UM, 200UM, 400UM, 500UM, 1200UM
2-3	Contribution of members	Blank	14	
		No problem	10	Good cooperation with mixed ethnic.
		To be broken regulation	2	Problems have been improved to participate in trial plot.
		Member's incentive	1	Few participants at the trial plot
		Shared work (Quantity of work)	1	To solved problems with discussion
2-4	Problems facing cooperatives on	Member's incentive	1	Some members join in cooperative's activities, but don't join in trial plot.
3-1	Condition, pledges at the settlement (Check all that apply)	Blank	1	
		Irrigation water	5	
		Input	7	
		Siphon (pipe)	1	
		Fence making	1	
		Tractor / Storage	6	
		Livestock for plough	1	
		Allocation of AVB	1	
		Training	1	
		Land distribution	8	
		Drinking water	7	
		Clinic / Hospital	12	
		School	13	
		Means of transportation	2	
		Electricity	1	
		Housing materials / tent	4	
		Don't know	1	
3-2	Performance of SONADER before broken canals (Check all that apply)	Blank	1	
		Irrigation water distribution	4	
		Training (vegetables)	5	
		Training (land preparation)	1	
		Training (Bird scaring)	1	
		Siphon (pipe) distribution	2	
		Seed distribution	1	
		Input loan	2	
		Maintenance of canals	1	
		Land distribution	8	1 vanet, Depend on the family size
		Food distribution	6	Distributed food aid from NGO after broken canals. Millet and oil for 2years, or 1 year, period was unclear.
		School	1	
		Clinic (by NGO)	2	
Drinking water (by NGO)	2	Established by NGO, Water supply track		
Training (soup, stitch work, etc)	5			
Nothing	6			
3-3	Performance on SONADER of current years	Blank	8	
		Irrigation water distribution	1	
		Nothing	19	
3-3	Performance on AVB	Blank	14	
		Instruction, advice at fields	11	Sometimes, Regularly (each campaigning), Conducted training, Seeds sales
		Never visited	3	

3-4	Obligation to SONADER	Blank	3	
		Payment of irrigation fee	22	Payment of irrigation fee for rice only. No need to pay for vegetable.
		Nothing / Don't know	3	
3-5	Payment of Irrigation fee	Blank	3	
		Paid	24	For rice and own field ( for vegetable field was 2cooperatives )
		Without payment	1	
3-5	Year of Stop-payment	Blank	4	
		After broken canals	24	Gave up payment, since canals were broken. (paid 3, 4, 5, 6, 7, 9, 10, 11 years ago ), Payment period was different by concerned location and cooperatives.
3-5	Payment in the .Future	Blank	14	
		Ready to pay		Need rehabilitatoin , improvement of yield, inside of schem only , water will be available, etc :with some conditions
4-1	Name of belonged UNION	UNION F.G.	16	First established UNION
		Fatmousa	9	Established in 2003. Number of cooperative 27, Membership fee 5,000UM , Micro credit (borrowing:10,000UM payback:14,000UM) Grocery shop management, Sales of Sorghum and Rice are good profit.)
		Don't know	2	
		No participation	1	We don't have any benefit currently, then we left UNION.
4-2	Reason of the participation	Blank	5	
		Obligation of membership	14	Obligation of membership , all cooperatives must participat in , recommendation
		Advantage of UNION	1	
		Advice, Training	4	Other cooperative, advice and training from SONADER, Government
		Know each other	2	
		Member's decision	3	Well organized members, necessity of participation , commitment on UNION
4-2	Membership fee	Blank	9	
		UNION F.G.	11	4,000, 5,000, 6,000, 7,000UM, 1,000UM, 1,500UM
		Fatmousa	4	1,500, 1,600, 5,000UM
		Payment before	1	Price was uncertain.
		Don't know	2	We don't know how much we paid for UNION.
4-3	Role of UNION (Check all that apply)	Benefit distribution to cooperatives	13	Provided information and input from Government, Shop (Input) in F.G. , Communication with each cooperatie
		Handling loan and input.	4	Procurement of input, Loan program, Tractor lease, Set up the office
		Connection between Government and the cooperatives	1	
		Representative cooperative	1	
		Don't know	6	
		(Problems)	1	Some of cooperatives pocked benefit from UNION (unfair )
4-3	Benefit from UNION	Blank	5	
		Nothing	12	Some of cooperatives pocketed benefit from UNION, UNION is functioning, without any profit distribution. UNION keeps benefit by itself.
		Don't know	1	
		Distribution of input (current year)	6	Provided materials, fencing, foods, seed of onion and carrot
		Distribution of input (before year)	2	To sell seeds and fertilizer in low price. To provied input and fencing
		Others	3	Purchase rice in low price, changing price high, sell it., visiting and consulting problems on cooperative by UNION. Conducted some project by UNICEF
6-1	Training experiences (Check all that apply)	Blank	11(2)	
		Nothing	2(7)	
		Agricultural technology	2	
		Land preparation	2	
		Vegetable growing	5	
		Poultry	1	Gave up activity due to many disease
		Dried vegetable	1	Gave up activity due to canal damages
		Dyeing, Stich work	8	Supported by Cooperative in Kaedi and Ministry of Women
		Soup making	1	
6-2	Training (needs) (Check all that	Blank	1	
		Vegetable preservation	16	
		Dried vegetable	10	Use excess production effectively
		Seed production	5	
		Pest disease control	9	Weeds, rabbit
		Marketing	7	Sales place , Sales method, etc
		Fence making technology	17	Making fence, How to make mesh (fence)
		Putting fence	11	
		Making mesh fence	6	How to make mesh
		Stitch work , dyeing	23	Stitch work with sewing machine, If we will do this work (stich work), we want to
		Literacy education	2	
		Grocery shop management	1	
		Food processing	1	
		Balance (tools)	1	Buyers dicide selling price by themselves.
		Growing technology	1	
6-2	Problems /Constrains	Blank	14	
		Water shortage / Damaged Canal	2	
		Shortage of field size	1	
		Pest and disease	8	Wild animals/Livestocks, pest, termite
		Lack of input	10	Seed is expensive, fencing, balance, Watering can, etc agricultural materials
		Putting fence	7	
		Vegetable preservation	2	
		Lack of training opportunity	1	
		Marketing	4	Bias of sales period / Price down, Transportation cost / means
		Drinking water	2	
6-3	Living Life	Blank	10	
		Livestock	2	
		Farming	12	Sorghum, Miaz, Rice ( If water is available ), Stopped growing rice,
		Jobless / Retired	3	Parrents retired, Husband is jobless
		Driver and farming	1	Temporary farmers
6-3	Your(Women's) jobs	Blank	10	
		Farming	11	Farming, Family does housekeeping mainly.
		Farming and Housekeeping	6	Farming and food preparation
		Retired	1	My daughter works in farming.
		Heaviest jobs in all housekeepings?	7	Cooking is hardest work
6-4	Others comment			Preserve onion in tent for around 5months
				One of family is working in PAM as nutrition instructor.
				Spent income to children
				Vegetable growing is better than rice.
				Spent income to family.
				Sometimes help rice planting
		Canals were destroyed by trees before.		

**Table 5 Activity on Women's cooperative in M'bout and Moybrak (Results)**

Questionnaire No.	Question & Answer		No. of Answers	Remarks
1-4	Field size of family	3ha	1	We had a field in S21(F.G.). When we moved to M'bout, we went there.
1-4	Location of Family field			
1-8	Variety of crop	Sorghum Matze Nyebe (beans)		
1-10	Sales place	Blank Self consumption	3 1	
1-4	Size of original Field (Cooperative)			
1-4	Location of original field	Inside of F.G.	1	Settled F.G. in 1993, but moved to M'bout in 1994
1-4	Reason of leaving of the original			Gave up growing rice (Moybrak)
1-5	Size of actual Field	Blank Less than 1ha More than 1ha~ less than 3ha Over 3ha Unclear	 1 1 1 1	
1-5	Location of actual field	Inside of F.G.	1	We have our field in S9, 8
1-6	(Actual field) means to access to the	Blank Lease land Purchased Personal Property	1 1 1 1	Purchased our field in 2002. Committed 1,200UM each member.
1-7	Reason of starting vegetable growing	Blank Needs farm land to establish a cooperative	3 1	When established a agricultural cooperative, it needed farm land and farming.
1-7	Growing experiences	Blank 1~10years Within 11~20years Over 21years	0 1 2 1	
1-9	Main crop season	Cold dry season	3	
1-8	Vegetable (Main cropping season)	Onion Cabbage Carrot Okura Tomato Eggplant Sugar beat Chill pepper		
1-9	Rainy season cropping	Nothing Do	3 1	To help family field in rainy season.
1-8	Other cropping season variety of crop (Check all that apply)	Okura Ground nut Vissap Watermelon		
1-10	Place to sell (Check all that apply)	Blank M'bout Self consumption	1 2 1	Vegetable in F.G. is better quality than ours. Sell only excess production. small-scale
1-10	Transportation cost			
	Transportation cost per bag (UN)			
2-1	Cooperative Established year	Blank 1~10years Within 11~20years Over 21years	 2 2 2	
2-1	Number of Cooperative members	Blank Less than 30 members 31~Less than 60 Over 61	  2 2	
2-2	Reason of establishment (Check all that apply)	Blank Advice from SONADER Advantage of a cooperative To participate in trainings Ownership Other information / Advice No reason	  1  3  	Effectiveness of communal work To create working opportunity for women (wanted something to do, sold meat)
2-2	Advice/support from SONADER or	Blank Support from Government Support from NGOs Support from Other cooperatives Others	 1  3 1	Provided fencing, vegetable seed, advice from CNRADA expert Only information on supporting of NGO in Kaedi Training by UNICEF/PAM (sanitation), Support from Red cross (land, agricultural tools), Support from Food security office (well, fencing), Fo Support fencing
2-3	Activity	Vegetable growing Grocery shop Stitch work Dyeing Incense making and sales	4 3 3 1 1	Leather processing (matte), Stitch work with sewing machine
2-3	Activity on each activities (Check all that apply)	Blank Hold a meeting Participation in Farming Purchasing goods	1 3 1 1	Hold a meeting each activity group, annual meeting, Regular meeting at beginning of campaigning All members must participate in farming. Purchase goods at Nouakchott every 2-3months.
2-3	Membership fee	Blank Payment only at participation Payment at participation and Payment at campaigning at beginning or Payment at regularly Before and after campaigning and regularly At participation and regularly Stopped regular collection	     2 1	500UM at participation, 500UM irregularly / 200UM at participation, when needed, collect some. 4,000UM at participation and 200UM or 100UM monthly as fee
2-3	With or Without Common fund	Blank With Without	 4 0	



2-3	Management of Common fund	Running cost for Grocery shop	1	Sales uses as running cost of activities.
		Procurement cost of input	2	Sales ratio: 30% common fund, 70% each members, or 10% common fund, 90% each members
2-3	Loan system on Common fund			
5-1	Place to purchase	Blank	2	
		F.G.	1	
		Kaedi	1	
		Nouakchott	1	
		Seed production (Onion)		
5-1	Loan system by SONADER /UNION			
5-1	In charge of input buying	Blank	1	
		Purchase by own	0	
		Purchase by cooperatives	3	Purchase by cooperative with common fund or representative pay in advance
5-1	Problem on input procurement			
2-3	Bylaw (cooperative)	Payback about loan	0	
		Absence of activities	2	Penalty 500UM with absence 3times, if over 3times, leave a cooperative. Leave a cooperative: no refund membership fee Be forced to leave a cooperative: refund (to avoid trouble)
		Allocation board members	1	Micro-finance , President, Vice, Finance, Storage, Supervisor, etc positioning
2-4	Contribution of members	Blank	2	
		Nothing	1	
		Follow our leader	1	
2-4	Problems on facing cooperatives			
4-1	Name of belonged UNION	Blank	2	
		UNION Other UNION	1	Agro Pastoral Cooperation for the Improvement of the production
		UNION F.G.	1	(Moybrak)
4-2	Reason of the participation	Blank	4	
		Obligation of membership		
		Advantage of UNION		
		Advice, Training		
		Know each other		
		Member's decision		
4-2	Membership fee	Blank	1	
		UNION F.G.	1	5,000UM at participation and 2,000UM at meeting
		Other UNION	1	2,000UM at participation
		Payment before		
		Unknown		
4-3	Role of UNION (Check all that	Blank	1	
		Benefit distribution to cooperatives	1	Input and Land arrangement
		Instruction to Cooperatives	1	Instruction on cooperative management
		Connection between Government and cooperatives	1	
4-4	Benefit from UNION	Blank	1	
		Nothing	2	
		Provide information on supporting	1	Only information on vegetable training and well construction (but no action)
		Distribution of input (before year)		
		Others		
6-1	Training experiences (Check all that apply)	Blank	2	
		Nothing		
		Agricultural technology	1	Training on Making mesh fence by WFP
		Land preparation		
		Vegetable growing		
		Poultry		
		Dried vegetable	1	Training facilitated by Ministry of Agriculture
		Dyeing, Stitch work		
		Others	1	Training opportunity was very few, then we didn't acquire any skills.
6-1	Training (needs) (Check all that	Blank	2	
		Food processing	1	Vegetables produced in F.G. will process in M'bout, etc
		Stitch work , dyeing	1	
		Medical care	1	
		Barber skill	1	
		Fruits growing technology	1	
		Follow up after training	1	
		Regular training	1	
6-2	Problems /Constrains	Blank	3	
		Shortage of field size	1	
		Lack of fence	2	
		Low price of vegetables	1	Price is going down, flowing vegetables from F.G.
6-3	Living Life			
6-3	Your(Women's) jobs			
6-4	Others comment			Onion, cabbage, ground nut were produced last year. Flooding destroyed some facilities. Some project, school, sanitation, etc Expect to expand farming Our area withdraws water from river directly.

