

Vegetable Production Along the Senegal River



A Reconnaissance Survey of Gardens in the Brakna and Gorgol Regions

Mauritania Agricultural
Research Project II

College of Agriculture
The University of Arizona
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**A RECONNAISSANCE SURVEY OF GARDENS IN THE
BRAKNA AND GORGOL REGIONS**

by

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Executive Summary

This report presents the findings of a three week survey of vegetable gardening and marketing along the Senegal River Valley undertaken in April of 1986 under the auspices of the AGRES II project. This study grew out of a dry season farming systems reconnaissance survey conducted in February of 1986 (Frankenberger et al. 1986) which highlighted some of the constraints to vegetable production in the Gorgol and Brakna regions. Thirteen vegetable gardens were visited, as well as interviews conducted with merchants and customers in the various villages and in the Kaedi market. A brief history of vegetable production in this part of Mauritania is sketched. The survey information which follows includes descriptions of the vegetable gardens themselves as well as their histories, use of inputs, organization, products and marketing. A final section discusses constraints to production and makes recommendations for further research and extension.

General Characteristics of the Gardens

- The majority of gardens are recently established, with over half started in the two years prior to the survey.
- The gardens are located on fonde and dieri soils and range in size from 100 square meters up to 11.5 hectares. Ten of the gardens are watered from the river, with seven of these having access to pumped water. The remainder of the gardens are hand-watered.
- All but one of the gardens were organized as cooperatives with varying degrees of collective activities and centralized management. The majority of gardens were organized in a highly collective manner.

Cultivation Skills

- Since most of the gardens are new and extension services are limited, the growers often lack adequate cultivation knowledge. Most of their skills are learned from gardeners in neighboring villages, from trial and error, and lastly from extension personnel. Knowledge about appropriate use of fertilizers and pesticides is also limited.

Cropping Patterns and Labor

- Most villages only cultivate vegetables during the cool dry season. Some vegetables adapted to warmer temperatures are kept in the gardens beyond the October to April season.
- Since most vegetable gardeners are women, they perform the bulk of the work on the gardens. Women have always been more involved in the cultivation of vegetables in the dieri and falo fields, they are less involved in the irrigated perimeters, and such tasks as hand-watering are more traditionally women's than men's work.
- The daily input of labor varies from one garden to another. In the average garden in which vegetables are grown mainly for consumption, cultivations does not require more than half a day. If organized collectively, each member need not work each day. Hand-watering is the most time demanding task.

Inputs

- Villagers typically have little capital to initiate a garden. They usually pool their money to buy absolute necessities, such as seeds. Often, they depend on financial help and inputs from government agencies or NGOs.
- The cost of gardens vary greatly but most of the cooperatives had kept their expenses under 6000 UM. A major expense is often the purchase of fuel and maintenance costs for the donated or rented pumps.
- Some gardens have difficulty acquiring land for their cultivation. Often the land is on loan from the village or from the prefect.
- Water is free except in one village (Maghama) where the garden must purchase water that is pumped from two wells.

Outputs

- Quantities produced vary enormously from one garden to the next. A very rough estimate of average yields would be 1 kilogram per square meter (a very poor return).
- Only one garden had kept good records on income and this commercial garden reported an income of 46 UM per square meter. Most vegetable gardeners believe they turn a small profit, especially when inputs are kept to a minimum. In their view, any vegetables produced or sold are considered profit.
- Quality of products are generally poor although most vegetables which end up at the market are certainly edible.

Marketing

- Most gardeners sell their vegetables in their local markets. They often sell very small quantities as they are harvested. A common income for a day is only 1-200 UM.
- Marketing costs are low if sold locally. Transport costs are expensive and limit the range of most sellers.

Extension Services and Financial Assistance

- Virtually all the gardens had received some help from outside agencies ranging from a few packets of seeds to a pump. Most gardens had little continuing contact with extension personnel after an initial contact.
- Many agencies are involved in vegetable gardening including SONADER, the Department of Agriculture, the Centre Promotion Feminin, CNRADA, the Peace Corps, USAID, CARITAS, the Catholic Relief Services, Africa '70 and the Partnership for Productivity.

Aims of Vegetable Production

- Reasons given for growing vegetables emphasized consumption requirements, including the improvement of nutrition. Others mentioned a desire to generate incomes.

Constraints to Vegetable Production and Recommendations

— Climatic Constraints

1. Most vegetables cannot tolerate the high temperatures typical of this region in all but the cool winter months. Temperatures and winds can be controlled with simple techniques such as mulching and shading which could be extended to gardeners.
2. Extension of the growing season beyond the winter months could also be encouraged if seeds of vegetables adapted to the other seasons were made available to the vegetable gardeners.
3. Access to adequate water is a problem for most of the gardens. Water retention techniques could be extended and living windbreaks could be considered for gardens with secure land tenure. Other efforts to improve water access, such as the introduction of storage tanks should be investigated.

— Lack of Inputs

1. Insect pests are a serious problem for all gardens. Access to pesticides is limited as is knowledge of proper application. Improving the extension of such knowledge and the materials could be very beneficial to yields.

— Extension Problems

1. Due to a shortage of extension workers, group instruction would seem the best way to extend knowledge. The training session held in 1986 at the agricultural school in Kaedi was well attended and transmitted a great deal of knowledge to a wide group of women's collective gardens. Such efforts should be encouraged.

— Marketing Constraints

1. For those gardens which are producing marketable surpluses, techniques of packaging and transport need to be extended. Communal sale of products across villages should also be investigated, and has been initiated by some Peace Corps volunteers.

— Conservation and Transformation

1. The conservation of vegetables is limited and the sun-drying of a wider repertoire of vegetables should be extended. The feasibility of encouraging small businesses for the transformation of vegetables should be investigated.

ACKNOWLEDGMENTS

There are numerous people we would like to thank and who offered us both help and support during the research, survey and preparation of this document.

We would especially like to thank Mr. Mamadou Diarra, Director of CNRADA, and his staff at the National Research Center in Kaedi for their contributions and assistance. Notable among these people is Mr. Ba Mamadou Lamine, whose advice and reports on CNRADA's vegetable and fruit program were most helpful.

A second group of experts on vegetable production also deserve special thanks. Our interviews with the staffs of the Africa '70 Project as well as of Partners for Productivity were extremely helpful.

Similarly, the many Peace Corps volunteers involved in vegetable production in this area should be thanked here for their assistance, but also recognized for their important contributions to the progress and spread of vegetable cultivation in this region.

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their skills as farmers and their efforts to introduce vegetable gardening into their repertoire of food and income generating enterprises. We hope that our report does them justice, and that the outcome of our research efforts will repay their kindness.

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I. INTRODUCTION

This report presents the findings of a three week survey of vegetable gardening and marketing along the Senegal River Valley undertaken in April of 1986. This survey was conducted under the auspices of the Mauritanian Agricultural Research Project II at the prompting of USAID and the Ministry of Rural Development.

AGRES II personnel, upon completing a dry season farming systems reconnaissance survey along the river valley, had recommended the further encouragement and development of vegetable production in this region (Frankenberger et al. 1986a). Efforts in the 1970s and early 1980s to promote commercial vegetable production, however, have been largely unsuccessful. A better understanding of the constraints under which vegetable production currently operates was, therefore, considered crucial.

Research was concentrated on the eastern part of the River Valley where vegetable cultivation is in general a relatively recent introduction. Most of the villages in this area have only adopted vegetable production in the last two or three years. Most previous research has focused on regions in which vegetable production has been longer established, especially southwest Mauritania (the Trarza region centering on the town of Rosso). With the efforts of CNRADA in recent years in testing different vegetable varieties and cultivation techniques, it was felt that a focus on this eastern sector of the river valley, centered in Kaedi, was timely.

During a three week period between April 6-26, ten villages with thirteen vegetable gardens were surveyed as well as the market in Kaedi (see Table 1). The villages were located in the Gorgol and Brakna regions, from Maghama in the east to Boghe in the west (Map 1).

Further interviews were conducted with organizations involved in vegetable production in this region including Partners for Productivity, Africa '70, Peace Corps and the Department of Agriculture in the Ministry of Rural Development. Background research was completed before field research was initiated and references consulted both before and after research are listed in Appendix A.

The report is organized into several basic sections. The objectives of this study are first outlined followed by a brief description of the methodology, and some of the historical background to vegetable production in Mauritania. The results of the current survey are then presented, including major constraints and recommendations.

Table 1

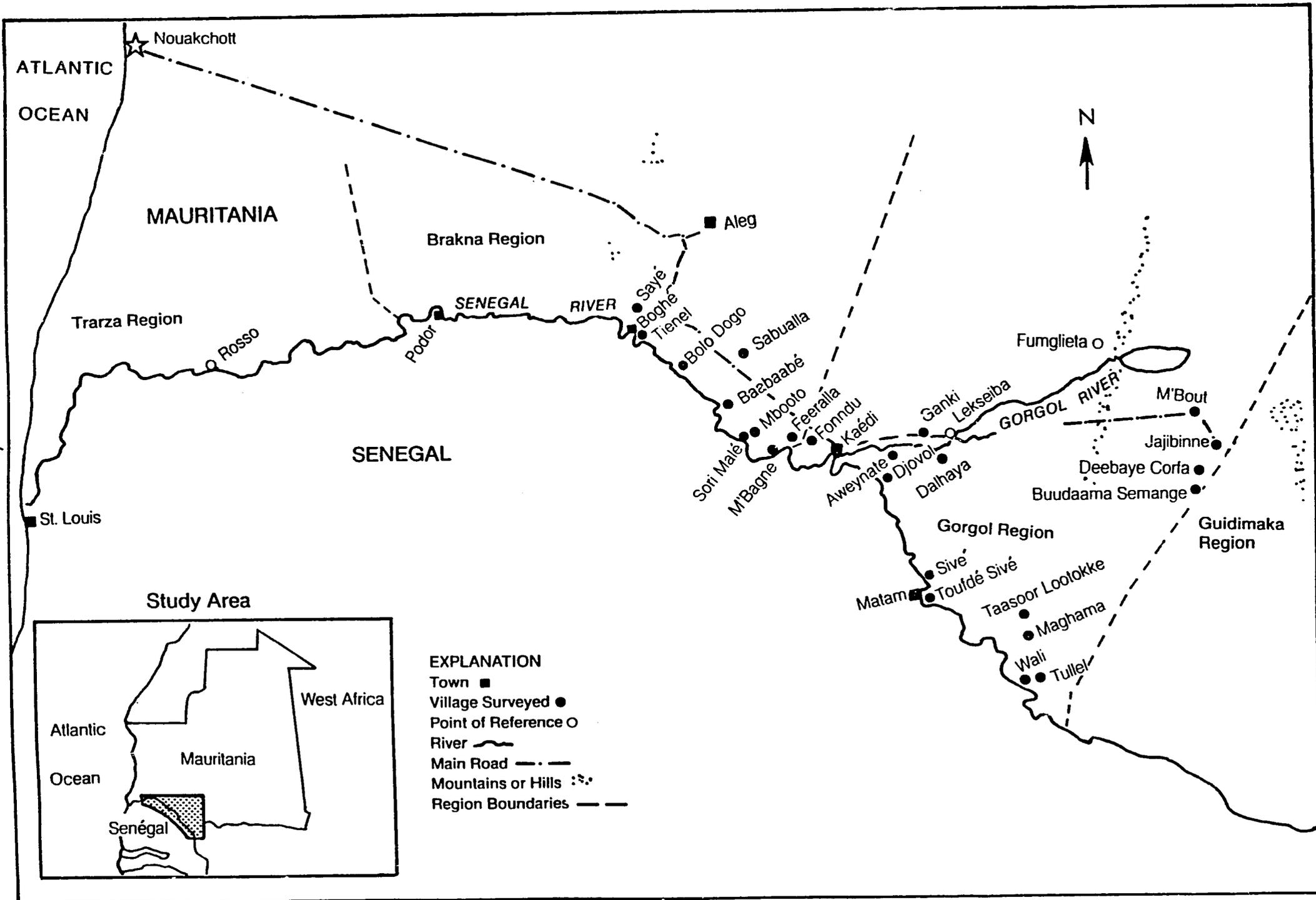
LIST OF SURVEYED VILLAGES AND INTERVIEWS