## ANNEX 12 RESULTS OF SURVEY ON FARM ECONOMY

**Table A12.1 Household Annual Budgets for Producing Rice among the Respondents**

(UM/household/year, unless otherwise specified)

		Foum Gleita					Lexeiba	PPG1&2			
		N.	Minimum	Mean	Median	Maximum	Standard Deviation	Median	Median		
Area (annual cumulative, ha)		15	0.3	1.3	1.0	6.0	1.4	1.3	2.0		
Revenue	Production (paddy, kg)	15	320	2,225	1,648	7,840	2,041	7,667	7,268		
	Selling price (paddy, UM/kg)	13	22	47	47	63	11	83	64		
	<b>Value of products</b>	<b>12</b>	<b>20,000</b>	<b>110,860</b>	<b>59,625</b>	<b>490,000</b>	<b>132,973</b>	<b>1,400,52</b>	<b>522,200</b>		
	Max. production (paddy, kg)	14	800	3,291	2,720	8,640	2,429	10,667	7,968		
	Min. production (paddy, kg)	15	160	1,255	960	3,520	1,167	1,088	2,851		
	Max. price (paddy, UM/kg)	10	28	61	63	109	20	89	94		
	Min. price (paddy, UM/kg)	9	17	32	31	47	10	80	56		
Cost	Material	Seeds	Quantity (kg)	15	13	41	32	115	30	51	88
			Price (UM/kg)	15	0	129	109	600	141	0	159
			Cost	15	0	5,087	1,875	19,800	5,631	0	14,000
	Urea	Quantity (kg)	16	50	218	150	1,170	270	400	600	
		Price (UM/kg)	15	150	195	200	240	28	150	173	
		Cost	15	10,000	39,383	24,000	234,000	54,911	64,000	103,800	
	TSP	Quantity (kg)	16	0	51	17	200	70	0	17	
		Price (UM/kg)	7	100	164	160	240	45	150	125	
		Cost	15	0	6,344	0	28,000	8,888	0	0	
	Agricultural chemicals		19	0	0	0	0	0	7,667	0	
	Water		15	0	0	0	0	0	68,933	66,610	
	Storage bags		14	771	4,477	3,366	14,000	3,724	17,113	16,800	
	<b>Total</b>		<b>15</b>	<b>13,675</b>	<b>55,250</b>	<b>49,881</b>	<b>255,514</b>	<b>59,191</b>	<b>163,180</b>	<b>212,850</b>	
	Labor	Land preparation	14	0	12,601	7,500	54,000	14,372	48,000	25,680	
		Nursery preparation	13	500	2,176	1,250	12,000	3,051	3,500	3,250	
Transplantation		12	3,000	24,486	13,000	123,750	34,859	28,000	22,500		
Weeding		13	2,750	26,423	15,000	75,000	24,319	34,667	49,375		
Bird control		10	15,000	49,333	48,750	105,000	30,827	35,000	52,500		
Animal control		13	28,000	111,962	82,500	300,000	89,585	65,000	43,125		
Harvesting/thrashing		13	4,000	42,135	28,250	198,000	53,322	70,500	78,625		
<b>Total</b>		<b>13</b>	<b>46,000</b>	<b>225,561</b>	<b>163,500</b>	<b>582,000</b>	<b>162,692</b>	<b>396,000</b>	<b>333,430</b>		
Transportation	9	0	5,592	3,125	23,500	7,366	0	11,750			
<b>Total excluding labor</b>		<b>13</b>	<b>15,829</b>	<b>60,675</b>	<b>37,511</b>	<b>259,886</b>	<b>64,585</b>	<b>163,180</b>	<b>221,850</b>		
<b>Total including labor</b>		<b>13</b>	<b>61,829</b>	<b>286,235</b>	<b>221,000</b>	<b>757,886</b>	<b>210,223</b>	<b>447,938</b>	<b>555,280</b>		
<b>Profit excluding labor</b>		<b>15</b>	<b>-214,886</b>	<b>53,719</b>	<b>20,700</b>	<b>405,375</b>	<b>136,942</b>	<b>387,862</b>	<b>259,673</b>		
<b>Profit including labor</b>		<b>15</b>	<b>-712,886</b>	<b>-200,586</b>	<b>-152,527</b>	<b>14,619</b>	<b>178,455</b>	<b>199,362</b>	<b>-137,065</b>		

N.: number of respondents in Foum Gleita who provided viable answers (Maximum 19: 15 [those who were regularly cultivating rice] + 4 [those who had not cultivated rice in recent years but restarted this year]).

Source: Agricultural household survey, conducted by the JICA study team (2009)

**Table A12.2 Representative Household Annual Budgets for Producing Maize, Sorghum, Cowpea, and Sweet Potato among the Respondents in Foug Gleita**

(UM/household/year, unless otherwise specified)

	Maize	Sorghum	Cowpea	S. Potato	Total	Remark
Area (ha)						1
Production (kg/ha)	180	430	237	1,891		2
Price (UM/kg)	62	110	116	80		
<b>Value of production (UM)</b>	<b>15,800</b>	<b>60,000</b>	<b>34,916</b>	<b>135,658</b>	<b>246,374</b>	3
Seed						
Quantity (kg/ha)						
Price (UM/kg)	444	138	465	0		
Cost	2,000	1,113	1,100	0	4,213	4
Urea						
Cost	0	0	0	5,000	5,000	5
TSP						
Cost	0	0	0	0	0	
Agricultural chemicals						
Cost	0	0	0	0	0	
Water fee						
Cost	0	0	0	0	0	
Bag for storage and sale						
Cost	480	960	480	3,120	5,040	
Machinery rental						
Cost	0	0	0	0	0	
Transportation						
Cost	700	1,400	875	4,550	7,525	6
<b>Production cost</b>	<b>3,180</b>	<b>3,473</b>	<b>2,455</b>	<b>12,670</b>	<b>21,777</b>	
<b>Profit</b>	<b>12,620</b>	<b>56,528</b>	<b>32,461</b>	<b>122,988</b>	<b>224,597</b>	

Source: Agricultural household survey, conducted by the JICA study team (2009)

1. Many farmers in Foug Gleita cultivate sorghum in rainy season in rainfed cropland (Diéri) and cultivate maize and cowpeas in cold dry season in flood recession land (Décrue). While sweet potatoes can be cultivated throughout the year, the majority of the respondents cultivated this crop only once a year or at most twice a year. According to them, although those lands are passed on from generation to generation, cultivated area changes every year depending on the amount of rainfall and the expansion of flooded area. Therefore, it was not possible to obtain reliable information on the average annually cultivated area for these crops.
2. It should be noted that these data are averages of the quantity produced, which changes from year to year, and also that these are not measured but recalled data by the respondents.
3. Quantity times unit price does not equal value of production, because each of these values are the median for each variable among the respondents and the number of respondents who provided viable answers were different across the variables.
4. The majority of the respondents obtained sweet potato vine for free.
5. While no respondent applied fertilizer to maize, cowpeas or sorghum, the majority of the respondents cultivating sweet potatoes answered that they applied urea to the crop.
6. [Transport cost from farm to storage place] + [Transport cost from storage to Foug Gletia market].

**Table A12.3 Representative Household Annual Budgets for Breeding Cattle, Sheep, and Goat among the Respondents in Fom Gleita**

(UM/household/year, unless otherwise specified)

	Cattle	Sheep	Goat	Total	Remark
Number of animals bred	3	5	8		1
Number of Birth (heads/year)	1.0	3.4	5.3		
Mortality	0.1	0.1	0.1		2
Age when selling	5.0	1.3	2.4		
Price (UM/head)	72,625	9,000	7,500		
<b>Value of production</b>	<b>13,073</b>	<b>22,309</b>	<b>14,921</b>	<b>50,302</b>	3
Pellet Feed					
Quantity (kg/head)	75				
Price (UM/kg)	90				
Cost	8,700	0	0	8,700	4
Wheat					
Quantity (kg/head)	41				
Price (UM/kg)	100				
Cost	4,425	0	0	4,425	4
Injection					
Cost	308	258	0	566	
Tablet					
Cost	188	0	0	188	
Care					
Cost	0	0	0	0	
Transportation					
Cost	0	0	0	0	
<b>Production Cost</b>	<b>6,033</b>	<b>1,186</b>	<b>3,150</b>	<b>10,369</b>	4
<b>Profit</b>	<b>7,040</b>	<b>21,123</b>	<b>11,771</b>	<b>39,934</b>	

Source: Agricultural household survey, conducted by the JICA study team (2009)

1. As the objective of this analysis is to calculate the annual value generated by the breeding, the number of animals bred is basically irrelevant, because it represents the value of asset. However, there must be naturally a positive correlation between the number of animals bred and the number of annual birth.
2. Assumed value.
3. Estimated by the following calculation:  

$$[\text{value of production}] = [\text{number of birth}] \times (1 - [\text{mortality}]) \times [\text{price}] / [\text{age when selling}]$$
4. Quantity times unit price does not equal cost, or the sum of each cost does not equal the total production cost, because each of these values are the median for each variable among the respondents and the number of respondents who provided viable answers were different across the variables.

## ANNEX 13 IRRIGATED AREA OUTSIDE THE PERIMETER

There are lots of irrigated areas outside the perimeter and they are irrigated by water from the perimeter with hoses through siphon. The Study Team made a list of those outside cultivators in this period (the list is attached at last). Following is the analysis of the list.

First of all, Table 1 shows that total of 132 individuals and cooperatives are cultivating outside with the area of 155 ha and majority is located upstream areas along diversion canals and S1, the most upstream outlet of P1. The total area is equivalent to 8 % of the perimeter, or 1/3 of present cultivated area.

Table 2 (multiple answers) shows major products produced in the areas. More than a half of producers cultivate rice, and maize, vegetable, sorghum and sweet potato follow. In terms of the area, still rice occupies the largest, and vegetable, maize, sorghum and sweet potato follow. Rice, vegetable and maize are the major products in the areas. Rice cultivation affects water demand of the whole perimeter due to large water consumption.

Table 3 shows the reasons, why farmers cultivate outside. Eighty five percent (85%) of farmers answered water shortage. They cultivate the areas along the main canals to get easy access for irrigation water.

At last, Table 4 shows the answers for a question if they have farmlands inside the perimeter. Sixty one percent (61%) of farmers answered “Yes”. And according to the interviews, most of them told that they would cultivate their farm inside the perimeter, once irrigation water would reach there after the rehabilitation of the irrigation system.

**TableA13.1 Outside irrigated areas**

	Area	No. of people	Area (ha)
Diver-sion	OA	32	70.0
	AD	21	29.5
	Partiteur	9	10.5
P1	S1	42	21.0
	S3	10	5.0
	S5	4	2.0
P2	SF7-S16	5	8.5
	S23	4	4.3
	S25	5	4.0
Total		132	154.8

**TableA13.2 Products**

Products	No. of Producers	Potential area (ha)
Rice	96	77.5
Maize	30	37.5
Vegetable	27	67.5
Sorghum	10	12.8
Sweet potato	9	12.5
Millet	3	3.3
Fruit	2	18.0
Total	177	229.0

**TableA13.3 Reasons of outside cultivation**

Answers	
1. Water shortage	69
2. Insufficient land	9
3. Owning the land	2
Total	80
Rate of "1." (%)	86

**TableA13.4 Fields inside the perimeter**

Answers	
Yes	80
No	52
Rate of Yes (%)	61

Information of Outside Cultivator

Location	Given name	First name	Village	Cooperative	Product	Area (ha)	Field inside	Reason for outside cultivation
S1	Abderahmane	Ould Mami	Aguoeda	Tahara	Rice	0.5	Yes	SI break
	Yarbe	Ould Miami	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Hasni	Ould Abdi	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Jaafar	Ould Wedara	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mriissara	Ould Mohamed El Abd	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abdelilah	Ould Mohamed El Abd	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abderahmane	Ould Birama	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Laila Khmathe	Ould Birama	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Deiche	Ould Birama	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abdelilah	Ould Abdi	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Ahmed	Ould Tewmi	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Khweya	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Ahmed Sidi	Ould Boubacar	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	El Hacem	Ould Taleb Youssef	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Wenatou	Ould Mohamed El Mokhtar	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Sidi Mahmoud	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Salem	Ould M'Berguene	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Bah	Ould M'Berguene	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Noutou	Ould Mohamed Saghier	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Samba	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Samba	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	El Hacem	Ould Samba Val	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Kerim	Ould Abderahman	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Nagi	Ould Abderahman	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Jaafar	Ould Sid'Ahmed	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Baba Nagi	Ould Sid'Elmine	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Hechem	Ould Mexvide	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Melamine	Ould Sid'Ahmed	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Mexvide	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Mondriche	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Sidi Mohamed	Ould Boullah	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Alioune	Ould Mondriche	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abdatt	Ould Abeide El Baraka	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abidine	Ould Ahmed	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Sidi Mohamed	Ould Tomi	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Khairala	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Dah	Ould Magha	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Manetoullah	Ould Magha	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Nagem	Ould Magha	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	El Hacem	Ould Sidi Mohamed	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Mohamed	Ould Ali	Aguoeda	Tahara	Rice	0.5	Yes	Water shortage
	Abdelilah	Ould Maleck	Sabhallah	El Wihda	Rice	0.5	Yes	Water shortage
Sidi	Ould N'geyda	Sabhallah	El Baghia	Rice	0.5	Yes	Water shortage	
Bilale	Ould Sleymane	Sabhallah	El Wihda	Rice	0.5	Yes	Water shortage	
Cheikh	Ould Moryd	Sabhallah	El Wihda	Rice	0.5	Yes	Water shortage	
Mohamed	Ould Sabar	Sabhallah	Taakhi	Rice	0.5	Yes	Water shortage	
Sidi	Ould Sabar	Sabhallah	Taakhi	Rice	0.5	Yes	Water shortage	
Abdeikerime	Ould Soule	Sabhallah	Dar Selam	Rice	0.5	Yes	Water shortage	
Bouka	Ould Ali	Lehseye	El Barakatt	Rice	0.5	Yes	Water shortage	
Teyibe	Ould Ali	Lehseye	El Barakatt	Rice	0.5	Yes	Water shortage	
Tetoubatt	Ould Bambari	Lehseye	El Barakatt	Rice	0.5	Yes	Water shortage	
Dah	Ould Beybahi	Baghdada	Lesseye	Rice	0.5	Yes	Water shortage	
Sidi	Ould N'geyane	Baghdada	Lesseye	Rice	0.5	Yes	Water shortage	
El Housseyne	Ould Ghassem	Baghdada	Lesseye	Rice	0.5	Yes	Water shortage	
El Hacem	Ould Samba	Baghdada	Lesseye	Rice	0.5	Yes	Water shortage	
S3								
S5								

Information of Outside Cultivator

Location	Given name	First name	Village	Cooperative	Product	Area (ha)	Field inside	Reason for outside cultivation
O-A	Sidi	Ould El Hage	Meyjige	Charave	Fruit, vegetable	12	No	Land owner
	Moulaye ahmed	Ould Né	Rakna	Teyssir	Maize, sweet potato	2	Yes	S16/T192/2/V2 no reason
	Astel	Sow	Meyjige	aucune	vegetable, maize	0.5	No	
	Issa	Alfa	Meyjige	aucune	vegetable, maize	2	No	
	Abderahmane	Awe	Meyjige	aucune	vegetable, maize/CSC rice	2	No	
	Cooperative Meyjige 1		Meyjige	Meyjige1	vegetable	1	No	
	Cooperative Chebak	Meyjige	Meyjige	Chebak Meyjige	vegetable	1	Yes	S1 break
	Hamamdi	Demba	Meyjige	aucune	vegetable, maize	1	No	
	Harouna	Hamidou	Meyjige	aucune	vegetable, maize	0.5	No	
	Dené	Mint Saleh	Meyjige	aucune	vegetable, maize	0.5	No	
	Adama Aleli	Sow	Meyjige	aucune	Rice, maize	0.5	No	
	Oumar	Djaniel	Meyjige	aucune	Rice, maize	0.5	No	
	Yéro	Bamol	Meyjige	aucune	Rice, maize	0.5	No	
	Mohamed	Ould Moundriche	Meyjige	aucune	Rice, maize	0.5	Yes	
	Amar Sidi	Ould Amar	Meyjige	aucune	Rice, maize	0.5	No	
	Niaki	Ould Amar	Meyjige	aucune	Rice, maize	0.5	No	
	El Yemari	Ould Mahmoud	Meyjige	aucune	Rice, maize	0.5	No	
	Mohamed Cheikh	Ould El Hage	Meyjige	aucune	Rice, maize	0.5	No	
	Sidi	Ould El Hage	Meyjige	Charaf	Rice, maize, fruit	6	No	
	Hassine	Mint Askeri	Zreigua	Teyssir	maize	0.5	Yes	Landlessness
	Chrif	Ould Isselmou	Zreigua	El etihad	maize vegetable	2	Yes	Owning land
	Moulaye Idrisse	Ould El Hage	Zreigua	aucune	vegetable, maize	0.5	No	
	Abdellah	Ould El Hacem	Zreigua	aucune	maize, millet	1	No	
	Cooperative teyssir femmes		Zreigua	Teyssir femmes	vegetable	3	No	
	Cooperative Nour1		Zreigua	aucune	vegetable	2	No	
	Cooperative Wihda-beder		Base vie	aucune	vegetable	6	Yes	
	Cooperative mena		Base vie	aucune	vegetable	1	No	
	Groupment non cooperative		Base vie	aucune	vegetable	8	No	
	Cooperative Aleyba		Base vie	aucune	vegetable	6	No	
	Cooprative Dhebe		Base vie	aucune	vegetable	5	No	
	Deti		Base vie	aucune	Cereal	0.5	No	
	ifra	Woulou	Base vie	aucune	Sweet potato, sorghum maize	2	No	
	Ahmed	Ould Bouchgueygue	Meyjige	aucune	Cereal sweet potato	2	No	
	Dede	Ould Ahmed Salem	Meyjige	aucune	maize sorghum sweet potato	1	No	
	Cooperative Wuhda Barrage		Ould Ali Agweda	aucune	vegetable	6	No	
	Baba Nagi	Ould Meylidi	Agweda	aucune	Rice, sorghum	1	No	
	Samba	Fati	Ould Ali Agweda	aucune	Rice sorghum	1	No	
	Adama	Amadou	Ould Ali	aucune	Rice sorghum	2	No	
	Issa	Alfa	Meyjige	aucune	Rice maize potato	4	No	
	Yahya	Ould Lekmache	Meyjige	aucune	Rice	1	No	
Tahra	Mint Taleb Vezaze	Meyjige	aucune	Rice	1	No		
Melanine	Ould Sidi Ahmed	Meyjige	Tahara	Rice maize potato	1	Yes	S1 break	
Chama	Mint Ethmane	Agweda	El Baqhia Taher	maize sorghum	1	Yes	S1 break	
Mohamed Elabde	Ould Laghdaf	Ould Ali	aucune	Rice maize potato	1	No		
Mohamed	Ould Laghdaf	Meyjige	aucune	Rice maize potato	1	No		
Hachem	Ould Maatalla	Meyjige	El Baqhia Taher	Rice maize potato	1	No		
El Hasnia	Mint Jeddou	Meyjige	El Baqhia Taher	Rice sweet potato	1	Yes	S1 break	
El Bane	Ould Elbane	Meyjige	chilouhviichi	Rice	0.5	No		
Marieme	Mint El Bane	Meyjige	chilouhviichi	Rice	0.5	No		
Samba	Ould Abderahmane	Meyjige	chilouhviichi	Rice	0.5	No		
Abdi	Ould Ahmed	Ould Ali	El Baqhia Taher	Rice	1	Yes	S1 break	
Hadiya	Ould Slama	Ould Ali	El Baqhia Taher	Rice	1	Yes	S1 break	
Ahmed Levram	Ould	Ould Ali	aucune	Rice	1	No		

Information of Outside Cultivator

Location	Given name	First name	Village	Cooperative	Product	Area (ha)	Field inside	Reason for outside cultivation
Partiteur	Ahmedou	Ould Mehdi	Rakna	El Baghla Taher	Rice maize potato	2	Yes	S1 break
	Oumar	Ould Birama	Zreigua	aucune	Rice vegetable sweet potato	1	No	
	Idoumou	Ould Nirama	Sabhallah	Tahara	Rice sweet potato	1.5	Yes	S1 break
	Touhami	Ould Mohamed	Rakna	aucune	Rice sweet potato	1	No	
	Hachem	Ould Souiedi	Rakna	aucune	Rice	0.5	No	
	Brahim	Ould Messoude	Rakna	aucune	Rice	2	No	
	Cheikh	Ould semssed	Sabhallah	El Baghla Taher	Rice	1	Yes	S1 break
	El Ghotobe	Ould Hofdo	Zreigua	Teyssir	Rice	0.5	Yes	Insufficient land
	Jaafar	Ould Khoiyrre	Zreigua	aucune	Rice	1	No	
	Moustapha	Ould Sidya	Zreigua	aucune	Rice	1	No	
SF7-S16	Yahya	Ould Ahmed Lejed	Zreigua	Teyssir	Rice	0.5	Yes	Insufficient land
	Moulaye	Ould El Hacene	Zreigua	Teyssir	Rice	5	Yes	Insufficient land
	Sidi Mohamed	Ould Messoude	Rakna	aucune	Rice	1	No	
	Mohamed	Ould M'Beirik	Zreigua	Nour	Sweet potato sorghumu maize	1	Yes	Insufficient land
Sifon S25 P2	Cooperative NASROUNE Femme	Sid'Elhady		NASROUNE Femme	vegetable	1	Yes	S 24 break
	Cooperative MEDINA FEMME	Bachatt II		MEDINA FEMME	vegetable	0.75	Yes	lack of water on their vanette
sifon S25	Cooperative ETHADE Femme	Bachatt II		ETHADE	vegetable	0.5	Yes	lack of water on their vanette
	Cooperative NDOULE	Bachatt I		NDOULE	vegetable	1.25	No	No land in perimeter
S23 P2	Cooperative EL VADEL	Bachatt I		EL VADEL	vegetable	0.5	No	No land in perimeter
	Rabya		TOUGUE	NASROUNE	vegetable	0.5	Yes	Water shortage
S23	Sidna		TOUGUE	aucune	sorghum, millet	0.25	No	No land in perimeter
	Sidi Mokhtar	Ould Mreziague	TOUGUE	NEJAH	sorghum	1.5	Yes	Insufficient land
4.25			TOUGUE	IM'Bediatt	vegetable, millet, sorghum	2	Yes	

Total/Average

Total No. of people (groups) 132		Total area		Reason	
Products	No	Potential area (ha)	Field inside perimeter	Yes	No
Rice	96	77.5		69	Water shortage
Maize	30	37.5		9	Insufficient land
Sweet potato	9	12.5	Rate of Yes (%)	2	Owning the land
Vegetable	27	67.5		80	Total
Sorghum	10	12.8		86	% of water shortage
Millet	3	3.3			
Fruit	2	18.0			



## ANNEX 14 RESULTS OF DIAGNOSIS OF FOU M GLEITA DAM

### A14.1 Fondations de l'appui latéral

#### 1) Appui droit

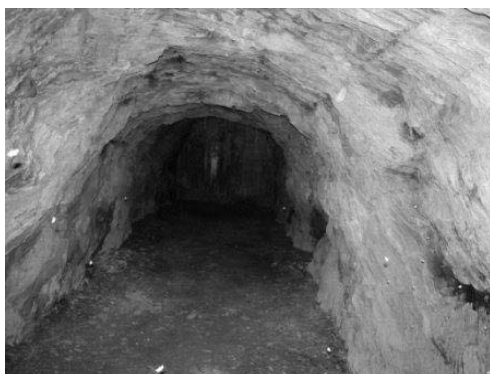
Nous avons examiné l'appui droit du barrage en novembre 2008. Le réservoir était presque plein et à cause du vent à la surface du barrage la crête du déversoir de l'évacuateur de surface avait atteint le niveau de déversement.

A l'examen de la pente de l'appui droit du barrage aucune fuite d'eau n'a été constatée. Le technicien SONADER qui nous accompagnait nous a confirmé que depuis qu'il était affecté à ce travail il n'avait jamais constaté de fuite sur cette partie.