Date	Name of Village	Interviews
April 6, 1986	Kaedi	-Garden: Jaara Yaxarun Kafo -Market Kaedi
April 8, 1986	Kaedi	-Market, merchants
April 9, 1986	Kaedi	-Market, merchants
April 10, 1986	Djovol	-Garden Djovol 1 -Private garden
April 11, 1986	Djovol	-Market Djovol -Merchants Djovol -Consumers Djovol -Garden: Guiraye -Garden: Djovol 5 -Garden: Djovol 3 -Private garden: Gory II -Garden: Djovol 6
April 12, 1986	Kaedi	-Merchants market
April 13, 1986	Ganki Belinabe	-Garden
April 13, 1986	Aweynate	-Garden -Consumers
April 14, 1986	M'bagne	-Market -Merchants -Garden
April 14, 1986	M'boto	-Garden -Consumers
April 15, 1986	Sori Male	-Garden -Consumers -Market
April 16, 1986	Kaedi	-Market, merchants
April 17, 1986	Bolo Dogo	-Garden -Consumers
April 18, 1986	Boghe	-Market -Merchants -Consumers -Garden
April 18, 1986	Tienel	-Garden
April 19, 1986	Tienel	-Garden
April 20, 1986	Kaedi	-Review
April 21, 1986	Sive	-Garden (women) -Garden (men) -Consumers
April 21, 1986	Toufde Sive	-Caritas
April 22, 1986	Maghama	-Garden (women) -Garden (men) -Consumers

Table 1

LIST OF SURVEYED VILLAGES AND INTERVIEWS

Date	Name of Village	Interviews
April 23, 1986	Kaedi	-Market, merchants -Africa '70
April 24, 1986	Foum Gleita	-Cooperative gardens (3) -Private garden -Boutique
April 25, 1986	Kaedi	-PFP
April 26, 1986	Bababe (Dartiotionbelel) Return to Nouakchott	-Private garden



Map 1. Location of Villages Along the Senegal River

II. METHODOLOGY

A. Village Selection

Ten villages were selected as representative from the 34 villages surveyed by the reconnaissance team in February of 1986. This dry season study had already collected some information relevant to vegetable gardening, helping to direct village choice (Frankenberger et al. 1986b).

An effort was made to select villages which represented the range of diversity found along the river valley. Criteria included variety of water source (both river and well were included), access by road during the rainy season, proximity to large markets, size of village, and ethnic group. Table 2 summarizes these characteristics for the ten villages. Additional villages displaying specialized characteristics are also included and are marked by an asterisk. The village of Aweynate, for example, was not a part of the February reconnaissance survey but was surveyed here to include in the sample a Peuhl village located in a particularly arid location with little other vegetation. Fom Gleita is exceptional in that vegetable production benefits from the dam which provides a constant supply of water via the large perimeter irrigation system. Finally the garden visited in Bababe is notable for the fact that it is a large private garden which won first prize at the Kaedi agricultural fair in March of 1986.

B. Survey Instruments

Three basic questionnaires were employed. The first and most extensive interviews were conducted with the growers themselves. Most of the growers interviewed were in women's cooperatives. Formal interviews were combined with visits to the gardens themselves. A second questionnaire was directed toward merchants in the local market and included questions on prices, quantities sold, and profitability of selling vegetables. The third group of questions were asked of groups of consumers of vegetables. Consumers were contacted at the market or at home, and were questioned about the quantities of vegetables consumed, the amount of money spent on vegetables, and preferences. The questionnaires are included as Appendix B.

A more in-depth study of the market in Kaedi was also undertaken. A series of visits were made to collect comparable data on prices and quantities sold throughout the three week period (Appendix E). A sample of 14 merchants from a pool of approximately 250 vegetable sellers was chosen. The weekly price collection by the Africa '70 project (begun in November of 1985) is also used in this report.

The research team included four members listed in Appendix C. Three of the researchers spoke Pulaar, the language in which most interviews were conducted, while one also spoke Hasanya and Wolof which proved useful in some instances.

Table 2
Characteristics of Surveyed Gardens

Village	Region	Water Source & Pres. Pump	Access	Population	Regional Function	Ethnic Group
Kaedi	Gorgol	r&w some p.	all yr	80000	regional market	mixed
Djovol/ Guiraye	Gorgol	r&w some p.	dry sn	6000	12 km from Kaedi	mixed
Ganki	Gorgol	w no p.	all yr	1000	no reg. function	Halpulaar
Aweynate*	Gorgol	w no p.	all yr	400	8 kms from Kaedi	Peuhl
M'Bagne	Brakna	w no p.	dry sn	3000	regifonal market	mixed
M'Boto	Brakna	w no p	all yr	2500	no reg. function	Halpulaar
Sori Male	Brakna	r some p.	dry sn	560	no reg. function	Halpulaar
Bolo Dogo	Brakna	r some p.	all yr	408	no reg. function	Halpulaar
Boghe	Brakna	r no p.	all yr		regional market	mixed
Tienel	Brakna	r men's p.	all yr	3970	3 kms from Boghe	Halpulaar
Sive	Gorgol	r men's p.	dry sn	1000	no reg. function	Halpulaar
Maghama	Gorgol	w no p.	dry sn	5000	regional market	Halpulaar
Foum Gleita* (Foum Gleitat, Fumglieta)	Brakna	weir lake			no reg. function	mixed

Table 2
Characteristics of Surveyed Gardens

Village	Region	Water Source & Pres. Pump	Access	Population	Regional Function	Ethnic Group
Bababe* (Baabaabe)	Brakna	r p.	all yr	9500	regional market	Halpulaar

Key:

r = river

p = motor pump

w = well

all yr == access all year round

dry sn = only accessible during the dry season

III. BACKGROUND TO RESEARCH

A. Rationale for this Survey

At the presentation of the findings of the reconnaissance survey, USAID personnel expressed concern about the feasibility of expanding vegetable production in Mauritania. They mentioned the numerous problems encountered in the past including lack of transport and of water for irrigation. Similarly, the Secretary General of the Ministry of Rural Development felt that the recommendation of further development of vegetable production should be based only on in-depth study. Past vegetable production projects had failed as a result of insufficient data about the environment and infrastructure.

This current survey addresses these concerns. Although previous studies have been conducted on vegetable production in Mauritania (Quebedeaux et al. 1982), this survey supplements available research results in several important ways. First, this survey focused on a part of the river valley in which vegetable production is relatively new, and which has received little attention in previous studies. Since many of the gardens in this region have only been started in the last few years, earlier research did not have the opportunity to study these new enterprises. Secondly, the production and consumption of vegetables has increased dramatically in recent years, not only in terms of total amounts but in terms of geographic spread. Finally, the methodology used in this survey and its integration with broader data better integrates vegetable production in a farming systems context.

B. History of Vegetable Production in Mauritania

The cultivation of western vegetables in Mauritania emerged largely as a response to the prolonged drought. The drought not only greatly reduced the production of the traditional cereal crops, but also vegetable crops grown in the walo and dieri, such as melons, cowpeas, okra and hibiscus. Western vegetables were introduced in the 1970s in an effort to compensate for these losses and to offer vegetable crops with short growing cycles. Another important goal of the government was to improve the nutrition of Mauritians. The diet had come to consist primarily of cereals, oil and some animal protein and lacked in vitamins. The traditional fresh foods, most notably the wild, gathered leaves and fruits, had diminished in availability with the drought. A third goal was an effort to limit migration into cities by offering an alternative rural activity.

The Ministry of Rural Development has approached the integration of vegetable production into the farming system through three of its services. The first, are the regional extension services (secteurs agricoles) which imported seeds in 1972 and began to introduce them to farmers.

The second service involved in vegetable production has been CNRADA. In 1976, research began along the Senegal River (DeBon 1980). CNRADA has conducted experiments on the three soil types (dieri, fonde, holalde). They have found all of these soils suitable for vegetables, although each needs specific inputs. Dieri soils require organic matter, fonde soils need manure and leguminous plants, while holalde soils need mineral inputs of PK (DeBon May 1980). CNRADA has also conducted multiple varietal tests and comprehensive lists are available of best adapted types and varieties of vegetables. More than 20 species and 500 varieties have been

tested at the various stations (Lamine 1986).

The third government service involved in vegetable production has been SONADER. Although their main goal has been to increase production of irrigated cereals, in recent years there has been concern about diversification of production in perimeters. A German project (GTZ) financed the introduction of vegetable growing into one-third of the small perimeters between Rosso and the Gouraye sector in 1981. SONADER provided technical assistance, while GTZ provided all materials (such as seeds and tools). Since 1981, SONADER has included vegetable production among its programs in small perimeters. Although most vegetable production in this region is organized as women's collectives, SONADER has initiated men's cooperatives to help the farmers repay their perimeter loans.

As of 1982, only about 600 ha. of vegetables were being cultivated in the entire country including hundreds of small garden plots that produce no marketable surplus (Quebedeaux and Parks 1984). The consumption of fruit and vegetable products is still very low compared to the international norm of 60-90 kg. per year per person (FAO 1976). In urban areas of Mauritania, it has been estimated the consumption per individual is 24 kg/year while rural residents consume only 6 kg/year. Nonetheless, over half of the vegetables consumed are imported from Senegal and Europe. It has been estimated that Mauritania would have to triple its domestic production in 14 years just to meet growing rural demand, and much more for import substitution (Quebedeaux and Parks 1984). Yields also remain lower than average for Africa for all vegetables except tomatoes and potatoes (Quebedeaux et al. 1982).

IV. RESULTS OF THE SURVEY

A. General Characteristics of Gardens

The following section gives a brief description of the gardens surveyed including their histories, soil and organizational characteristics. The summary tables of the vegetable garden surveys are presented in Appendix D.

A1. History of the gardens

The majority of the gardens visited are recent. Ten of the twenty-two gardens were in their first production year, while another four were only two years old. The oldest garden was begun in 1959 (Sori Male), while the rest had been started in the last ten years. Some of the constraints to production are undoubtedly due to the recent introduction of vegetable gardening to most farmers in this region.

A2. Location, size and soil and water characteristics

Most of the surveyed gardens are located on fonde soil (thirteen) watered either from the river or from wells. Of the ten gardens watered from the river seven benefited from pumps, while the remaining three were hand-watered. Most of the remainder of the gardens (six) are situated in the dieri watered solely from wells. The final three gardens were located in old river beds and received their water from canals provided by SONADER. The soil characteristics of these three locations differed noticeably with the fonde gardens having clayey soil, the dieri gardens sandy soils, and the gardens in old river beds in heavy clay.

The gardens varied greatly in size. The smallest garden was the newly formed women's cooperative in Djovol (Djovol 3) which measured only 100 square meters. The largest garden was the private garden of Bababe which has 8 hectares in vegetables, and 3.5 hectares planted in fruit. Similarly, the two commercial gardens of Sive were large, totalling 6 hectares with plans to extend to 9 hectares. The majority of the cooperative gardens measured around 1-2 hectares.

A3. Organizational Characteristics

All but one of the surveyed gardens were organized as cooperatives. Three major forms of cooperatives were distinguished:

a) all tasks are done communally or by turns with a central purse. Incomes are either distributed among the members or saved centrally. Fifteen of the gardens were organized in this fashion,

b) members have their own parcel as well as a cooperative parcel. Members control revenues from their own plot while the income from the cooperative plot returns to the group. Eventually this money is distributed among the members. Only two gardens were organized in this way.

c) all the members have their own plots and work on them separately. The revenues are kept by the individual. Four gardens are organized in this fashion.

Despite the range of collective effort displayed in the preceding breakdown, even the most individually organized gardens maintain some cooperative functions. For example, all the gardens buy their seeds as a group and pool their money to make this purchase.

So the majority (68 percent) of the gardens surveyed were organized in the most collective form of organization. The benefits of cooperative effort, including acquiring land, land preparation, coordinating the purchase of inputs, as well as social benefits, seem to override any benefits of individual effort or motivation.

The great majority of the gardens were collectives of women (17), with only two of men and the remaining three having both male and female members. These latter gardens were supervised by the men. In general however, there are no major differences between the men and the women's gardens. Both men and women's gardens are small-scale enterprises engaged primarily in gardening for consumption.

The two commercial gardens (Bababe and Sive) are not included in the categorization discussed above. The garden in Bababe is a cooperative of 15 families which owns its own truck and motorpump. Half of the pump and fencing costs were paid for by USAID via the Peace Corps. The men's garden in Sive was initiated by SONADER to help the men defray their debts and is a cooperative of 48 men. They rent the motorpump from CARITAS and receive help from CARITAS and the Peace Corps as well. The garden at Bababe won first prize at the vegetable fair held in Kaedi in March of 1986, with the gardens at Sive coming in second.

A4. Ethnic Composition

Of the twenty-two gardens surveyed, the vast majority were Halpulaar (15). Of the remaining, four of the gardens were partially Halpulaar partially Maure, two were Soninke, and one Peuhl. Halpulaar is, of course, the dominant ethnic group in the surveyed region. They also seem to have adopted vegetable gardening somewhat in advance of the Soninke, and are more accustomed to including vegetables in their diet than are the Maures.

A5. Management

The gardens showed a wide range of variability in how carefully and centrally they were organized and managed. Eight of the gardens were carefully managed including a detailed book-keeping system, a set distribution system of produce and income, and a common knowledge of quantities grown and sold (for example, Maghama, Djovol 6, Guiraye I). Two of the women's gardens which were managed by men were similarly subject to more rigid management (Kaedi, Tienel). The women in these gardens, however, had little knowledge of the profits of their own gardens.

Six of the gardens had a lower level of management (for example, Djovol 1, Djovol 3, Fom Gleita women's garden). They had no or very simple bookkeeping systems, and the members were unaware of amounts of vegetables or incomes they had produced. They did, however, have a good sense about the viability of vegetable production, marketing, seasonality, and the costs of inputs into their gardens.

The remaining four gardens had a very low level of management (for example, Bolo

Dogo, Djovol 5). They had no concept of amounts produced or any regulated system of vegetable or income distribution. They did have some knowledge of the prices of vegetables.

It must be remembered that these gardens are on the whole quite new and thus it may be premature to expect profits or record keeping. Secondly, many of these gardens are grown for consumption as much as they are for income, and so must be judged on their contribution to the growers' nutrition as well as to their pocketbooks.

B. Cultivation Skills

Since most of the gardens are new and extension services are limited, vegetable growers in this area often lack adequate cultivation knowledge. This results in a high percentage of crop losses, inappropriate use of fertilizers and pesticides, low yields, and inefficient use of time.

What skills the growers do possess are primarily derived from trial and error and to a lesser extent from extension services. Information is shared between gardeners from various villages. This is probably the most important source of practical knowledge, and even material help for the fledgling gardens.

Although some vegetable gardeners have developed considerable skills, knowledge of cultivation techniques is not widespread. The appropriate times for planting and transplanting may have been taught by extension personnel from the Ministry of Agriculture or from Peace Corps volunteers, but many gardens still are planted too late. There are many reasons for planting delays, beyond knowledge of optimum dates. Many gardeners do not get their seeds in time for early planting. Others confront conflicting demands on their time ranging from delayed dieri harvests to heavy domestic duties (see Stone et al. 1986). Finally, some gardeners prefer to wait several weeks after the cessation of the rains until the insects have died off.

The application of water is also sometimes a matter of guesswork. Most gardens are watered twice a day until the soil appears wet. But this amount of water may not always be appropriate, and individual needs of different vegetables are largely unknown. Most gardeners are reluctant to thin their vegetables even if the desirability is known, resulting in small plants and vegetables which command lower prices on the market.

Few gardeners use fertilizers or pesticides. If lucky, gardeners have access to NPK and Urea fertilizers, but apply them haphazardly. Pesticides may be sprayed directly by extension agents. If these inputs are not provided by an agency such as SONADER, most gardens do without.

Many gardeners have not been taught the appropriate use of pesticides. On the one hand, some gardeners poorly understand the dangers of improper application and use them carelessly. They may, for example, spray the vegetables when they are already mature and eat the vegetables immediately after treating them. Recently, the unexplained death of a small girl was reported in a small village with a vegetable garden. It seems likely she was poisoned by eating vegetables that had been sprayed the day before and eaten without being properly washed. On the

pesticides at all. In another village, the gardeners were having serious insect problems and did have access to pesticides. They did not dare use it because the bottle pictured the skull and cross bones of poison and they were unable to read the instructions.

Harvesting is done piecemeal when the vegetables are mature and presents few problems. Most vegetable growers know that certain vegetables such as tomatoes and eggplants yield repeatedly.

Other types of knowledge such as marketing strategies and ways to improve yields were generally absent. This is not surprising considering that most gardens are very small and most gardeners have little access to outside sources of knowledge besides word of mouth. Since most of the vegetable growers are illiterate, dissemination of information via pamphlets is not feasible. It must be noted, however, that the Peace Corps has made great efforts and progress in extending knowledge of vegetable cultivation throughout the region.

C. Cropping Patterns

Most villages only cultivate vegetables during the cool dry season. This includes approximately the months of October to April. In October, the seeds are planted in nurseries, and replanted into the beds by November or December. The harvest begins in February and can continue several months. A summary of the crop calendar in Table 3 indicates the timing of major cultivation. Table 4 specifies the calendar for various vegetables.

D. Labor

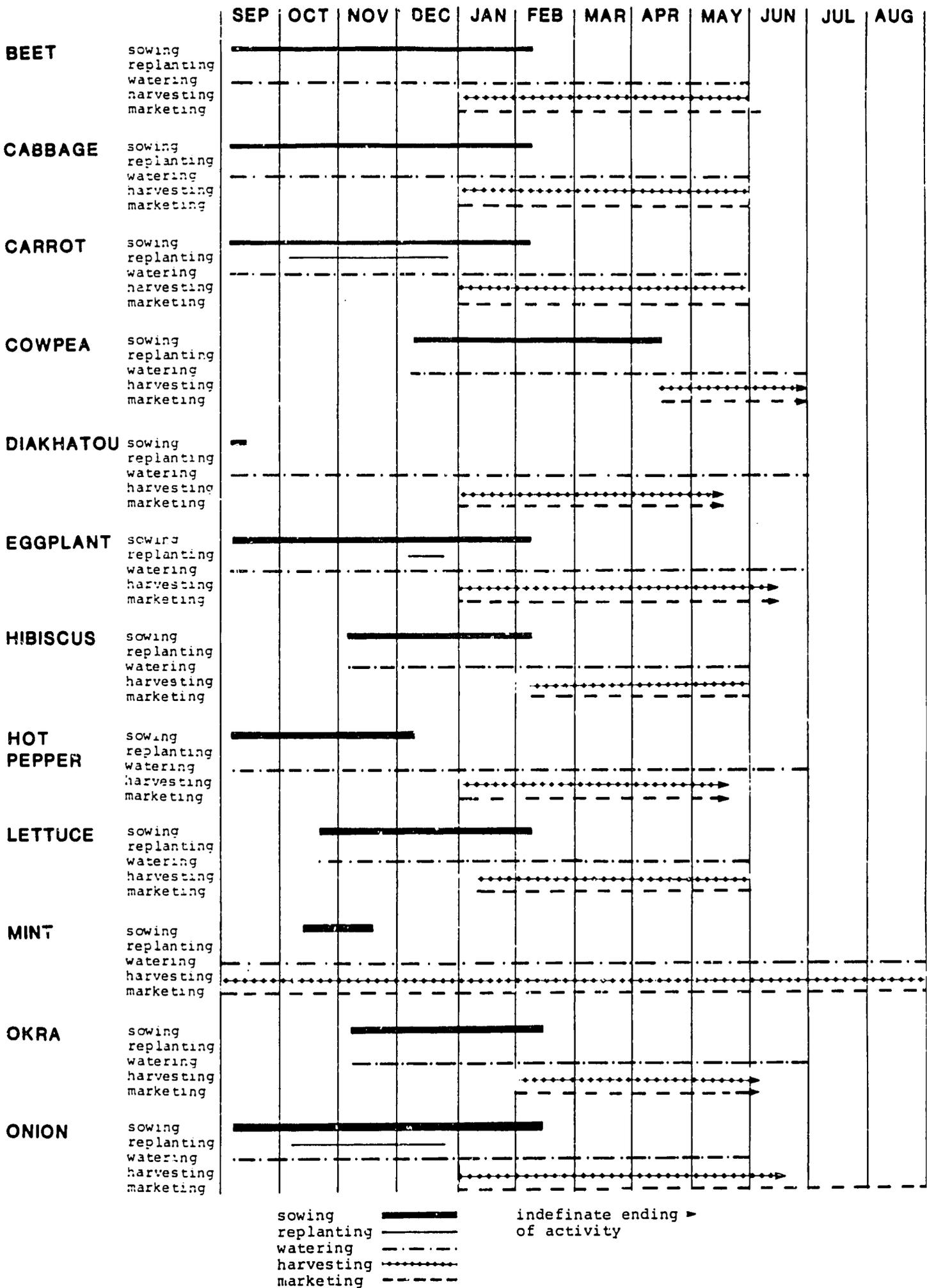
Since most vegetable gardeners are women, they perform the bulk of the work on the gardens. The preponderance of women gardeners may in part be due to the policy of development organizations in directing these efforts to the women. It may also be a function of the sexual division of labor in other agricultural tasks. Men are more involved in the irrigated perimeters, for example, as well as in the cultivation of the other major cereal crops on the dieri and walo. The women may thus have had more time at their disposal for the cultivation of vegetables. Furthermore, some of the tasks necessary to vegetable gardening such as hand-watering are more traditionally women's than men's work. Finally, vegetables are primarily viewed as sauce ingredients which have always been more the concern of women than men. Women commonly, for example, tend the melons and other intercropped sauce plants in the dieri fields. The division of labor in the women's, the mixed and the men's gardens are presented in Table 5.