Dans l'appui droit du barrage, près du niveau de l'eau du fleuve amont, un forage de reconnaissance a été percé. Le niveau d'eau augmente en amont lors des crues, (ou encore lorsque les sédimentations du fleuve sont importantes). L'eau s'infiltré par cette galerie mais lors de notre expertise le niveau n'atteignait pas l'orifice et donc il n'y avait pas d'infiltrations. Le fond du forage de reconnaissance est recouvert d'une fine couche de liquide noir qui s'apparente au goudron et d'après un employé de la SONADER, il s'agirait des excréments des chauves-souris. L'eau est parfaitement immobile en surface et aucune percolation ou fuite d'eau dans la roche n'ont été remarquées jusqu'au fond.

#### 2) Appui gauche

Nous avons eu l'occasion d'ausculter complètement le barrage en février 2010. Le réservoir était à un mètre environ au dessous du niveau maximum normal. Comme pour l'appui droit, aucune fuite d'eau n'a été observée du côté aval de l'appui gauche. (Observation confirmée par le technicien SONADER). Le niveau du fleuve étant plus bas que le forage d'observation, nous avons pu voir à l'intérieur de la galerie, qui est creusée en ligne droit à partir de la paroi de la roche en face la rivière, suit l'axe du barrage sur quelques mètres, et en amont tourne à angle droit. Nous pouvons voir sur la photo qu'aucune fuite d'eau n'est visible sur la roche jusqu'au fond du couloir.



Il n'est pas possible d'observer le lit de la rivière à cause de l'eau, mais d'après ce que nous avons pu voir sur les deux appuis, les fondations sont étanches et il n'y a aucune crainte de fuite. La géologie du site est composée de schistes durs du paléozoïque, formant des plans de litage inclinés de plus de 60°. C'est une structure géologique qui permet d'avoir une bonne étanchéité aux infiltrations d'eau du réservoir. En tant que barrage voûte en béton on juge que les altérations et les fissures jusqu'à la roche de fondation dure, sont le fruit des excavations.

## A14.2 Barrage

### 1) Crête du barrage

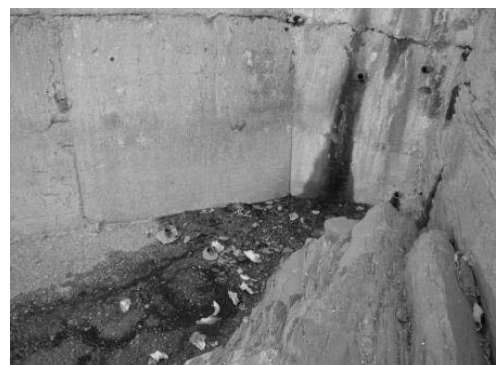
La route en crête du barrage présente des fissures à la surface de chaque bloc de béton (du bloc 1 au bloc 11). Ce sont en général des fissures de sécheresse pas spécialement dirigées dans une direction particulière, certainement dues à des contraintes externes.



Les fentes sont peu profondes, ne dépassant 1 cm d'après le technicien SONADER. Ce béton est une simple protection injectée à la superficie du barrage n'ayant aucun rapport avec la sécurité de l'ouvrage et les fissures ne vont pas jusqu'à l'écaillage du béton de protection donc un simple revêtement d'un matériau polyuréthane devrait suffire pour récupérer l'aspect esthétique.

### 2) Corps du barrage

Aucune anomalie n'a été observée sur les contreforts à l'aval du corps de barrage qui n'a par ailleurs aucun problème d'étanchéité car le béton est solide. Le barrage est constitué de 11 blocs, et les plaques d'étanchéité ne présentent aucune anomalie. Aucune fuite n'a été observée entre les joints. (Sur les parties basses du barrage qui exercent une forte poussée il ne nous a pas été possible de déterminer s'il y avait des fuites en aval du fleuve car il est en général immergé et l'eau est trouble.)



Des fuites ont été observées sur les raccords de 9 blocs (béton de garnissage du joint entre le corps de barrage et l'appui). Sur cette partie il y a des trous de drainage et des trous d'injection. Ils n'ont pas été bouchés après l'arrivée du technicien sur le site, il y a déjà longtemps, donc il semble qu'ils l'aient été quand le barrage a été terminé. Les fuites sont infimes, et ne s'aggravent pas avec le temps, par conséquent à l'heure actuelle elles ne posent pas de problème. Les mêmes réparations s'observent sur l'appui droit (sur 2 ou 3 blocs ?) mais sans fuite d'eau. Si des problèmes de fuite apparaissent dans l'avenir, il est fort possible qu'elles se produisent sur ce type d'endroit. Il faudra dans l'avenir continuer à les observer et enregistrer

les changements de situation.

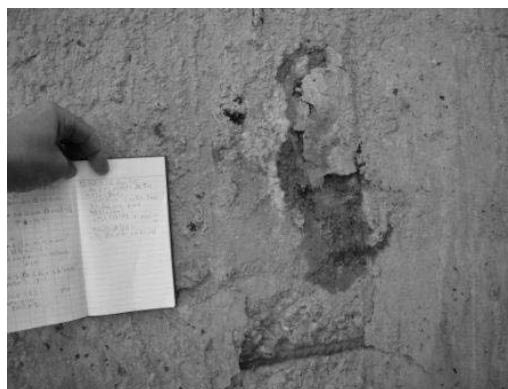
Sur les raccordements des 9 blocs, les fuites sont moins importantes lorsque le réservoir est à son niveau maximum normal que lorsque le niveau est bas. La pression de l'eau du réservoir se propage sur les fondations des appuis par l'intermédiaire des arcs avec une poussée d'autant plus forte que la pression de l'eau est importante, aussi on suppose qu'elle s'exerce dans le sens de fermeture des minuscules veines d'eau entre les plans de litage des fondations à fort gradient.

Sur les raccordements des 9 blocs de la rive gauche, le béton de finition est écaillé sur une partie du contrefort aval et le ferrailage est à nu. Cela n'a aucune incidence sur la sécurité du barrage, mais laissé ainsi l'érosion attaquera le fer et pourrait aggraver l'écaillage ; il serait souhaitable de réparer avec un matériau isolant en polyuréthane.

Il n'a pas été possible de diagnostiquer la partie amont du contrefort de barrage car il est rempli d'eau. D'après les analyses de qualité de l'eau d'irrigation du barrage le pH est neutre, la salinité est nulle (les agriculteurs boivent cette eau), et donc n'a aucune incidence négative sur le béton. De plus la qualité du béton qui se trouve constamment sous la surface du réservoir est d'avantage maintenue. Dans ces circonstances, le contrefort amont est en meilleur état que le contrefort aval.

Il y a des thermomètres et des tensiomètres à l'intérieur de chaque bloc du barrage. Les mesures sont relevées régulièrement tous les mois. D'après les résultats de mesures il ne semble pas qu'il y ait des craintes particulières.

- ① La température interne est dans l'ensemble basse en hiver, et élevée en été, ce qui montre que le thermomètre fonctionne normalement.
- ② Les thermomètres posés en plusieurs endroits du barrage 3 ans après son achèvement indiquent des valeurs supérieures à ceux posés par la suite.
- ③ On suppose qu'il y a une différence entre le volume des précipitations et les volumes d'eau du barrage utilisés mais ces dernières années le niveau du réservoir a tendance à augmenter d'année en année. La fluctuation du niveau du réservoir fait fluctuer la pression de confinement.
- ④ A part sur les blocs 1 et 11 qui touchent l'appui, sur tous les blocs elle correspond à l'augmentation du niveau du réservoir.
- ⑤ Au contraire sur les blocs 1 et 11 la pression de confinement n'est pas conforme à la montée du niveau de l'eau du réservoir, elle a tendance à baisser. Cela devrait venir du fait que le béton du barrage a subi un confinement sur les fondations lors des dilatations causées par la chaleur générée à l'achèvement du barrage. Ensuite pendant plusieurs années, la pression s'est libérée, et l'ensemble des contraintes ont tendance à diminuer.



### A14.3 Ouvrages auxiliaires du barrage

Le diagnostic du barrage a été fait en 1990, 1994 et 2004. Les fentes que nous avons constatées sur le béton de finition avaient été relevées également en 2004. Elles n'avaient pas été jugées assez conséquentes pour mettre la sécurité des structures en danger. Le rapport précise que le barrage ne présente aucun problème particulier, est posé sur une roche de fondation très étanche et dure, et fonctionne en toute sécurité.

Les constatations de la mission concordent avec le diagnostic de 2004 quant à l'état de détérioration et les méthodes concrètes de réparation de chaque dispositif du barrage mentionnés dans le rapport. Nous indiquons ici uniquement les éléments devant être particulièrement pris en compte et les points de divergences par rapports aux diagnostics antérieurs.

- Sur tous les appareils hydrauliques qui équipent les vannes il est impossible de régler la pression. Les appareils sont arrivés au terme de leur longévité et le système hydraulique fuit. Il faut tous les remplacer. Il en est de même pour les joints d'étanchéité des vannes.
- La vanne de prise qui se trouve en amont du barrage est actuellement ouverte et n'a pas été actionnée depuis plusieurs années (plus de 20 ans ? ). Cette vanne est nécessaire pour arrêter le lâcher en aval. Il faudrait faire un essai de fonctionnement de la vanne.
- Comme il n'est pas sûr que la vanne puisse être fermée, pour réparer la vanne radiale en aval de la tour de prise qui contrôle le débit d'eau envoyée dans les canaux d'irrigation, il faut que la vanne à glissière à l'intérieur de la tour de prise fonctionne. Pour la faire fonctionner on utilise la grue qui se trouve sur la crête de la tour mais comme elle a été endommagée par une trop lourde charge, elle a été remplacée par un treuil avec un socle en fer, qui a un défaut de fabrication et n'est pas assez haut, et donc il n'est pas possible d'actionner la vanne coulissante.
- Pour pouvoir l'actionner, 3 solutions sont envisageables : (1) refaire la grue sur la tour de prise, (2) modifier la hauteur du socle en fer, (3) couper la vanne à glissière pour pouvoir utiliser le socle tel qu'il est et modifier la structure de la vanne pour pouvoir l'assembler avec des boulons de fixation. D'un point de vue économique et sécuritaire, nous recommandons la solution (3).
- Si possible, il serait souhaitable de relever le niveau d'eau du réservoir tous les jours. Leur analyse et l'analyse des données pluviométriques du bassin versant permettraient d'évaluer les crues en période d'hivernage.

## ANNEX 15 RESULTS OF RURAL WATER SUPPLY SURVEY

### A15.1 Cadre de l'étude

On pensait que les conditions indispensables d'une agriculture durable reposaient sur la possibilité d'obtenir de bons rendements et d'avoir des habitations proches des parcelles. Or si on observe la situation du développement de l'agriculture irriguée à Foum Gleita, on s'aperçoit que les terres et les villages sont abandonnés à cause de la baisse des fonctions du réseau d'irrigation, et que le faible niveau d'aménagement des infrastructures de base des villages rend l'agriculture et la vie des agriculteurs extrêmement difficiles. C'est pourquoi nous avons décidé qu'il fallait absolument entreprendre une étude des infrastructures vitales des villages, en particulier l'approvisionnement en eau potable.

A part quelques villages (El Wihida, D'Dakhla, El Adala), presque tous les agriculteurs des environs du périmètre irrigué dépendent de l'eau des canaux d'irrigation pour leurs besoins domestiques. Mais cette eau, dont le degré de turbidité dépasse largement les normes de l'OMS (5NTU) et est colorée (342 NTU) est tout à fait préjudiciable à la santé. Même les agriculteurs du secteur confrontés aux problèmes de fourniture de l'eau potable et qui acceptent une qualité médiocre ont conscience du problème. Pour preuve :

- Ils percent le flanc des rives sur les oueds à sec pour puiser l'eau des fuites afin de trouver une eau de qualité un tant soit peu meilleure
- Ils demandent aux visiteurs de Nouakchott de ne pas boire l'eau des canaux, et vont puiser l'eau des puits éloignés pour eux.

De nombreux agriculteurs ont exprimé à la mission le souhait qu'elle prévoit l'aménagement d'un approvisionnement en eau potable.

Par ailleurs, les canaux d'irrigation sont utilisés par les agriculteurs pour leur eau domestique et donc il semble difficile de couper l'alimentation pour faire l'entretien sans s'être mis d'accord avec les intéressés sur les dates et les durées de coupure, par exemple lorsque cela risquerait de provoquer des entraves à l'entretien même si les réparations sont faites. Cela parce que si l'eau des canaux est arrêtée, et bien que les agriculteurs s'approvisionnent souvent au Gorgol même pendant la saison sèche, les agriculteurs le supporteraient différemment à cause de la distance jusqu'à la rivière et selon qu'il y a un puits dans le village ou non.

Nous sommes arrivés à la conclusion qu'il était tout à fait vital d'aménager un système d'approvisionnement en eau potable pour fixer les agriculteurs qui devront être là pour relancer l'agriculture irriguée sur le périmètre de Foum Gleita et pour entretenir le réseau d'irrigation régulièrement.