The daily input of labor is difficult to calculate and varies greatly from one garden to another. The size of the garden, the division of tasks among members, and the system of irrigation, all affect the time spent in cultivation. In the average garden in which vegetables are grown mainly for consumption and only a small portion for sale, cultivation does not require more than half a day. The daily tasks include watering, weeding, harvesting and marketing. The major tasks may require much more investment on certain days including preparation of the soil, planting, and transplanting.

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Fence Reparation												
Soil Preparation												
Sowing												
Transplanting												
Weeding												
Watering												
Harvest												
Market												

Table 3 : CROPPING CALENDAR

TABLE 4. CROPPING CALENDAR BY VEGETABLE



sowing —————
 replanting —————
 watering - - - - -
 harvesting
 marketing - - - - -

indefinite ending ▶
 of activity

TABLE 4. (Continued)

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
PARSLEY	sowing		—————									
	replanting			—————								
	watering											
	harvesting											
	marketing						.....	.....	.....
POTATOE	sowing		—————									
	replanting											
	watering											
	harvesting					.....	.....	.....	
	marketing											
SQUASH	sowing		—————									
	replanting											
	watering											
	harvesting											
	marketing								.....	.....
SWEET PEPPER	sowing			—————								
	replanting											
	watering											
	harvesting											
	marketing											
SWEET POTATOE	sowing	—————	—————	—————	—————	—————	—————	—————				
	replanting											
	watering											
	harvesting					.....	.....	.....	.....	.....	.....	.....
	marketing											
TOMATOE	sowing	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————
	replanting											
	watering											
	harvesting					.....	.....	.....	.....	.....	.....	.....
	marketing											
TURNIP	sowing	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————
	replanting											
	watering											
	harvesting					.....	.....	.....	.....	.....	.....	.....
	marketing											

TABLE 5. DIVISION OF LABOR BETWEEN MEN AND WOMEN

	Women's Gardens (17)	Men's Gardens (2)	Mixed Gardens (3)
Fencing	Women: rarely family members (men) or hired labor	men	both
Preparation Soil	Women: in one case hired labor or family members cutting trees	men	both
Making canals	Women or hired labor (men)	men	both
Sowing/Replanting	women	men	both
Weeding	women	men	both
Watering	women	men	both, or women only
Harvesting	women	men	both
Marketing	women	men and women (wives)	both
Profits	women	men	men, for family income

If organized collectively, not every member need work on the garden every day. If each member is given her/his own plot, however, a daily visit to the garden is usually necessary especially for watering. Watering, as mentioned, is usually done twice a day and takes about 1-2 hours a day per plot. This may become very burdensome, especially if the garden is at some distance from the village. Marketing can also be very time consuming and if not done collectively can require each woman to visit the market every morning to sell her small pile of vegetables.

E. Inputs

Villagers typically have little capital available to start a garden. They usually pool their money in order to buy absolute necessities such as seeds. Often, however, they get financial help from other sources such as from the government or from an international organization.

E1. Funds to Cover Variable Costs

The funds to meet these costs are almost always collected among villagers. Each member puts up a certain amount in cash when the garden is first started ranging from 20-400 UM depending on other sources of income for the garden. Normally, only those who will be actively involved in the garden contribute to the kitty. In the village of MBagne, however, all the women of the village pooled their money in order to start a garden although only a certain number women were going to work.

Most of the gardens also have a system which involves monthly contributions of money to cover debts and costs (for example, Maghama men and women's gardens). The costs may become quite high if collected month after month (for example, Guiraye I, Djovol I). Other gardens only collect funds when a specific purchase is made (for example, Sori Male, Tienel).

Rarely, the costs of the gardens may be partially covered by remittances from emigrated villagers. This may be especially true for the larger purchases such as a well or a pump (for example, Guiraye I).

In one instance (MBagne), the government in 1975 gave the garden 3000 UM as start-up costs.

E2. Variable Costs and Incomes

The costs of gardens vary greatly. The least invested was 650 UM while the private garden in Bababe had sunk 2,475,000 UM into its garden. The average amount for the collective gardens was of course much lower. Fifty percent of the gardens have kept their expenses under 6000 UM. These gardens, however, did not invest in long-term improvements.

Most of the gardens located next to the river have access to a pump. In most cases this pump was a gift from the Peace Corps or some other organization. Sometimes, the pump is rented from CARITAS and SONADER. Although the gardeners do not have to purchase the pumps, they must still pay for the fuel and maintenance which is often a major expense for these small gardening operations.

Of the gardens which could estimate their incomes and profits, only one was carrying a debt (10,000 UM). The other ten gardens all reported a profit for the preceding year.

E3. Land

Access to land is often a major problem for vegetable gardeners. Often the land is village property which is loaned to the women by the elders of the village. Alternatively, the prefect may allot the field to the cooperative (for example, Maghama, Kaedi). Rarely, the land may have belonged to a cooperative member. Some of the problems involved in access to land center around other people's reluctance to lend them land which is a part of their inheritance, even though the land may not have been cultivated for many years due to the drought (for example, Boghe).

The women in Boghe illustrate some of these problems. Their garden is situated on falo land at the edge of the river. They have lost their vegetable plants several times due to a sudden rise in the river which washed away the garden. They had begun asking the prefect for a new location a year and a half earlier and still had no answer at the time of the survey.

E4. Water

Water is free except in Maghama where people are charged for water that is pumped from two wells. The members of the gardens pay 5 UM per barrel of water, and must also pay for transport to the garden. They use from two to five barrels per day on the each plot. Although the three gardens in Foug Gleita do not have to pay for the water they get from canals, the rumor is that SONADER will begin to charge if too many people use the water for commercial purposes.

F. Outputs

F1. Quantities Produced

Quantities produced vary enormously from one garden to the next. Only one garden (MBagne) could estimate yields per plot. They averaged 20–25 kg. per plot although one woman managed to harvest 50 kg. from her one plot. Most gardens could only estimate yields for the garden as a whole. From these data, we can estimate an average yield of 1 kg per meter square. The range was from .06 to 3 kg per square meter. This figure should be read with caution however because of the difficulty of most gardens in monitoring outputs. Furthermore, the total area of the garden often does not reflect the actual amount of land under cultivation. Often large alleyways are left between plots, meaning that perhaps only half of the garden area is actually under cultivation. It nonetheless gives a rough idea of the poor returns most vegetable gardeners get for their efforts.

It is not always the larger gardens which produce the most. The small garden at Aweynate for example produced in the same unit area 3 kg. for every 2.1 kg produced at the very large garden at Bababe.

F2. Incomes

Incomes are even more difficult to estimate than quantities produced. The only garden which had good data on income was the commercial garden in Bababe. They reported an income for the 1984-85 year of 46 UM per square meter. They had not yet estimated their income for 1985-86, although they were confident it would exceed the previous year's. They had lost 40 percent of their production due to transport problems - their vehicle had broken down on the way to Nouakchott. Bababe's income was the highest of all gardens. The lowest income was reported by Sori Male which reported only 2000 UM for the 1984-5 season.

It is not worthwhile attempting to estimate profits per unit area for the other gardens. Most gardens have a very poor idea of their cumulative incomes, since most marketing is done piecemeal. For the current 1985-86, furthermore, the harvest was still underway at the time of the survey. Efforts to estimate incomes were thus not considered useful. For example, the women of the garden of Tienel reported an income of 3100 UM. The size of the garden is 2 hectares although only half was under cultivation since the motorpump could not reach the rest. If we were to just divide the income by the size, we would get only .3 UM per square meter which is a ludicrously low income. Even the large, well-run garden at Djeol 1 reports only 1.5 UM per square meters income. Most vegetable gardeners believe they turn a small profit, especially when any inputs are kept to a minimum. In their view, any vegetables produced or sold are considered profit.

F3. Quality of Products

Quality is generally poor, although most vegetables which end up at the market are certainly edible. The imported vegetables from Europe or Senegal are often of much superior quality, although this does always make a great difference to local consumers. It is not uncommon to see a customer purchase an inferior vegetable from one merchant, while the seller in the next stall is selling a much higher quality vegetable at the same price. This puzzle will be discussed further under marketing.

G. Marketing

Almost all the vegetables are sold at local markets either by the producers themselves or by their wives in the case of the male gardens. Rarely, vegetables are sold to a middle man (for example, mint is sold to travelling merchants by the garden in Tienel). Mostly the producers themselves take their small amount of produce to market and sell them on a small table or on the ground. Quantities often do not exceed a few kilograms, and they sell their products in small piles. What is not sold, is consumed. A common income for a day is only 100-200 UM.

The market is usually full of these petty merchants who do not compete with each other. Some effort may be made to improve the appearance of vegetables such as peeling carrots or sweet potatoes. Occasionally, the price for some products, such as old wrinkled potatoes, is lower than fresher vegetables. In other cases, customers may actually prefer older vegetables. A tomato seller in Boghe was selling old and pasty vegetables at the time of the survey. Nonetheless she sold almost ten kilos of these tomatoes in half an hour. She was a large scale market woman with many regular customers, but the primary reason given for why she sold

so many tomatoes was because they were already nearly porridge and thus easy to cook. It is not known how representative this example is but, nonetheless, western standards of vegetable quality may not always be appropriate.