## **A15.2 Secteur d'intervention de l'étude du système d'approvisionnement en eau potable**

Les bénéficiaires sont constitués des agriculteurs et de leur famille installés sur le périmètre irrigué de Foum Gleita et le secteur d'intervention concerne les zones habitées et agglomérations des environs du périmètre. Les agglomérations situées sur le périmètre sont indiquées à la figure A15.1. Les agglomérations qui accompagnent la création du périmètre irrigué, sont constituées des implantations créées ou non par la SONADER sur le périmètre irrigué, des agglomérations dans lesquelles vivent les agriculteurs qui disposent d'un droit de culture sur des parcelles du périmètre, et de la commune de Foum Gleita créée au centre du secteur comme base du périmètre d'irrigation avec les bureaux de la SONADER. La plupart des habitants de la commune détiennent un droit de culture sur les parcelles du périmètre.

A la phase I du programme les cultures irriguées ont débuté en 1984 sur 550 ha, puis sur 1400 ha supplémentaires en 1989. Pour faciliter la culture et l'entretien du réseau, la SONADER a créé 9 implantations pouvant accueillir 500 à 600 familles le long des canaux, qui se sont installées là.

Les villages de El Wihida, D'Dkhla et El Adala font partie de cette première mouture. Ils ont été équipés d'un puits, d'une école, d'un dispensaire, d'un marché, et encore aujourd'hui il sont mieux aménagés que la plupart des autres agglomérations. A la phase II ont été créés Aravatt, Megta D'Diom, Essaada, Z'reigat, sabbahalla, Lehseye mais sans pratiquement aucune des infrastructures prévues.

Ensuite alors que l'agriculture irriguée régressait, ces secteurs d'établissement ont été délaissés, et selon une enquête de la SONADER de 1993, dans les deux villages de Aravatt et Essaada aucun habitant n'a été vérifié. Aujourd'hui Megta D'Diom a disparu, mais 7 villages non mentionnés en 1993 ont refait surface, dont 5 le long des canaux. Les habitants de ces villages possèdent un droit de culture sur le périmètre.

## **A15.3 Situation socio-économique**

Nous avons mené une enquête auprès des ménages des agglomérations proches des canaux d'irrigation afin de comprendre la situation de l'approvisionnement et de l'utilisation de l'eau dans le secteur de notre étude. Notre temps était limité, aussi nous avons interrogé 1 à 4 familles par village selon la taille du village. Les ménages ont été choisis parmi les autorités telles que le chef de village et les responsables des coopératives qui connaissent l'histoire du village et le contenu des questions, ou les agriculteurs du secteur qui ont accepté de coopérer. C'est pourquoi, n'ayant pas pu obtenir un échantillon aléatoire, notre enquête n'est pas représentative du secteur. Les chiffres qui concernent les personnes en particulier (par exemple le nombre de personnes dans une famille) peuvent comporter des erreurs, ne seront pris qu'à titre de référence. En outre, lorsque dans un village il y a un groupe qui parle peuhl et un autre qui parle hassanya nous avons essayé de prendre des ménages représentatifs de l'étude dans les deux groupes.

### A15.3.1 Nombre de ménages et structure d'un ménage, population

Le tableau ci-après représente le nombre de ménages, le nombre de personnes qui compose un ménage en moyenne, et la population du village.

	Nombre de ménages	Nombre de ménages	Nombre de personne	Population estimée	Données Foum Gleita (2007)		
					Ménages	Population	personne/mén.
El Adala	3 (H:1, P:2)	160	9	1 440	232	1,464	6,3
Lehseve	3 (H:1, P:2)	125	8	1 000	83	463	5,6
Eheldidi	1 (H:1)	40	8	320			
Sabbhalla	2 (H:1, P:1)	120	7	840	146	766	5,2
Ehl Elbane	1 (H:1)	6	8	48			
Barrage Foum	1 (P:1)	5	10	50			
Mayjija I	1 (P:1)	45	8	360	43	393	9,1
Mayjija II	1 (H:1)	50	17	850			
Zreiga Adama	1 (P:1)	6	6	36			
Z'Hel El Hassen	2 (H:1, P:1)	60	9	540			
Z'reigat	2 (H:2)	65	11	715	99	471	4,8
Z'reigat Ehel Lehbib	1 (H:1)	6	15	90			
Essaada							
Megta D'Diom							
Tough T'ghir	1 (P:1)	40	10	400			
Aravatt							
Ehl Sidi El Hadi	1 (H:1)	20	10	200			
El WIHDA	3 (H:1, P:2)	140	10	1 400	107	1 289	12,0
D'Dakhla	3 (H:2, P:1)	425	10	4 250	254	1 593	6,3
Foum Gleita	4 (H:2, P:2)	858	15	12 870	731	2 697	3,7
Total sites	16	1 035	9,3	9 645	921	6 046	6,6
Total Sites	31	2 171	11,7	25 409			

Il est difficile de chiffrer le nombre d'habitations car les agriculteurs vivent dans des enceintes composées de plusieurs maisons, les Peuhls ne veulent pas dire combien de personnes il y a dans leur famille, les cartes d'identités n'existent qu'à partir de 18 ans, et donc il est très difficile de connaître le nombre de ménages et la population. Si l'on compare les données de la commune de Foum Gleita de 2007 avec celles d'aujourd'hui, le nombre de personnes dans une famille est beaucoup plus important, et les chiffres estimés ici ne peuvent servir que de référence.

Nous voyons que le nombre de ménages est de seulement 2000 maximum sur l'ensemble du secteur, dont 1000 environ sur les terres d'établissement.

### A15.3.2 Estimation du nombre de ménage sur les périmètres de culture

Les agriculteurs de Foum Gleita ont reçu un droit de culture pour 0,5 ha quelle que soit la taille de la famille et le nombre de couples qui la compose. La SONADER nous a expliqué que le droit n'était pas attribué à un couple mais à une famille.

Nous avons pourtant observé un certain nombre de dérogations. De plus il y a des familles qui cultivent plusieurs périmètres dont ils empruntent le droit aux familles qui ont abandonné l'agriculture. Certains agriculteurs affirment être propriétaires des terres qu'ils possédaient avant la création du périmètre irrigué, et en réalité les investissent. Donc même si les agriculteurs qui ont quitté le secteur reviennent après la réhabilitation du réseau, il sera difficile d'estimer le nombre de ménages

de chaque secteur à partir de la superficie des parcelles irriguées.

Parmi les 31 ménages, un n'avait pas de droit de culture.

### A15.3.3 Bétail

Tous les ménages possèdent des bovins, des caprins, des ânes, des ovins. Ils utilisent l'eau du Gorgol pour les faire boire, et donc peuvent ne pas être pris en compte dans le plan des installations d'eau potable.

### A15.3.4 Travail hors du secteur

Près de 70 % des ménages ont quelqu'un qui est parti chercher du travail loin du secteur. Ils se rendent principalement à Nouakchott, à Nouadhibou, à Selibaby. Certains ménages se plaignent qu'il n'y a pas de travail pour les jeunes, et donc l'exode devrait se poursuivre. C'est également une autre cause de la difficulté de compter le nombre de personnes d'un ménage.

### A15.3.5 Infrastructures de base (installations publiques)

#### (a) Infrastructures de base

Elles sont répertoriées dans ce tableau.

	Puits	Ecole primaire	Centre de santé	Mosquée	remarques
El Adala	○	○	Pharmacien	○	L'école manque de capacité d'accueil
Lehseye		○		○	L'école manque de capacité d'accueil
Eheldidi					
Sabbhalla		○		○	L'école manque de capacité d'accueil
Ehl Elbane					
Barrage Foum					
Mayjija I					
Mayjija II					
Zreiga Adama					
Z'Hel El Hassen		○		○	L'école manque de capacité d'accueil
Z'reigat			Pharmacien	○	
Z'reigat Ehel Lehbib					
Essaada					Village abandonné
Megta D'Diom					Village abandonné
Tough T'ghir					
Aravatt					Village abandonné
Ehl Sidi El Hadi					
El WIHDA	○	○		○	L'école manque de capacité d'accueil, le puits de peut pas couvrir les besoins
D'Dakhla	○	○	○ (antenne de Foug Gleita)	○	La pompe à pédale était en panne
Foug Gleita		○	○	○	

Nota) Les villages en gris sont les villages établis par la SONADER

Source : étude

Pharmacien : personne nommée au centre de santé de Foug Gleita et qui vend les médicaments



aux populations.

L'enquête a porté sur les puits, les écoles, les dispensaires et les mosquées.

Il y a trois puits (1 à El Adala, 2 à El Wihda), une mosquée dans les villages d'établissement sauf à Aravatt, mais la capacité des écoles est très faible. Il y a un médecin dans 2 dispensaires, et il n'y a pas de dispensaire dans les autres secteurs au nord du Gorgol difficiles d'accès. En dehors des secteurs d'établissement les villages n'ont presque aucune infrastructure de base.

(b) Difficultés rencontrées dans la vie de tous les jours

Dans la vie de tous les jours, les villageois rencontrent cinq types de difficultés. Comme l'enquête a été menée par interview pour le plan d'approvisionnement en eau potable, les chiffres ne sont pas très fiables comme pour les autres composantes. Mais à part Elwhida qui a un puits, tous les répondants mettent les difficultés d'approvisionnement en eau potable en haut de leurs difficultés.

Catégorie	Nombre	Explication
Eau potable	(28)	A part El Wihda qui dispose de puits, tous les villageois ont placé le problème de l'eau dans la toute première priorité. La fiabilité des réponses est toutefois altérée du fait que cette enquête portait sur la construction d'un système d'approvisionnement en eau.
Dispensaire	21	Mauvais traitements médicaux (19) mauvais soins de santé pour les femmes enceintes et les nouveaux nés, moustiques très nombreux
Education	17	Manque d'établissements scolaires (15), faible niveau d'éducation (2)
Agriculture	15	Dégât des oiseaux et du bétail (8), manque d'intrants agricoles (3), manque de terre(2), équipements pour le traitement après-récolte, vente des produits agricoles
Réseau d'irrigation	13	Manque d'eau (8), vieillissement du réseau (2), mauvaise utilisation, drainage non aménagé, protection des terres de culture insuffisante
Transport	11	Transports mal assurés (9), secteur isolé (2)
Puits	3	Capacité insuffisante(2), mauvais entretien
Pauvreté	3	Faible niveau de vie, éducation des enfants insuffisante, peu de chances d'emploi
Système	1	Manque de transparence des aides de l'état et des prêts
Mosquée	1	Mosquée mal aménagée

Nota) 31 répondants, réponses multiples

D'après cette enquête sur les ménages, on voit que les villageois plus encore que les réhabilitations, ont besoin de d'infrastructures vitales telles que les établissements sanitaires ou les écoles.

(c) Maladies

D'après les réponses au tableau des maladies qui a servi à l'enquête, on voit que les maladies soupçonnées d'être liées à l'eau, sont extrêmement fréquentes et qu'il faut améliorer les problèmes d'eau potable et d'hygiène sur le secteur.

Maladie	Liées à l'eau	Répondants
Diarrhées	Contagieuses	29
Maladie des yeux	Trachome	24
Fièvres	Paludisme	28
Sang dans les urines		19
Maladies du tube digestif	Typhus, Giardiase	15
Maladies de la peau	démangeaisons	27

Nota) 31 répondants, réponses multiples source : mission d'étude

### A15.3.6 Infrastructures vitales (eau domestique)

Nous avons interrogé les villageois sur les ressources en eau domestiques, le temps passé à la corvée d'eau, les objectifs d'utilisation de l'eau et les volumes afin de connaître la situation actuelle de la fourniture d'eau et de son utilisation. Les résultats sont donnés ci-après.

#### (a) ressources en eau

Les habitants du secteur prennent l'eau des puits, des canaux d'irrigation, du Gorgol et l'eau stockée par l'ANEPA dans des citernes ou encore l'eau des oueds à sec. Parmi ces 5 sources d'approvisionnement les canaux d'irrigation sont les plus fréquents, et l'eau du Gorgol devient une source d'appoint. Dans les villages équipés d'un puits, il devient la principale source d'approvisionnement, mais l'eau coûte 5UM/20L, et la corvée d'eau demande beaucoup de temps, donc la lessive par exemple se fait avec l'eau des canaux d'irrigation.

Ils perforent aussi le flanc des rivières et puisent les infiltrations d'eau, s'efforçant d'obtenir ainsi une eau beaucoup plus saine que celle des canaux

Les citernes ANEPA n'existent qu'à Foum Gleita mais un habitant du village proche de Z'reigat Ehel Lehib dit faire 5km pour venir chercher l'eau à Foum Gleita. L'eau est transportée par citerne du puits de Koubehl Javer à 7 km c'est pourquoi elle est payante. Elle était à 100 UM/20l mais le nouveau président élu en juillet 2009 a fixé le prix à 10 UM/l (20 UM/20l disent certains. Ainsi la plupart des habitants de Foum Gleita s'approvisionnent à la citerne pour leur eau domestique. Mais pour la lessive et autres nombreux sont encore ceux qui utilisent les canaux.