Prices can fluctuate dramatically, responsive mostly to a glut in supply during the peak growing season. Appendix E provides data on price fluctuations recorded for the Kaedi market.

G1. Marketing Costs

The primary cost of marketing is time. Only in the markets of Kaedi and Boghe are merchants charged a nominal fee (10 UM in Kaedi and 5 UM in Boghe per day). Larger merchants may have to rent scales and a stall, but most vegetable sellers do not have access to this equipment, and weigh their produce with the scales of another merchant if necessary.

Since the costs of marketing are so low, women consider any sale a profit. The few larger market women may have to sell a great deal to cover their costs. One woman in Kaedi must pay 900 UM a month (300 for the market dues, 300 for the scale, 300 for the stall). This kind of investment in selling is unusual, however.

G2. Transport

Transportation is a major problem in the marketing of vegetables. Most vegetable growers are limited to their local village or neighboring markets where competition may be high (for example, the Djeol gardens, Goury I). Transport is either not available at all, or is too expensive, especially given the very low rates of return on vegetable sales. Also vegetables tend to spoil quickly, and may not survive delayed or lengthy trips. Some vegetables, such as onions and potatoes, are of course more tolerant of transport problems than are others such as lettuce or tomatoes. Due to these and other problems, many vegetable growers don't even know the cost of transport.

The only garden with access to their own transport is the private commercial garden in Bababe. This garden owns a refrigerator truck to transport their products to Nouakchott, and which is also used as a cold-storage container if necessary. As mentioned above, however, this truck broke down as they attempted to transport the bulk of their produce to Nouakchott in the last year.

Since vegetable growing is restricted almost entirely to the cool dry season, the other difficulty of transport is not encountered i.e. that many villages and whole areas of the country are inaccessible during the rains. If efforts are made to extend the growing season, this major constraint must be taken into account.

H. Extension Services and Financial Assistance

Virtually all the gardens surveyed had received some help from outside agencies ranging from a few packets of seeds up to a pump. Most gardens have had little continuing contact with extension after an initial contact. This lack of follow-through will be discussed below under constraints.

Most of the help to date consists of some initial financial assistance (seeds,

fertilizers, pumps) and some extension guidance in how to start a garden (including information on appropriate vegetables, planting techniques, etc.). Little management training is given, which hampers the gardens' abilities to expand.

The following list summarizes the financial and input assistance received:

1. Pumps: Eight villages had access to motorpumps. Five were outright gifts, two came at half price, and one is rented.
2. Tools: Six villages received tools from various agencies. Most commonly these tools consisted of shovels, picks, watering cans, etc.
3. Fences: Five villages received fences or were given the material to construct fences. Usually, this consists of wire and/or iron spikes, to replace the traditional wood and thorn fences.
4. Seeds: This is the most common gift, with fifteen of the gardens having received them. Although free seeds were always welcome, the quality was not always good.
5. Fertilizers: Only two of the gardens have received fertilizers.
6. Pesticides. Seven gardens have been given pesticides.
7. Money. In only one case had money been given directly to the members of the garden. This was only once in 1975.
8. Credit. Credit is also rare, and was only reported once.
9. Food. The Food for Work program had been tested in Foun Gleita.
10. Purchase of Fertilizer, Pesticides, Seeds. The chance to purchase these goods which would often be difficult to acquire on the open market, is considered a service here. The sale of seeds by assistance organizations is rare, mostly they are given as gifts.
11. Management tools. One women's cooperative which included a garden, was given a cash box and a calculator.

The agencies involved include SONADER, the Department of Agriculture, the Centre Promotion Feminin, CNRADA, Regional Inspection, Peace Corps, USAID, CARITAS, Catholic Relief Services, Partnership for Productive, and Africa '70. The most active organizations included SONADER, the Department of Agriculture, and the Peace Corps. Some of the organizations (such as Africa '70 and CARITAS) work in restricted areas and so would not be well represented in a broader regional survey.

I. Aims of Vegetable Production

The vegetable growers surveyed expressed a variety of reasons for cultivating vegetables. Most of the growers placed consumption as a primary objective (Sive, Maghama, Bolo Dogo, Tienel, Goury II, Aweynate, Goury I, Djeol 1, MBagne,

MBoto, Sori Male). Some expressed this as a desire to improve the nutrition of themselves and their children (MBagne, Sori Male, Bolo Dogo, Goury II). Others found the purchase of Senegalese vegetables too costly (Maghama women) or wanted to substitute new vegetables for traditional ones which no longer yield (Tienel, MBoto). Others add income generation as a goal (Sori Male, Djeol 1, Goury I, Sive men's, Goury II). The village of Aweynate stated that they had started the garden for consumption but if they received extension advice and marketing posed no problem, they would gladly commercialize. There are few other sources of income for rural women in these areas.

These goals should be kept in mind as recommendations for improvements are offered. In introducing new varieties, for example, taste preferences may prove more important to the growers than yield. Similarly, nutritional considerations should be taken into account. According to a 1981 survey, vitamins A and C are generally deficient in the Mauritanian diet (USAID 1981). Vegetables high in these vitamins, such as parsley, green peppers, tomatoes, turnips, sweet potatoes, and squash, should thus be encouraged.

National goals of self-sufficiency in vegetable production and rural income generation are also, however, relevant.

J. Storage and Preservation

Many gardens consume or sell all that they produce and so feel no need for conservation techniques (for example, Goury II, Aweynate). The most commonly dried vegetable is okra (for example, the gardens of Foum Gleita, Djeol 1, Tienel, Sive, MBagne) followed by hibiscus and the dried leaves of the cowpea (Tienel, MBagne). Others dry the leaves of onions, and conserve the onions themselves by laying them in sand in a dark room which can preserve them up to seven months (Kaedi, Djeol 3, Tienel, Sive). Onions can also be conserved by leaving them in the field without watering (Sive men's garden). Sweet potatoes are stored in wet sand (Sive men's garden).

Others stated that they had little knowledge of conservation practices but would be interested in learning more (for example, Foum Gleita mixed, Djeol 1). The large private garden in Bababe said they would like to learn about canning.

V. CONSTRAINTS TO VEGETABLE PRODUCTION IN THE SENEGAL RIVER VALLEY

This section will be organized under five basic headings. Climatic constraints account, in part, for the limited production of vegetables in the river valley. This section includes the problems of access to water. This discussion leads into the problems of other natural constraints such as pests and soil infertility tied to the lack of inputs such as pesticides, seeds and fertilizers to help combat such constraints. This is followed by a discussion of the lack of knowledge on the part of many gardeners in the proper use of such inputs and in cultivation techniques. Marketing is also a common problem throughout the survey region. The storage, packaging and conservation of vegetables is the final constraint discussed.

A. Climatic Constraints

Most vegetables cannot tolerate temperatures in excess of 35 degrees centigrade. This limits vegetable growing to the cool dry season over the winter months. There are vegetables marginally adapted to the warmer temperatures, but they give reduced yields. Some of the vegetables that can be grown in the warmer temperatures include eggplant, melons, okra, pepper, squash, maize, sweet potatoes, tomato, watermelon and cowpeas (Quebedeaux et al. 1982). Many of these are already grown in dieri and walo fields, and the conservation of these crops is more fully developed than for the other produce (see storage and preservation). Sand-laden winds along with the heat preclude most vegetable gardening in the later season.

Access to adequate water is a problem for most of the gardeners surveyed (see also Frankenberger et al. 1986b and Stone et al. 1986). The water is available in the river or in wells, but many gardeners have difficulties getting the water to the gardens. Most gardens are hand-watered and those that have access to pumped irrigation water may suffer from mechanical failures (Djovol 1). The garden in Maghama must pay for its water which represents a major expense to the gardeners. In one case, the problem was actually too much water applied with an irrigation pump, reflecting poor leveling and water application techniques (Foum Gleita, mixed).

Compensating Strategies

1. Several of the gardens surveyed made efforts to keep their gardens productive longer than just the cool season. Two of the gardens (Djovol 5, Bababe) cultivated maize, sorghum and millet in the garden during the rainy season. The garden in Kaedi cultivated cowpeas and continued to tend eggplants that had been planted in the cool season during the hot season. The Kaedi garden under the direction of Africa 70 also planted maize during the wet season. The garden in Tienel grows mint, eggplant, onions, okra, hot peppers and bitter tomato in the off-season.
2. Most gardeners water twice every day in order to adequately moisten their crops.

Recommendations

1. Temperatures and winds can be controlled in gardens with simple techniques of mulching and shading. This would allow extension of the vegetable season letting gardeners take advantage of higher prices at the beginning and end of the more common growing season. Although these techniques are known by Peace Corps volunteers and other extension personnel (Lent and Pecant 1986) the techniques have not often been taught to the gardeners.
2. Water retention and management techniques have similarly not been extended to the gardeners. The simple advice to water at the coolest part of the day, rather than in the midday as is often done, is not commonly given. Other techniques such as sunken beds, drip irrigation, merit further research and extension.
3. Living windbreaks could serve multiple purposes including protection from wind and sun, but also stabilization of the soil, could provide supplementary produce, and even in the case of some species (eg. Neem trees) act as natural pesticides.

The planting of such windbreaks and shades, however, may be made difficult by the uncertain land tenure of some of the gardens. This factor should be taken into account before long-term plans are made.

4. Efforts should be made to improve water access for vegetable gardens. Storage tanks might be appropriate, especially for some gardens where access to water is more limited. Research might be conducted on the use of animal traction, hand pumps or small diesel pumps to lift water into storage tanks. All of these measures, however require capital which is in short supply and the gardeners ability to afford such equipment should be considered (see Frankenberger et al. 1986b).
5. Extension of the vegetable growing season could greatly improve gardeners profits, as they could avoid the seasonal glut and lower prices. Free seeds are currently distributed only in the fall, and are difficult to acquire in the off-season. The availability of seeds for vegetables adapted to the wetter seasons could give the gardeners the option of extending their production. Such varieties might be obtained from Senegal, IITA or the Asian Vegetable Research and Development Center in Taiwan.

B. Lack of Inputs

Various of the problems contributing to poor yields cited by the gardeners reflect a lack of appropriate inputs. The most common complaint of the gardeners surveyed was of pest attacks (Djovol 1, Djovol 3, Fourn Gleita (women), Fourn Gleita (Sira Ba), Djovol Guiraye II, Aweynate, Bolo Dogo, Tienel, Sive, MBagne, MBoto). Some noted they had lost all of their harvest of certain vegetables to pest attacks. Tomatoes and cabbage seem especially sensitive. The problem of pests also limits the growing season. Gardeners must wait several weeks after the end of the rainy season before planting until the insect population has diminished (Lent and Pecant 1986).