Source	Nombre de ménages utilisateurs
Canaux	30
Puits	13
Gorgol	23
Oued (hivernage seulement)	2
Citerne de l'ANEPA	5

Nota) 31 répondants, réponses multiples – source : cette enquête

Nous voyons dans ce tableau que les villages prenaient en priorité l'eau domestique dans les canaux d'irrigation. Même lorsqu'il y a des ressources de remplacement, les canaux d'irrigation

deviennent des ressources vitales, et il est très difficile d'obtenir l'accord des villages pour couper l'eau en cas de réparation ou d'entretien des canaux.

(b) Distance jusqu'à la ressource, temps passé à la corvée d'eau

Les distances jusqu'au puits, au Gorgol, ou aux canaux telles qu'indiquées par les répondants sont les suivantes. Ceux qui ont répondu se rendre dans l'oued sec vivent dans ses parages, la citerne se déplace près des habitants et donc ces deux systèmes ne prennent presque pas de temps.

Source	Distance (km)				Durée (nombre d'H)			
	Réponses	Mini.	Maxi.	moyenne	Réponses	Mini.	Maxi.	moyenne
Canaux	29	0.3	4	0.5	29	0.1	3	1
Puits	12	0.1	8	1.3	12	0.2	5	1
Gorgol	22	0.3	4	2	17	1	5	2

Source : mission

Ce sont les habitants de El ADALA qui font 4 km jusqu'au point d'eau du fait que l'eau n'arrive pas sur les canaux en bout de réseau près du village. Ils doivent donc se rendre en amont.

Les villages viennent de loin pour puiser l'eau du puits entre Sabbhala et El Adala. Pour une distance moyenne de 2 km on compte 2 heures en moyenne passées à la corvée de l'eau, temps qui incluse le temps d'attente.

(c) Volumes puisés et transport

Le volume puisé par un ménage et par jour est en moyenne de 33 litres, chiffre obtenu à partir des bidons de 20 l utilisés pour porter l'eau multiplié par le nombre d'allers et venues au point d'eau. compte tenu que 20 l sont puisés à chaque fois. La fréquence de distribution des 10l/j/p est la suivante.

Volume /jour/personne	Réponses
<10	2
10-20	5
20-30	8
30-40	4
40-50	2
50-60	6
60-70	2
70<=	1

Source : mission

L'utilisation de l'eau est indiquée au tableau ci-après. Les canaux qui sont proches et ont de l'eau toute l'année sont utilisés pour la lessive, la vaisselle, le bétail, l'arrosage. L'eau est alors utilisée en abondance, 9 ménages dépensant plus de 50 l/j/p, 6 ménages étant dans cette fourchette. Ce sont presque toujours les enfants et les femmes qui vont à la corvée d'eau, qui est portée par un âne.

(d) Utilisation de l'eau

Les principales sources d'utilisation de l'eau sont indiqués ci-après.

Utilisation	Ménages
Boisson	31
Cuisine	31
Vaisselle	31
Lessive	8
Toilette	8
Bétail	5
Arrosage du potager	1

Nota) 31 répondants, réponses multiples

Source : Mission

L'eau puisée est utilisée pour boire, cuisiner, faire la vaisselle alors que l'eau de la lessive, de la toilette et du cheptel est prise au point d'eau. Même si un système d'approvisionnement est installé, l'eau de la lessive, de la toilette et du bétail continuera à être prise sur les canaux.

Le résultat de l'enquête sur les ménages concernés par l'eau domestique parmi les groupes d'habitants des environs du réseau d'irrigation, même s'ils ne sont pas tous bénéficiaires sont donnés ci-après.

- Outre la commune de Foum Gleita il y a 19 villages dans les environs du réseau d'irrigation, dont 9 sont des villages établis lors de la création du périmètre irrigué. 3 d'entre eux sont abandonnés et déserts.
- La plupart des agriculteurs du secteur élèvent des bovins, des caprins, des ovins, des ânes et utilisent les canaux d'irrigation ou le Gorgol pour les faire boire.
- Plus de la moitié des ménages ont quitté le secteur à la recherche de travail ailleurs.
- Les infrastructures de base rencontrées sur le secteur sont le puits, l'école primaire, le dispensaire et la mosquée, mais seulement 3 villages ont un puits de faible capacité, l'école primaire n'a pas les capacités suffisantes pour accueillir tous les enfants en âge d'être scolarisés. Il y a un dispensaire dans les villages de l'ouest et au village de Foum Gleita, mais il n'y en a pas au nord du réseau d'irrigation.
- Reflet de la situation des infrastructures de base, beaucoup disent que plus encore que le manque d'installation à l'irrigation, c'est la situation sanitaire et l'éducation qui rendent la vie de tous les jours difficile.
- Les maladies imputées à l'eau sont très fréquemment rapportées : diarrhées, maladies des yeux, etc.
- Les ressources en eau domestique proviennent principalement des canaux d'irrigation, et du Gorgol comme ressource d'appoint. Mais les deux présentent un degré de turbidité très élevé et sont impropres à la consommation. En outre, certains villages ont un puits, mais de faible capacité, et donc l'eau domestique dépend fortement des canaux.

- La distance moyenne jusqu'à la source d'approvisionnement en eau et le temps passé à la corvée d'eau donnent un chiffre médian de 0,5 km et 1 heure respectivement.
- Dans presque tous les ménages se sont les femmes et les enfants qui vont à la corvée d'eau. L'eau est transportée par un âne. Chaque ménage puise environ 33 l d'eau par personne.
- L'eau domestique sert pour boire, pour la cuisine, pour la vaisselle. La plupart des ménages utilisent les points d'eau pour la lessive, la toilette ou le bétail.

#### **A15.4 Nécessité d'un système d'approvisionnement en eau**

Nous avons vu que les canaux d'irrigation du périmètre irrigué constituait la source d'approvisionnement en eau domestique. Or cette eau, outre sa turbidité n'est pas saine et a mauvais goût et donc peut difficilement porter le nom d'eau potable. Les maladies imputées à l'eau sont très fréquemment rapportées : diarrhées, maladies des yeux, etc.

Lorsque le réseau d'irrigation sera réhabilité, de nombreux agriculteurs vont venir s'installer sur le périmètre, et à cause de l'agriculture ou de l'entretien du réseau, ils seront limités dans leurs déplacements vers les points d'eau potables. Par conséquent il est impératif d'aménager les infrastructures vitales qui permettront aux agriculteurs de s'installer sur le périmètre, écoles et dispensaires, à commencer par un système d'approvisionnement en eau pour ceux qui vont cultiver les périmètres irrigués, y compris ceux qui s'y trouvent actuellement.

Pourtant, si l'aménagement des infrastructures vitales est reconnue comme condition indispensable à l'établissement des agriculteurs sur le périmètre de notre étude, les informations manquent pour savoir s'ils vont venir s'installer ou pas. Il est essentiel de s'attaquer au système d'approvisionnement en eau potable lorsque ce point sera éclairci. Il faut connaître

- les raisons qui les ont fait quitter le secteur à un moment, et les analyser.
- avoir des informations sur les agriculteurs et leur famille susceptibles de venir s'installer après la réhabilitation du réseau d'irrigation (population, période, secteur, données de base sur la préparation d'un plan d'eau potable)
- les possibilités que les agriculteurs acceptent de supporter les charges qui permettront d'utiliser longtemps les infrastructures aménagées,
- Le plan d'aménagement des infrastructures vitales (écoles, dispensaires, routes) n'est pas connu, et donc si l'eau potable est installée, les agriculteurs auront certainement d'autres motifs d'insatisfaction (par exemple si l'école est aménagée, certains trouveront à redire qu'il n'y ait pas de collègue dans la commune de Foum Gleita)
- la rentabilité obtenue des 0,5 ha de périmètre irrigué accordé par ménage car pour s'installer sur un secteur manquant d'infrastructures vitales on espère un revenu en conséquence.

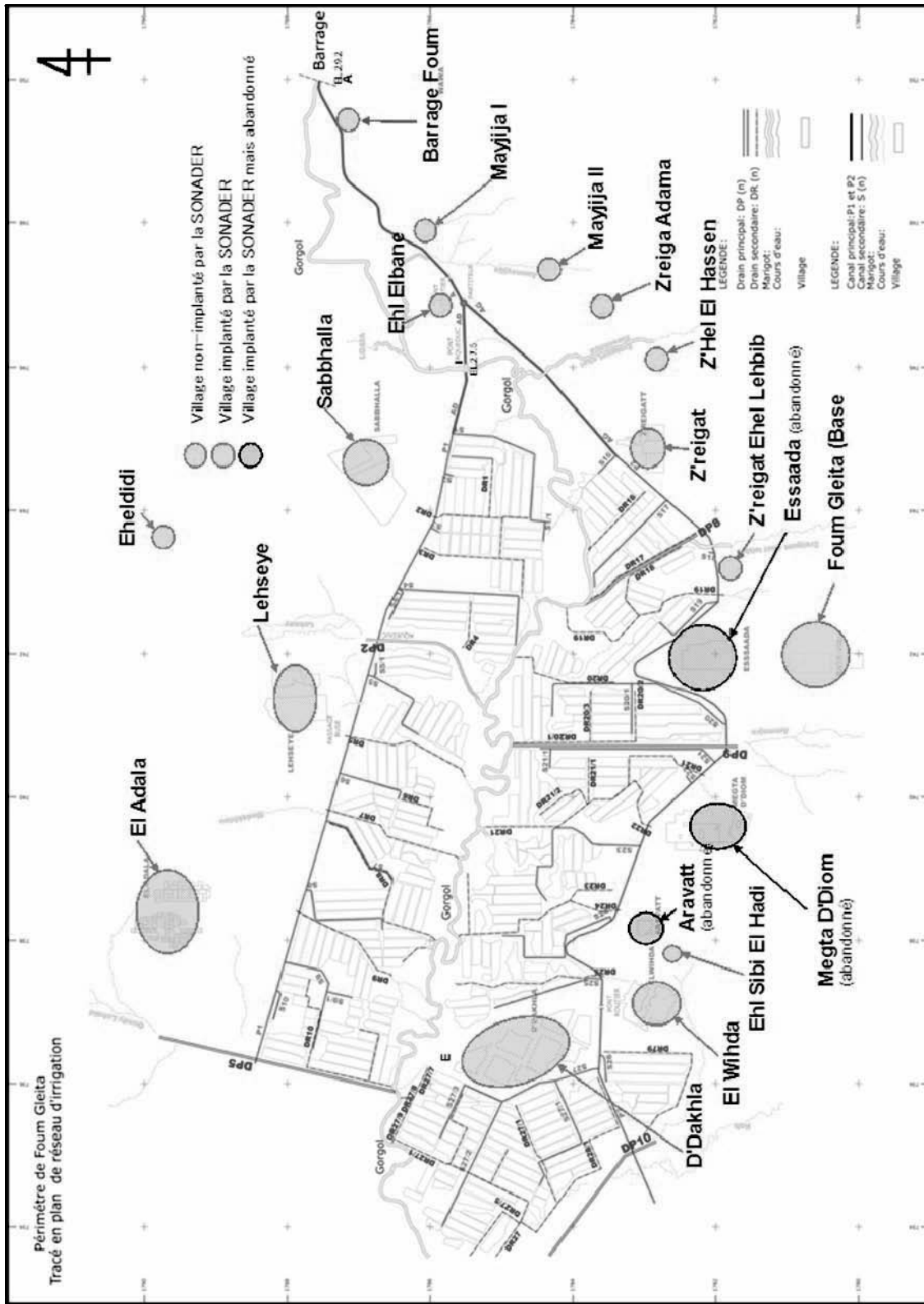


Fig. A15.1 Location des villages dans le Périmètre Irrigué de Foum Gleita

## **ANNEX 16 PARTICIPATORY WORKSHOP**

In this study, it was essential to provide enough information to the farmers so that the sense of ownership will be improved. Therefore, extensive participatory workshop was conducted three times including the beginning of study, starting of the verification trial, and the end of final field study with the representatives of the farmers' cooperatives in Foum Gleita irrigated area under the initiative of JICA Study team, and SONADER Foum Gleita office.

### **A16.1 Workshop at the Beginning of the Study**

#### **(1) Outline**

The objectives of the workshop were to confirm 1) whether the farmers have motivation for the maintenance of the facilities in case of implementation of rehabilitation work, 2) motivation to participate in the verification trials. A total of 80 persons participated in the workshop including 30 women. Active discussions were made in both Hassania which is used by 60% of the farmers and Pular language which is used by 40% of them.