Other pests include larger animals and many gardeners cited their need for adequate fencing. Traditionally, farmers used branches to fence fields from animal predation. Since the drought, many trees from which the branches were cut have died. The alternative of metal fences is expensive and often beyond farmers means. In 1982, one meter of metal fence cost 40 UM and it was estimated that the cost of modern fencing was equal to 35-40 percent of the overall expense of vegetable production (Quebedeaux et al. 1982). Again a major investment in fencing is tied to the security of land tenure.

Diseases are not such a problem because of the low humidity but could be if the growing season were extended into the rainy season (Quebedeaux et al. 1982).

Villagers also noted the difficulty in getting seeds. Some donated seeds were found to be of poor quality and difficult to germinate (Bababe). Others received the seeds too late for timely planting.

What chemical fertilizers are used have generally been donated (Sori Male, Djovol 1, Guiraye I, Sive). They may not receive the fertilizers each year and thus cannot maintain soil fertility.

Compensating Strategies

1. When available, pesticides are applied. As mentioned earlier (See Section B - Cultivation Techniques), even when available pesticides are not always properly applied.
2. Communal funds are used to purchase fencing or at least to start saving for fencing.
3. An extensive inventory of pests has been made by CNRADA researchers. Among the more common pests are fruit borers in tomatoes, larvae worms in cabbage, and fruit flies on melons and squash. Most damage is done by aphids, white flies, mites, and grasshoppers.
4. Some gardeners travel into Senegal to purchase their seeds (Maghama women's garden, Djovol 1) because of the difficulty of finding good seeds on the Mauritanian open market.

5. Some gardeners apply manure as a substitute for commercial fertilizers (M'Bagne).

Recommendations

1. The timely application of pesticides is both a question of supply and knowledge. Pesticides are expensive and difficult to acquire on the open market. Most gardeners depend on donations from government or private agencies for the material and often even for the direct application. This dependence on external agencies means that often the vegetables do not get sprayed at all, or so late as to represent a health hazard. Natural pesticides would seem preferable. Techniques such as not planting similar vegetables together can inhibit the damage done by pests. The use of border plants with natural pesticide qualities should also be investigated.
2. Soil improvement techniques could be extended without dependence on chemical fertilization. The use of organic fertilizers, for example, could improve the texture of the sandy soil upon which some gardens are situated and so increase the retention of water and soil nutrients (Lent and Pecant 1986).
3. The encouragement of the private sector in the sale of seeds, fertilizers and pesticides is perhaps premature given the small amounts of capital available to most vegetable growers. Nevertheless, the dependence on donations from government and NGOs is unfortunate and could be difficult to change in the future. Intermediary forms, such as purchase of seeds at subsidized prices from government agencies, may be preferable.

C. Cultivation Techniques and Timing

Several of the problems cited and recommendations made above derive more from a lack of knowledge of appropriate cultivation techniques rather than a lack of inputs *per se*. Many vegetable growers receive limited advice from extension personnel, and learn techniques through trial and error and through copying the techniques of other gardeners. Such problems noted in this survey included the too high density of plants, improper transplanting techniques, poor leveling of plots, placing all vegetable varieties in each plot so that each vegetable is not cultivated to suit its needs, improper water application, etc. Techniques to deal with these problems exist, but have not been taught to the gardeners. These techniques have the advantage of being no cost improvements easily made by the gardeners themselves.

Many of the gardens are planted too late delaying vegetable growth into the hotter season and reducing yields. This is in part a problem of seed supply, in part a problem of the lack of time for vegetable cultivation as work on the dieri fields extends, but also lack of knowledge.

Recommendations

1. Due to a shortage of government extension workers trained in vegetable production, it is not feasible to propose individual visits to each garden. Group instruction is more feasible whether on the site of a particular garden, or at a more central location. The training session held in September of 1986

at L'Ecole Nationale de Formation et Vulgarisation Agricole at Kaedi should be replicated. The presidents of numerous gardens were brought together for ten days of intensive training and were asked about their constraints. Possibilities for seminars in more isolated regions and at times less busy in the agricultural year should also be explored (see Stone et al. 1986). Furthermore, the increasing involvement of Peace Corps volunteers in vegetable production should be encouraged.

D. Marketing Constraints

Despite the fact that vegetable production is limited, the growers are confronted with marketing problems for their surpluses. Primary problems include: 1) an absence of an adequate road system to transport products to urban area 2) difficulty in the storage of vegetables 3) high cost of land transportation, and 4) lack of knowledge about the market. A recent USAID report found the cost for the transport of one kilogram to vary from 43.90 UM to 104.50 UM (Quebedeaux et al. 1982). Many vegetable producers strive to resolve the problem of transportation by using donkey or horse carriages, but these are not efficient for long distances and large quantities. Their cost, although comparatively low, is still prohibitive to many vegetable growers. In general, the vegetable growers sell to one another, and may have to discard spoiled produce which is not sold.

Recommendations

1. Many of the gardens are producing such small surpluses that transport and marketing concerns are still premature. For those that are producing marketable surpluses, however, techniques of packaging and transport need to be extended (see also Frankenberger et al. 1986b). These are recognized as areas needing further research (Lamine 1986).
2. Some communal sale of products may be feasible. Many women still sell their produce individually and in very small quantities. Coordination between women and between gardens for rental of transport to more major centers should be feasible.
3. Research could focus on identifying or developing vegetable varieties that transport easily, such as tomatoes with harder skins (Frankenberger et al. 1986b). Such varieties may already exist elsewhere.

E. Conservation and Transformation of Products

Techniques of vegetable conservation are limited. Certain vegetables are dried, others stored underground to increase their shelf-life. There exists interest on the part of gardeners in learning techniques of conservation and this topic is recognized by CNRADA as needing further research (Lamine 1986).

Recommendations

1. Sun-drying of vegetables could be extended beyond okra. Through Peace Corps volunteers or seminars, very simple techniques of screen drying of tomatoes, squashes, etc. could be taught to the vegetable growers. Such practices could

give gardeners access to their own produce during other seasons, as well as increasing their sales.

2. The feasibility of encouraging small businesses for the transformation of vegetable products is unknown. Further research into the viability of small enterprises for the drying or canning of vegetables should be conducted.

Appendix A

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APPENDIX B

I. Questions to the Vegetable Producers

- A. General questions
- B. Vegetables grown
- C. Composition of the group
- D. Organization of the work
- E. Technical data
- F. Extension and financing
- G. Production
- H. Management
- I. Market data
- J. Opinion of producers about feasibility of vegetable production
- K. Conservation practices

A-K specified:

A. GENERAL QUESTIONS

- 1. Size of vegetable garden
Where situated; soil type
- 2. Which vegetables grown
- 3. Quantities grown
- 4. History of vegetable production in the village
- 5. Individual or cooperative
- 6. Number of participants

B. VEGETABLES GROWN

- 1. Which vegetables
- 2. Where are they from (seeds, plants)
- 3. Quantities grown, how many crops
- 4. Quality of vegetables
- 5. When planted/seeded
- 6. When harvested
- 7. Season when gardening

8. Consumption/sale

9. Losses

C. COMPOSITION OF THE GROUP

1. Situation of the group in the socio-political structure

2. Language; tribe

3. Connection among members of the group; family, neighbors

4. Approximate age of members

D. ORGANIZATION OF THE WORK

1. Division of labor (planting/seeding; watering; weeding; harvesting; fences; preparation of soil; selling activities; etc.)

2. Frequency of the work

3. Distribution of revenues (how, who decides, when)

E. TECHNICAL DATA

1. Technical competence of the members (knowledge about vegetable gardening, irrigation methods, etc.)

2. Production quality

3. Basic requisites: availability
 origin
 prices

4. Equipment; land; means of production; belonging to whom?

5. Water resources (well, river, marigot)

6. Handwatered or motorpump; size and make of pump

7. Inputs (fertilizers, insecticides)

8. Size of garden

9. Transport possibilities and constraints

10. Literacy of members; education level

F. EXTENSION AND FINANCING

1. Extension services (e.g. SONADER, International Organizations)
2. Financial help; from which organization; cash or materials

G. PRODUCTION STATISTICS

1. Overview of vegetable production since production started
2. Profits (mostly received from vegetable sales)
3. Costs (fertilizers; insecticides; motorpump, maintenance and gasoil; seeds; hired labor; tools; other materials; transport; etc.)
4. Net profits

H. MANAGEMENT

1. Management of distribution of vegetables for consumption
2. Management of distribution of vegetables for sale
3. Management of revenues
4. Who makes the decisions; how
5. Entrance to the cooperative
6. Payments for social purposes, saving funds
7. Cash situation
8. Accountancy documents
9. Realized investments by the group, for the garden
10. Realized investments by the group, for other purposes

I. MARKETING DATA

1. Local market situation: size
which products sold
access to marketing
figures of sales
2. Local demand

3. Local competition
4. Relation cost-price/selling price
5. Possibilities for marketing vegetables on local level
6. Existing regional marketing possibilities (which products; prices)*
7. Interregional markets (which products exported to this market; quality; prices)**
8. Costs of marketing

J. OPINION OF PRODUCERS ABOUT FEASIBILITY OF VEGETABLE PRODUCTION

1. Why are they growing vegetables
2. Which vegetables give the highest profit
3. Other sources of income; which is the most important
4. Willingness to extend vegetable production, why (not)
5. Necessity of external assistance when starting vegetable production
6. Necessity of external assistance when vegetable production already started

K. CONSERVATION PRACTICES

1. Existing modes of conservation
2. Known methods of conservation
3. Projects to start conserving vegetables

* To how many markets are they selling their products

** How far is the farthest market

II. Questions to be Asked at the Market Place

- A. Size of the market; how many markets
- B. Who are selling vegetables
- C. When are the vegetables sold
- D. Quantities sold
- E. Cost-prices vs. selling-prices
- F. Price fluctuations
- G. Surplus/shortages of vegetables to sell

III. Questions to the Vegetable Consumers

- A. Which vegetables are bought
- B. Prices
- C. Quantities
- D. Which vegetables in which seasons
- E. Price fluctuations
- F. Money spent on vegetables
- G. Vegetable preference
- H. Opinion about growing vegetables themselves
- I. Are they growing vegetables themselves

IV. Questions to the Vegetable Traders

- A. How long have they been trading in vegetables
- B. Which vegetables, quantities
- C. Cost-prices vs. selling-prices
- D. Location of the (consumers) market(s)
- E. Competition

- F. Transport
- G. Hired "staff"
- H. Profits - costs - net profits
- I. Perception whether marketing of vegetable production is lucrative or not
- J. Which vegetables give the highest profits
- K. Conservation practices
- L. Other sources of income/revenues
- M. Occupation when vegetable season is over

APPENDIX C

MEMBERS OF THE RESEARCH TEAM

- Mr. Sarr Hamidou, Researcher in the division for vegetables and fruits at CNRADA, B.P. 22, Kaedi.
- Ms. N'Diaye Fatou, Department Manager, Ministry of Social Affairs, Nouakchott.
- Mr. Sy Moussa, Agricultural School, Kaedi.
- Ms. Barbara Perquin, Social Anthropologist, Institute of Cultural Anthropology, University of Leiden, Holland.