Theme : Better management of Foum Gleita project area  
Date : January 21, 2009  
Place : Foum Gleita city municipal office meeting room  
Participants : SONADER Foum Gleita staff, representative of Union and agricultural cooperatives  
Members of JICA Study team (See ANNEX 17 for the list of participants)  
Representatives  
of farmers' group : 69 farmers' group (Male cooperatives : 42, Female cooperatives: 27)

#### **(2) Confirmation Items of the Workshop**

As results of the workshop, the confirmed items and issues are listed in Table 4.2.1 shown below. It was confirmed that the farmers who originally did not have enough experience in irrigated agriculture and did not recognize well on the importance of the facilities, but presently, they understood well that the irrigated agriculture is the most important matter for their life, and they also understand the importance of maintenance of irrigation facilities. Besides, the Study team requested for the cooperation of the verification trials in the next fiscal year and approval was obtained from them on verification trial.

**Table A16.1 Confirmation Items and Subjects of Verification Trial**

Confirmation items	Issues
<p>1. Check and repair of water facility</p> <p>The facilities should be inspected before and after cropping, and if repairs are necessary for the secondary and tertiary canals, they would be fixed immediately. Dredging was done by power shovel which was rented by the money collected from members. Workforce is mobilized for the primary canal as much as possible, but the government support is necessary especially for the big damages.</p>	<p>It is not clear on what can be done in the areas which are not currently cultivated. In order to confirm security of the facilities, regular inspection should be institutionalized. Moreover, the role of SONADER should be clearly defined.</p>
<p>2. Weeding and dredging on the canal</p> <p>Weeding is possible on all primary, secondary and tertiary canals and was done. In 2008, volunteers were mobilized for weeding, and a total of 2,500 persons-day/year in total. Dredging is possible only on tertiary canal, but primary and secondary canals are impossible to be dredged by human power.</p>	<p>It is not clear on what can be done in the areas which are not currently cultivated. In order to confirm security of the facilities, it is difficult to dredge by human power on the primary canal, and trials should be conducted to check the possibility in the secondary canal.</p>
<p>3. Penalty for not participating in the maintenance operation</p> <p>Each cooperative has certain rules and some of them has penalty.</p>	<p>The rules should be clarified and penalty should be included. It should be implemented as one of strengthening of organization.</p>
<p>4. Water facilities protection against animals.</p> <p>Fence and animal watering facilities are needed to protect the water facility. Metallic fence is better because natural trees are prohibited to cut and are not effective for rats.</p>	<p>Watering facilities and fence against livestock are needed.</p>
<p>5. Payment of water charges</p> <p>The farmers have intentions to pay. However, the fee should be used effectively, and the collected money should be managed appropriately.</p>	<p>Many of the WS participants expressed powerful statements, but it is not clear on what can be done in the areas which are not currently cultivated.</p>
<p>6. Countermeasures against natural disasters</p> <p>A few had temporary measures by selling of their livestock. When there are big damages, support is needed from the government, UNCACEM, and SONADER. The union possibly discusses rescheduling of loan. Formerly, certain cooperative used to collect charges for countermeasures.</p>	<p>It is necessary to understand aftermath of flood damage and if necessary, it is considered to reserve countermeasure charge in case of disasters such as flood or emergency. The role of SONADER should be defined.</p>
<p>7. Cultivation and water management</p> <p>Discussions are made at the cooperative level before the cropping and are engaged in farm management systematically. Even though they understood the importance of cultivation and water management, coordination was not made in the main canal level because of shortage of water. However, if there is enough water, it would be coordinated according to the plan.</p>	<p>It is not clear on how it could be adjusted in the main canal level if enough water is available to distribute.</p>
<p>8. Strengthening of organization</p> <p>When there were enough irrigation water and yield, the union possessed 120 million UM in a bank account and the organization management was going well. However, in accordance with decline in its functions, the role of organization became limited.</p>	<p>Strengthening of organization through reviewing agreement of cooperatives and union, creating list of members, organizing of cultivation right holders, preparing a transparent accounting system and gathering for meeting.</p>
<p>9. Consensus for verification trials</p> <p>The Study team explained the framework of the verification trials and gained approval. All the participants showed assertive intentions towards the trials.</p>	<p>Materialization of contents of verification trials and selection of sites.</p>



## A16.2 Workshop before Starting of Verification Trial

### (1) Outline

The objectives of the workshop were to explain 1) contents of verification trial, 2) the sites selected for each component of the study and 3) to explain the methods used to achieve them and to form a consensus. A total of 80 persons participated to the workshop including 30 women. Similar to the previous workshop, active discussions were made in both Hassania and Pular language.

Theme :	Details of verification trial, selected sites, and methods
Date :	June 11, 2009
Place :	Foum Gleita SONADER hall
Participant :	SONADER Foum Gleita staff, representative of union and agricultural cooperatives Members of the JICA Study team (detail in ANNEX 17)
Farmers' cooperatives	55 cooperatives (Male : 32, Female : 23)

### (2) Confirmation Items of the Workshop

As results of the workshop, the confirmed items and subjects are listed in Table 4.2.2 shown below. The contents of the verification trials, site selection and methods were accepted, but the management of cost remained as a major issue including the labor costs and the restarting of the payment of water charges for the maintenance of participatory irrigation facilities. The problem was mainly because of the fact that the union has not been functioning properly, and the farmers feel the lack of the management system of upper organizations. They are having some concerns about the transparency of fund management.

The Study team recognized that the workshops shall be conducted regularly so that the awareness and trust can be established among the farmers.

**Table A16.2 Confirmation Items and Issues of Verification Trial**

Confirmed Items	Issues
1. Maintenance of participatory irrigation system Agreement in principle on participatory irrigation facilities management and its need and implementation site of each operation.	The discussions regarding the payment to farmers and management of labor costs and collection of water charges were postponed. It was requested that the materials available at the site should be used and the trials shall be conducted in many sites.
2. Extension in demonstration field Agreement in principle on the experimental cultivation of paddy field, fruits and vegetables and the sites for each trial. The inputs would be provided by the Study team, but the funds from harvest will be used as reserve for the cooperative.	Nothing
3. Reconsignment Agreement in principle on the closure of primary canal for two weeks from June 25 to carry out emergency works and surveying works.	Although it is clear that there would be no damage, some took advantage to claim compensation. But, finally they agreed to complete the works until June 25

### **A16.3 Workshop at the End of Final Field Study**

#### **(1) Outline**

The objectives of the workshop were 1.to briefly outline the results of the Study, and 2. to suggest for the formation of new union. In that day, the workshop gained attendance of 80 participants excluding SONADER staffs and the Study team.

Theme : Briefing the results of the study and suggesting formation of new union

Date : June 3, 2010

Place : Foum Gleita city hall garden

Participant : SONADER Foum Gleita staff, representative of union and agricultural cooperatives,  
Members of JICA mission (See ANNEX 17 list of participants)

Representatives of 33 Farmers cooperatives  
farmers' group :

#### **(2) Confirmation Items in the Workshop**

Basic understanding was achieved after briefing the results of the Study. In regard to farmers' feedback on the results of the Study, the farmers highly appreciated that there have been no such opportunities for them to work together with the government, and among themselves. Regarding formation of one union or two unions for the new union, a part of the farmers group showed reluctance to a compromise plan (Establishing coordinating committee above 2 independent organizations, in the place of one union) as suggested by the Study team. It was decided that SONADER, local government and the farmers' group will cooperate together and shall make efforts to find out suitable solution.

**ANNEX 17 LIST OF PARTICIPANTS OF THE WORKSHOP  
IN FOUM GLEITA IRRIGATION AREA**

In Foug Gleita city conference room (January 21, 2009)

	氏名 Prénom et Nom	肩書 Titre	組合名 Coopérative	女性組合or男性組合 Coopérative Féminine ou Masculine	所在村名 Village
1	Djibril Ousmane Kane	Chef Antenne PP	SONADER	-	Foum-Gleita
2	Idoumou Ould Ethmane	AVB	SONADER	-	CENTRE
3	Javaar Ould Hassene	AVB	SONADER	-	CENTRE
4	Ba Samba Yéné	AVB	SONADER	-	Foum-Gleita
5	Mohamed Vall Ould Wori	AVB	SONADER	-	Foum-Gleita
6	Dia Abdoul	Membre	UCAF	-	Bachat Ould Boughrou
7	Ba Samba Yéné	Pdt CSC	UCAF	-	Bachat Ould Boughrou
8	Khalidou Allassane	Vice-President	UCAF	-	Foum-Gleita
9	Abdoulaye Harouna Ba	Animateur ONG	SOS generation future	-	Foum-Gleita
10	Melaimine Ould Touhami	Paysan	AFPD	-	Foum-Gleita
11	Seck Papa	President	GASP	-	Foum-Gleita
12	Zegouma Mint Sensed	Presidente	Hel Hachem	Féminine	Adala
13	Mariam Mamadou	Presidente	Ousman	Féminine	Adala
14	Modv Siré Ba	Paysan	El bassra	Masculine	Adala
15	Ba Mamadou Ousmane	Paysan	Najah Kissal	Masculine	Adala
16	El Hasnia Mint Samba	Presidente	Bachatt Centre Wai	Féminine	Bachat
17	Faty Dembele	Presidente	Bachatt Centre Weitare 1	Féminine	Bachat
18	Dandio Osmane	Presidente	Diama	Féminine	Bachat
19	Fatimetou Jarmouni	Presidente	Fadel 2 Bachat Centre	Féminine	Bachat
20	Fatimeou Mint Mahmoud	Presidente	Taidid	Féminine	Bachat
21	Dandio Mamadou	Presidente	Weltaré	Féminine	Bachat
22	Fatimetou Mint Messoud	Adjoint	Taghada	Masculine	Bachat
23	Yacob Ould Amar Sidi	President	Aemar Sidi	Masculine	Bachat
24	Alpha Mamadou	President	Boki 1	Masculine	Bachat
25	Mohamed Vall Soueidi	President	El Vowz	Masculine	Bachat
26	Demba Ould Messoud	President	El Wai	Masculine	Bachat
27	Ifra Samba Ramata	President	Hollaré	Masculine	Bachat
28	Mohamed Ould Med El Abed	President	Medina	Masculine	Bachat
29	Rabani Ould Grive	Tresorier	Nasroune	Masculine	Bachat
30	Aissata Oumar	Presidente	Arndendv	Féminine	Bachat Ould Boughrou
31	Penda Barry	Adjoint	Potal	Masculine	Bachat Ould Boughrou
32	Younouss Malal	President	Boki 2	Masculine	Bachat Ould Boughrou
33	Idi Labo Diallo	President	Diam-Diam	Masculine	Bachat Ould Boughrou
34	Sow Saidou Yéro	President	Pellital	Masculine	Bachat Ould Boughrou
35	Mohamed Vall	SG	Nasroun	Masculine	Bachat Ould Boughrou
36	Ekhdeije Mint Houssein	Vice-President	Nejah	Masculine	Bachat Ould Boughrou
37	Teslem Mint Rweijel	Presidente	Lehsev	Féminine	Bagdad
38	Nezihe Mint Jaavar	Presidente	Medekhlou	Féminine	Bagdad
39	Mekfoula Mint Mohamed	Presidente	Medekhlou 2	Féminine	Bagdad
40	Mbarka Mint Khouna	Adjoint	Bagdada	Masculine	Bagdad
41	Yaya Samba	President	Yakare	Masculine	Bagdad
42	Abderah.Ane Ould Rabah	President	Rahma	Masculine	Chantier
43	Oumar Sinbingué	Paysan	Bamta Aré	Masculine	Chantier / Base-Vie
44	Fatimetou Mint Mattala	Presidente	Bob Jaavar	Féminine	Cow Jaffar
45	Limame Ould Blal	Membre	Taghadoum	Masculine	Cow Jaffar
46	Sidi Ould Moulave Chrive	President	Nour	Masculine	Ezreighat
47	Moulave Ould El Hassene	President	Teissir	Masculine	Ezreighat
48	Aichete Meslem	Presidente	Lib Heiga	Féminine	Ezreighat Hel Didi
49	Khadiata Mamadou	Presidente	Diokere Ndama	Féminine	Foum-Gleita
50	Mana Mint Ahmed Moloud	Presidente	El Vayzat	Féminine	Foum-Gleita
51	Dioulde Mint Mamy	Presidente	Velah Vivaj	Féminine	Foum-Gleita
52	Faty Moussa	Presidente	Zeheb	Féminine	Foum-Gleita
53	Cheikh Ould Mbareck	Secrétaire	Nejah	Féminine	Foum-Gleita
54	Salamata Hamat	Adjoint	Wihde Bedel	Masculine	Foum-Gleita
55	Allassane Pathé	Paysan	Salem	Masculine	Foum-Gleita
56	Abass Ibn Cheikh Baheida	Paysan	Sed Elkheir	Masculine	Foum-Gleita
57	Mohamed Mahmoud Inejih	Paysan	Teissir	Masculine	Foum-Gleita
58	Abdallah Ould Maiziz	Paysan	x	Masculine	Foum-Gleita
59	Baba Ould Ethmane Ould Sidi	President	Itihad	Masculine	Foum-Gleita
60	Aicha Mint Diav	Presidente	El Emen Etahadoum	Féminine	Jedida