APPENDIX D

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

	<u>GUIRAYE II</u>	<u>GANKI BELINABE</u>	<u>AWEYNATE</u>
<u>A. GENERAL</u>			
Size	204 m ²	2000 m ²	630 m ²
Location	Fonde.	Dieri.	Dieri.
Soil type	Clayey.	Sandy.	Sandy.
Vegetables grown and quantities	Onions, tomatoes, cabbages, lettuce, squash. Quantities unknown.	Onions, tomatoes, eggplants, potatoes.	Cabbages - 400 kg. Carrots - 130 kg. Lettuce Eggplant - 300 kg. Tomatoes - 300 kg. Onions Hibiscus - 20 kg. Turnip - 60 kg. Beets - 30 kg. Potatoes - 80 kg. Every vegetable one seed packet.
Reasons for growing those vegetables		Gift from Ministry of Agriculture. Potatoes grow well in sandy soil; obtained from family member.	Gift from Ministry of Agriculture.
39 Origin of seeds	Kaedi.	Potatoes from Nouakchott. Other seeds from Ministry of Agriculture.	Onions from Kaedi. Other seeds from Ministry of Agriculture.
Number of yields			One. Only tomatoes & eggplant are harvested continuously.
Individual/Coop	Private; 1 family.	Coop.	Coop.
Number of members		50 women.	72 women, 32 men from 78 households.
<u>B. VEGETABLES GROWN</u>			
Quality	Bad, parasites.	Good, but onions too closely planted.	Good, except for parasites. Melon went bad.
Date of planting or seeding	December '85.		December 27, 1985.
Date of harvesting	February, March '86 for tomatoes, cabbages, lettuce.	Begin March: potatoes.	Jan/Feb: Lettuce. Rest in March. Onions not yet yielded.
Seasons	Cold.	Cold.	Cold.
Portion consumed/sold	Not estimated.	Both, don't know proportions.	Largest part sold. Only lettuce,

GUIRAYE II

GANKI BELINABE

AWEYNATE

Portion consumed/
sold (Cont.)

Preferred vegetables Onions, cabbage, parsley.

Losses: which/how Yes, from parasites and children
who pick vegetables.

beets, hibiscus and small quantities
of other vegetables are consumed.

Tomatoes: several yields. Onions
and potatoes: easy to conserve.

Tomatoes, cabbages, melons by
caterpillars and other parasites.

C. COMPOSITION OF THE GROUP

Language Halpulaar.

Tribe Sarabole.

Relations Family.

Halpulaar.

Halpulaar.

Halpulaar.

Peuhl.

Whole village.

D. ORGANIZATION OF THE WORK

DIVISION:

Plant/seeding Family.

Watering Family.

Weeding Family.

Fencing Family.

Prep soil Family.

Harvest Family.

Sale Wife.

Others

FREQUENCY:

Plant/seeding

Watering

Weeding

Fencing

Prep soil

Harvest

Men.

Women, in groups.

Men.

Men.

Men.

Men.

Men (in the garden itself).

Nurseries one time. Direct sowing
several times.

2 times/day.

Fridays, 1 time/week.

1 time, took two days.

1 time.

Every day.

GUIRAYE II**GANKI BELINABE****ANEYNATE**

Frequency (Cont.)

Sale

Every day.

Others

E. TECHNICAL DATA

Skills	Not a great knowledge about vegetable gardening.	After extension agent visits they manage themselves.	No real skills. They ask others when they buy seed.
Literacy	Illiterate.		Illiterate.
PROPERTY:			
Equipment	No equipment.	Shovels, rakes, watering cans, belong to coop.	Traditional hoe, rake, improvised watering cans. Belong to coop or individuals.
Field	Borrowed.		Belongs to village.
Means of production	No.	Well is village property.	Well is village property.
Source of water	Well, outside the garden.	Well, outside the garden.	Well.
Hand/motor	Hand.		Hand.
Fertilizers: type, quantity, costs, origin	No.		Manure.
Pesticides: type, quantity, costs, origin	No.		No.

F. EXTENSION & FINANCING

Organizations which help	"La jeunesse du village" constructed the well. Never received extension services. Don't have money to pay extension services.	Ministry of Agriculture sent an extension agent once to give seeds and instructions.	Ministry of Agriculture gave seeds. Africa '70 came two times to show how to sow.
Credit	No.		No.

G. PRODUCTION

History	Garden started in '84. Never calculated the value of production.	Garden started in '81.	Garden started Oct. '85. Prepared soil in Nov. Sowed in Dec.
Incomes	Don't know.		7000 UM

GUIRAYE II

GANKI BELINABE

AMEYNATE

EXPENDITURES:

Fertilizer

Pesticides

Motor pump

Gas/oil

Maintenance

Buckets

Rope

Seeds 200 UM

Hired labor

Tools

Fencing

Well

Transport

Other materials

Net profits Don't know.

H. MANAGEMENT

Distribution for consumption Woman distributes vegetables for consumption.

Distribution for sale Woman distributes vegetables for sale.

Distribution of the revenues: how/when Father receives income from the garden.

Who decides Woman.

Entrance No.

Pool No.

Money in cash No cash.

2 = 300 UM

16 meters = 800 UM

Onions, 4 packets = 120 UM

5800 UM

4 groups, each day another group receives vegetables. Distribution among all families.

President sells every day in the garden.

No distribution yet. Money stays in coop till harvest is finished.

Together, every 15 days.

Not yet decided. When started every household paid 20 UM

7360 UM (5800 + 78 x 20).

GUIRAYE II

Bookkeeping No.
 Investments in garden No, only family labor & seeds.
 Other investments

I. MARKET DATA

Local situation: Competition high, overproduction.
 access, costs,
 quantities sold,
 local demand, local
 competition

Regional market:
 which products,
 prices, costs

Interregional market:
 which products,
 prices, costs

Number of markets
 where products sold
 & distance

Knowledge other markets

Transportation:
 possibilities, costs,
 constraints

J. EARNING CAPACITY

Reason of growing
 vegetables Income and consumption.

Advantage of growing
 vegetables

Most profitable
 vegetables

Other sources of
 income

On woman's head.

Onions, lettuce, parsley,
 cabbages, tomatoes.

Fishing.

GANKI BELINABE

No local market, but on village
 level the vegetables are
 exchanged for sorghum & millet.

Lekseiba. All products which
 are not exchanged in Ganki.
 Prices are low (tomatoes
 20 UM/kg.)

Two.

By donkey.

Seeds were a gift.

Vegetable production is
 lucrative even when prices are
 low. Consumption and
 some income.

ANEYNATE

Yes.

Some purchases.

Human investments on village-level
 (school, road, mosque).

No local market; everything is sold
 from the garden. Also neighbors
 living in tents come to buy
 vegetables.

Kaedi. Surpluses sold if tran-
 sportation available. (They sold
 beets in Kaedi). Prices higher.
 10 UM/day.

Nouakchott. They will learn about
 marketing in Nktt. if production
 increases & can pay for
 transportation.

One. (Only once in Kaedi).

Only Kaedi.

To Kaedi: Donkey cart, 1000 UM for
 round trip. They don't have a
 donkey cart.

They started for consumption but if
 expansion possible and marketing no
 problem, they will expand.

Yes.

Tomatoes, eggplants.

Cultivation of other products; sale
 of milk.

GUIRAYE II**GANKI BELINABE****AWEXNATE**

Most important source
of income, why?

Garden.

Expand production?
Why/why not

Yes, they want to grow cowpeas
in the hot season.

Yes, garden is too small.

Yes, it is a lucrative activity.

Is outside help
necessary?

Help is always necessary.

In the beginning help was necessary
to get materials. They would like
more help but they can do it without
help once the garden is started.

K. CONSERVATION PRACTISES

Existence

No.

No conservation practises because
they eat everything immediately.

Knowledge

A little.

No knowledge. They will learn how
to conserve if there is surplus.

L. IRRIGATION

Motor pump

No.

No.

No.

Hand water:

Distance to field

3 meters.

20 meters.

40 meters.

Frequency

2 times/day.

2 times/day.

Quantity
liters/plot (8-10 m2.)

40 liters/plot/day.

Soil is very wet.

5340 liters/day. 150-180

Basin capacity

Remarks:

Overproduction is a problem.

Marketing prices:
Potatoes: 1 UM/piece
Carrots: 1 UM/piece
Tomatoes: 5 UM/3 pieces
Turnips: 1 UM/piece
Cabbage: 15-20 UM/piece
Eggplant: 5 UM/4-5 pieces
Beets: 40 UM/kg.

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

DJOVOL 5

DJOVOL 6

GUIRAYE 1

A. GENERAL

Size	1 ha., 1/2 ha.	2 ha.	3825 m ²
Location	Fonde.	Fonde.	Dieri.
Soil type	Clayey.	Clayey.	Sandy.
Vegetables grown and quantities	Corn, samé, onions (most important), tomatoes, cabbages.	Onion, 1500 g.(seed), 10 sacks Cabbage, 500 g., 250 kg.(yield) Carrot, 500 g. Eggplant, 250 g. Lettuce, 1 teaglass Turnip, 1 teaglass Beet, 1 teaglass Okra, 500 kg.(yield) Diakhatou, parsley, hot pepper, melon, sweet potatoes	Tomatoes, 100 g.(seed) 50 kg.(yield) Cabbages, 100 g. 150 kg. Onions, 100 g. 120 kg. Eggplant, 200 g. 20 kg. Carrots, 100 g. 80 kg. Lettuce, 100 g. - Turnip, 100 g. - Beet, 100 g. 10 kg. Parsley
Reasons for growing those vegetables		Income and consumption.	
Origin of seeds	Bought seeds in Kaedi. Onion seeds saved from last year.		
Number of yields	One.	Only cabbages and okra are harvested.	
Individuals/Coop	Coop.	Coop.	Coop.
Number of members	50 women.	65 women.	90 women.

B. VEGETABLES GROWN

Quality	Very bad. Only onions good.	Bad due to lack of water and fertilizers.	Bad due to diseases.
Date of planting or seeding	Begin December '85.	December '85.	December 5, 1985.
Date of harvesting	Not yet.		January '86: carrots, lettuce. March for other vegetables.
Seasons	Cold: vegetables, corn, samé. Wet: sorghum, millet.	Cold.	Cold.
Portion consumed/sold	They prefer to sell, so portion consumed is small.	Everything is sold to pay debts.	Preferably everything is sold. Surplus is consumed.
Preferred vegetables	Onions, cabbages, tomatoes.	Onions, cabbages, tomatoes.	Onions, cabbages, tomatoes.