	氏名 Prénom et Nom	肩書 Titre	組合名 Coopérative	女性組合or男性組合 Coopérative Féminine ou Masculine	所在村名 Village
61	Javaar Ould El Yamani	President	Veth	Masculine	Kob Ehel Yamani
62	Cheikh Ould Vallah	President	Inimich	Masculine	Kob Jaavar
63	Meimouna Mint Khouna	Presidente	Berakatt	Féminine	Lehsey
64	Cheikh Elbou Itouhami	President	Elbaraka	Masculine	Lehsey
65	Youma Mint Sid Elkheir	Paysane	Chilouhvchi	Féminine	Moiijje
66	Lalla Mint Boibahi	Paysane	x	Féminine	Moiijje
67	Zeinebou Mint Oumar Kelly	Presidente	Sabhala	Féminine	Sabhalla
68	Chreiva Mint Sihe	Presidente	Dar Selam	Féminine	Sabhalla
69	Jafar Hommany	Paysan	Elwihda	Masculine	Sabhalla
70	Al Hasnia Mint Touhai	Secrétaire	Nour	Féminine	Tarhil Wechkech
71	Cou.Ba Guelou	Adjoint	Dar Selam	Masculine	Tarhil Wechkech
72	Lala Mint Beilaly	Presidente	Tekfelitt	Féminine	Tekfelitt
73	Khadija Mint Mreizig	Adjoint	Nejah	Masculine	Tekfelitt
74	Cheikh Ould Bouh Sneiba	Paysan	Salem	Masculine	Tikielté
75	Sidi Mohamed Ould Nasse	x	x	Masculine	x

In Foug Gleita SONADER meeting place (June 11, 2009)

	Nom et prénom 氏名	Coopérative 組合	Fonction 肩書
1	Abdallahi ould Gueye	SONADER	Chef d'antenne
2	Chérif ould Yemany	UCAF	Président
3	Djibril Ousmane Kane	SONADER	C.S.Vulgarisation
4	Samba Yéné	SONADER	AVB
5	Dia Saidou Samba	UCAF	Membre
6	Mohamed ould Mahmoud	Nasroun	Président
7	Ifra Samba Ramata	Holaré	Président
8	Khalidou Dembely	Pinal	Président
9	Cheikh El Bou ould Touhami	El Barakatt	Président
10	Sid Ahmed ould Nass	Nejah	Président
11	Khalidou Alassane	UCAF	Vice president
12	Mohamed Ahmed ould Mbarek	Nimiss	Vice president
13	Yakhoub ould Amar Sidi	Amar Sidi	Président
14	Oumar Simbine	Bamtaaré	Président
15	Baba ould Eleyat	Rahma	Membre
16	Haidé ould Mohamed	Nour	Membre
17	Mohamed Lemine ould Moussa	Nour	Membre
18	Bocar Samba	Rahma	Membre
19	Yaraa ould Samba	El Wai	Trésorier
20	Idi Laba Diallo	Zem Zem	Président
21	Diouldé Hamadi	Holaaré	Magasinier(2)
22	Mody Ciré Ba	Al Basra	Président
23	Mohamed Mahmoud ould Mohamed El Abd	Médina	Président
24	Ahmed Vall ould Sidi	El Vowz	Président
25	Demba ould Messoud	Takhada	Président
26	Sidi Mohamed ould Jiddou	Fédéral	Vice president
27	Younous Malal	Bokki 2	Président
28	Sidi Mohamed ould Moulaye Chérif	Nour	Président
29	Salem ould Bilal	Ndoula	Membre
30	Jaafar ould El Yemany	El Veth	Président
31	Sidi ould El Ndiayane	Lehseye 1	Président
32	Abdallah ould Taleb	Sona	Président
33	Mahfoudh ould Mahmoud	Maatar F.Gleita	Vice president
34	Mamadou Ousmane Ba	Nezzah Kissal	Président
35	Mohamed ould Sansed	Itihad	Magasinier
36	Daouda Mamadou	Bamtaaré Loboudou	Secrétaire
37	Houssein ould Khairalla	Nezaha	Vice president
38	Jaavar ould El Hacen	SONADER	AVB
39	Brahim ould Abderahmane	Tahara	Vice president
40	Jaavar ould Chérif	Nour	Membre
41	Samba ould Mahmoud	Nour	Membre
42	Zeinebou mint Khallé	Nasroun	Président
43	Khadija Mint Mbarek	Amar Sidi	Présidente
44	Hasniya Mint Samba	El Wai	Présidente
45	Mama Mint Habib	El Emen	Trésorière
46	Aichetou mint Dah	El Emen	Présidente
47	Toutou Mint Benna	Besmana	Présidente
48	Fatimetou Mint Abdel Kerim	Médina	Présidente
49	Binte Mint Mbarek	Médina	Vice president
50	Aissata Diallo	Pellital	Présidente

	Nom et prénom 氏名	Coopérative 組合	Fonction 肩書
51	Fati moussa	Zeheb	Présidente
52	Dagndo Mamoudou	Weltaaré Bokki	Présidente
53	Haby Mamadou	Diokéré Endam	Trésorière
54	Fati Demba	Weltaaré 1	Présidente
55	Sogui Malal	Weltaaré 1	Trésorière
56	Zeinebou Mint oumar Kelly	Sabhalla El Hacén	Présidente
57	Dagndo ousmane	Diama	Présidente
58	Lalla mint Bathy	Tahkhikh	Présidente
59	Mona Mint Ahmed Maaloum	Vaizad	Présidente
60	Fatimetou Mint Tbakhje	Vaizad	Vice president
61	Fatimetou mint Mahmoud	Tejdid	Présidente
62	Fati Aliou	Teyssir Lissa	Présidente
63	Metou Mint Boubacar	El Wihda	Vice president
64	Aichetou Mint Oumar	El Wihda	Membre
65	Aiché Mint Ndiaye	El Amel Wo Takhadoum	Présidente
66	Khadijetou Fall	El Amel Wo Takhadoum	Sécretaire
67	Taleb ould Abeidallah	Dar Es Salam 1	Sec.Général
68	Abdalla ould El Mowji	Dar Es Salam 2	Vice president
69	Abdel Kerim	Dar Es Salam 2	Magasinier
70	Mbarek ould Mbarek	Dar Es Salam 2	Membre
71	Cheikh ould Salem	El Wihda	Magasinier
72	Idoumou ould Ethmane	SONADER	AVB
73	Leila mint Mohamed El Ide	Nour femme 2	Présidente
74	Leila Mint Mbarek	Nour 1	Présidente
75	Bouba Mint El Kory	Nour 1	Trésorière
76	El Hacén ould Mohamed	Lellihde Temiye	Membre

(参加者リスト記名順)

In Foum Gleita city hall garden (June 3, 2010)

	Prénom et Nom 氏名	Coopérative 組合	Titre 肩書	Village 所在村名
1	Moustapja Ould Ejer	Taghadoum	Membre	Kew
2	Mohamed Ould Bil	Itihad	Paysan	Zreiga
3	Abade Ould Ghati	Sans	Paysan	Kew
4	Moctar Ould Makhai	Hollare	Membre	Bachatt
5	Boudaye Ould Med	Mbedia	President	Bachatt
6	Ahmed Ould Elbou	Itihad	Membre	Zreiga
7	Amadou Salek	Itihad	Membre	Zreiga
8	Samba Ould Ely	Teissir	Membre	Zreiga
9	Yero Sall	Teissir	Membre	Zreiga
10	Moctar Ould Makhai	Teissir	Membre	Bachatt
11	Taleb Ould Moilid	Pelital	Membre	Oudey Lehdid
12	Mamadou Mbagne	Salam	Membre	Bachatt
13	Mohamed Ould Sidi	El Wai	Membre	Bachatt
14	Mamadou Mbagne	El Vowz	Membre	Oudey Lehdid
15	Cheikh Elbou Ould Sneiba	El Veth	President	Dar Salam
16	Med Mahmoud Ould Hach	Zemzem	President	Bachatt
17	Sidi Med Ould Cherif	Nijah	Secrétaire	Oudey Lehdid
18	Hacen Ould Yemani	Itihad	Membre	Zreiga
19	Hacen Ould Med	Zrega	Vice President	Bachatt
20	Sidi Ould Mreizig	El Wai	President	Oudey Lehdid
21	Samba Ould Ely	Dar Selam	Vice President	Itihad
22	Yero Sall	Nour	Membre	Bachatt
23	Djibi Sire Ba	Tageda	President	Bachatt
24	Dia Seradi Forba	Teissir	Vice President	Bachatt
25	Touhamu Puld Sidi	Zrega	Membre	Bachatt
26	Alpha Mamadou	Bachat	Vice President	Adalla
27	Feido Yew	Kow	Membre	Adalla
28	Dedaha Ould Yeba	Pelital	Membre	Zreiga
29	Med Ouldoumar	Tagadoum	Vice President	Oudey Lehdid
30	Limame Ould Bela	El Vowz	Membre	Bachatt
31	Sid Ahmed Ould Abeid	Inimich	Vice President	Adalla
32	Sidi Ould Ahmed	Inimich	Membre	Oudey Lehdid
33	Yacoub Ousmane Ba	Nour Selam	Vice President	Inimich
34	Rajel Ould Brafa	Bokki 1	Membre	Inimich
35	Moctar Ould Makhai	Bokk 2	President	Inimich
36	Oumar Khliwri	Nasroune	Membre	Inimich
37	Boudaye Ould Med	Nasroune	Vice President	Inimich
38	Mamadou Mbagne	Hollare	Membre	Inimich
39	Nagi Ould Ahmed	Inimich	Membre	Teissir
40	Daouda Mamadou	Inimich	Membre	Nour
41	Alpha Mamadou	Inimich	Membre	Oudey Lehdid
42	Moustapja Ould Ejer	Pelital	Secrétaire	Adalla
43	Oumar Khliwri	Pelital	Membre	Adalla
44	Boudaye Ould Med	Mbedia	Secrétaire	Adalla
45	Elkadi Ould Med	Mbeidiatt	Vice President	Zreiga
46	Dah Ould Khaide	Zrei	Membre	Sabhalla
47	Sidi Med Ould Cherif	Zreiga	Paysan	Sabhalla
48	Molouye Bade	Tedamoune	Secrétaire	Sabhalla
49	Limame Ould Bela	Tagada	President	Sabhalla
50	Nero Sow	Itihad	Secrétaire	Wechkech
51	Boudaye Ould Med	Itihad	Membre	Wechkech
52	Ledom Aliou	Elwihde	Paysan	Kew
53	Feido Yew	El Wai	Paysan	Kew
54	Serbat Ould Ali	Nejah	Vice President	Kew

	<b>Prénom et Nom 氏名</b>	<b>Coopérative 組合</b>	<b>Titre 肩書</b>	<b>Village 所在村名</b>
55	Demba Ould Med	Itihad	Secrétaire	Kew
56	Samba Ould Ely	Nejah	Membre	Zreiga
57	Moullaye Ould Limame	Pelital	Membre	Bachatt
58	Yacoub Ould Amar Sidi	Hollare	Membre	Tagadoume
59	Selmou Ould Hacén	Wai	Membre	Sabhalla
60	Moctar Ould Makhai	Tadamoune	Membre	Sabhalla
61	Demba Ould Med	El Nour	Membre	Sabhalla
62	Sow Djiby	Inimich	Président	Bachatt
63	El Hacén Ould Mohamed	El Vowz	Membre	Teissir
64	Tijani Samba	Salam	Président	Bachatt
65	Mohamed Ould Ahmed	Medina	Membre	Bachatt
66	Melainine Ould Jaavar	Ong Afpd	Membre	Foum Gleita
67	Moctar Ould Sidaty	Itihad	Président	Bachatt
68	Isselmou Ould Yacoub	Amar Sidi	Président	Bachatt
69	Ethmane Elemine Sidi	Dar Selam	Paysan	Sabhalla
70	Jedou Ould Cherva	Dar Selam	Paysan	Sabhalla
71	Sidina Ould Samba	Inimich	Paysan	Tachil Wechkech
72	Selemb Ould Sneiba	Inimich	Membre	Kew
73	Amadou Alasane	Inimich	Président	Kew
74	Moulaye Ould Bena	Inimich	Membre	Kew
75	Djibi Sire Ba	Lehsey	Membre	Tohde
76	Moulaye Hachem	Teissir	Président	Zreiga
77	Cherif Ould Med	Itihad	Membre	Sabhalla
78	Jaafar Ould Cherif	Nour	Membre	Wechkech
79	Daouda Mamadou	Medina	Président	Bachatt
80	Daoude Med Saleck	Nizam	Membre	Bachatt
81	Mody Cire Ba	Basra	Président	Oudey Lehdid