DJOYOL 5

Losses: which/how Cabbages, tomatoes, corn.
Lack of water.

DJOYOL 6

Lettuce, turnips, carrots,
beets, hot peppers. Lack of
water.

GUIRAYE 1

A lot of losses. Tomatoes and
cabbages. Diseases.

C. COMPOSITION OF THE GROUP

Language	Halpulaar.	Halpulaar.	Soninke.
Tribe	Halpulaar.	Halpulaar.	Soninke.
Relations	Open inscription.	Family and neighbors.	Open inscription.

D. ORGANIZATION OF THE WORK

DIVISION:

Plant/seeding	Together.	Together.	Together. Work is done by 3 groups. If lack of water, all the women work in the garden.
Watering	Together.	Take turns by groups.	Take turns by groups.
Weeding	Together.	Together.	Take turns by groups.
Fencing	Together.	Together.	Together.
Prep soil	Together.	Together.	Together.
Harvest	Together.	Take turns by groups.	Take turns by groups.
Sale	2 women.	2-4 women sell vegetables.	

Others

FREQUENCY:

Plant/seeding	1 time.	1 time.	1 time, took several days.
Watering	Depends on motor pump and willingness of men, who culti- vate neighboring field.	1 time/week.	2 times/day.
Weeding	3 times.	Not often.	Several times.
Fencing	1 time.	1 time.	10 days.
Prep soil		1 time.	1 time, took several days.
Harvest		Not often.	Several times.
Sale			

DJOVOL 5**DJOVOL 6****GUIRAYE 1**

Other

E. TECHNICAL DATA

Skills	They learned from SONADER extension agent, who stayed a long time with them. Before that, they planted rice, millet, sorghum, squash that they already knew about.	Some of them have the skills through practice.	Some women have skills through practice.
Literacy	Illiterate except for 1 woman who learned Pulaar.	Illiterate.	Illiterate, except for 2 women who have literacy grade.
PROPERTY:			
Equipment	No equipment.	Belongs to coop.	Belongs to coop.
Field	Gift from husbands.	Belongs to coop.	Belongs to coop.
Means of production	Motor pump belongs to men.	Belongs to coop.	Belongs to coop.
Source of water	River.	River.	Well.
Hand/motor	Motor pump, before carry on head from river.	Motor pump, since 3/4/86.	Hand.
Fertilizers: type, quantity, costs, origin	Last year SONADER gave them fertilizers. This year did not use. Don't know how to use manure.	No, not this year.	NPK (101020), 1 sack or 50 kg., 800 UM, from SONADER.
Pesticides: type, quantity, costs, origin	Last year from SONADER. None this year.	No, never used.	No.

F. EXTENSION & FINANCING

Organizations which help	SONADER gave advice, fertilizer, pesticide.	SONADER gave extension services and advice. CARITAS "gave" motor pump at 50% of cost (368,238 UM).	SONADER sold them fertilizer. No further extension services.
Credit	No.	Motor pump on credit from SONADER.	No.

G. PRODUCTION

History	In 1980 a woman came and told the men that the women had to work alongside their husbands. The men gave their wives a field and seeds. They started with 1/2 ha. In 1983 they got an additional ha. These women were the first in	1st year (started in 1985). Lack of water.	1st year (started in '85) without any knowledge, output was low. A lot of diseases and parasites.
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DJOVOL 5DJOVOL 6GUIRAYE 1

History (cont.)

Djovol to start vegetable production.

Incomes

84-85: 60,000 UM & 10 sacks of onions. Incomes now not low, not high.

18,000 UM

3000 UM

EXPENDITURES:

Fertilizer

800 UM

Pesticides

Motor pump

Rent: 7000 UM, already paid
73,279 UM

Oil

Gas

10,000 UM/year, but this year they will give the men a share of their proceeds.

2400 UM

Maintenance

Motor pump, 4000 UM

Buckets

Rope

Seeds

300 UM

1700 UM

Hired labor

450 UM

Tools

Fencing

2000 UM (large wood).

Well

Transport

7800 UM

Other materials

5000 UM

Others

Basin, 3550 UM

Net profits

Debt: 10850 UM

1600 UM

H. MANAGEMENT

Distribution for consumption

No consumption, all is sold to pay debts.

	<u>DJOVOL 5</u>	<u>DJOVOL 6</u>	<u>GUIRAXE 1</u>
Distribution for sale	Although it would be better to leave the onions in the ground because of surplus at the market, this is impossible because of thieves during the night.	2 members are in charge of selling. Everything is sold.	Vegetables distributed among the 3 groups; each of these looks after sale.
Distribution of the revenues: how/when	After the harvest, revenues divided in 3 parts: 1)cash, 2)to the women, 3)to pay debts.	None because they have to pay the debt for the pump.	None. Money will be used for investments.
Who decides	President, but all members have to agree.	Together.	Each group is represented by a member. Decisions are made together.
Entrance	500 UM	1000 UM	500 UM
Pool	50 UM/month to pay motor pump and fence.	10 UM/member/week.	200 UM/month.
Money available	9500 UM	3000 UM	16600 UM
Bookkeeping	No, but because of all the missions that come along and ask questions they are going to write quantities and prices down from now on.	One member is bookkeeper.	One member is bookkeeper.
Investments in garden	Fence. They have no idea about the prices and quantity used of gas and oil.		Fence, basin, canals, motor pump.
Other investments		No.	Dyeing cloth.
<u>I. MARKET DATA</u>			
Local situation: access; costs; quantities sold; local demand; local competition	Free access; free; competition is high.	Free access; free. 250 kg. Large demands for carrots, cabbage, lettuce, sweet potatoes. Competition is high.	Free access; free. 500 kg. All vegetables are in demand. Competition is high.
Regional market: which products, prices, costs	Kaedi, but surplus is high, so can't sell everything. Don't know prices there and don't want to go because of transportation costs and cost of staying there.	Kaedi, 18 km. Never sold there.	Kaedi. Never sold there.
Interregional market		No.	No.
Number of markets where products are sold and distance	1, 2 kilometers.	1 Their production is too low to sell products in other markets.	1 Their production is low.

DJOVOL 5

Knowledge of other markets

No.

Transportation: possibilities, costs, constraints

For women, no possibilities, lack of money. In their first year they sold their products in Kaedi, with the help of a man.

J. EARNING CAPACITY

Reason for growing vegetables

For income and consumption.

Benefit of growing vegetables

Incomes now not high, not low. There are surpluses and losses, but they are satisfied. Also they can keep the money gained by selling vegetables and it is not for their husbands.

Yes.

Yes.

Most lucrative vegetable

Onions. Most resistant to dryness.

Onions.

Onions.

Other sources of income

Market activities; sell of millet batter; tomato puree; hibiscus. Revenues go to husband and used for family purchases.

No.

Dyeing cloth.

Most important source, why?

Sale of vegetables, they can keep the money.

Dyeing cloth, but not sufficient. Garden just started so not much to say about viability.

Expand production, why/why not?

Yes, only if they have their own motor pump.

Yes. Vegetable production is viable.

Yes, if they can pay for it.

Is outside help necessary?

Help is necessary because of difficulties with lack of material and money.

Help is always necessary. In the beginning because women don't have anything to start with. Later for continuation.

K. CONSERVATION PRACTISES

Existence

Normally they dry onions. This year they dried in the field (i.e., ruined).

No.

No.

Knowledge

No.

No.

DJOVOL 6

No.

For women, no possibilities, lack of means and production.

GUIRAYE 1

They know about Kaedi market but never go there. No knowledge of other markets.

No transport possibilities; production is weak.

DJOVOL 5DJOVOL 6GUIRAYE 1L. IRRIGATION

Motor pump:

Capacity

Motor pump belongs to the men.
Women don't know the make.They got their motor pump 3/4/86.
100 m²/hour.

Power

Origin

United Kingdom.

Make

Lyster C3.

Time of watering

This year they go 3 x 2 days.

5 hours.

Area watered

1 ha.

1 ha.

Frequency

3 times in total.

1 time/week.

Distance to field

Garden is along the river.

100 meters.

Canals lined or not

Not lined.

Condition of canals

Weeds.

Hand watering:

Distance to field

The 1/2 ha. garden (their 1st
garden) they water by hand.

10 meters.

Frequency

2 times/day.

Quantity

Basin capacity

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

KAEDI

DJOVOL 1

DJOVOL 3

A. GENERAL

Size	2000 m ²	3 ha.	100 m ²
Location	Fonde	Fonde	Dieri
Soil type	Clayey	Clayey	Sandy
Vegetables grown & quantities	Potatoes, 158 kg. Cabbage, 100 kg. Eggplant, 2.5 kg. Onions, 4 kg. Carrot, 2.5 kg. Turnip, 30.5 kg. Hot peppers, Cherry tomatoes (Yield till 4/7/86)	Tomatoes, 2 kg.* Cabbage, 1 1/2 kg. Onions, 2 kg. Carrots, 1/2 kg. Hibiscus, 5 tea glasses Okra, 1/4 kg. Eggplant, 1/2 kg. Hot pepper, 1/4 kg. Squash, 1/20 kg. (Seed quantities). *Did not use it all because 500 gr. of tomato seeds is sufficient for 1 ha. 1/2 ha. onions, 1/2 ha. tomatoes, 1/2 ha. cabbages.	Cabbage, tomato, eggplant, onion, carrot (quantities unknown).
Reasons for growing those vegetables	Gift from Africa '70: eggplant, onions, corn seeds. CNRADA sold seeds: potatoes, carrots, turnips.	Peace Corps gave cabbage, tomatoes, cowpeas & corn seeds. The rest of the seeds they bought in Dakar.	Seeds are gift from Peace Corps.
Origin of seeds	Africa '70; CNRADA.	Dakar & Peace Corps. Women bought seeds in Dakar, because old seeds were not of good quality.	Peace Corps.
Number of yields	Depending on vegetable there will be several. Some are continuously harvested: Potatoes, 3 times; cabbage, 4 times; turnips, 7 times.	Continuous.	According to maturity; continuous.
Individuals/Coop.	Coop.	Coop.	Coop.
Number of members	45 women + 3 men (1 technician; 1 bookkeeper & cash-holder; 1 who gives credit if necessary).	150 women.	20 women.
<u>B. VEGETABLES GROWN</u>			
Quality	Good quality.	Not very good because of parasites and lack of water. 1st	Bad because of parasites.

	<u>KAEDI</u>	<u>DJOVOL 1</u>	<u>DJOVOL 3</u>
Quality (cont.)		yield of tomatoes failed because of insects. Also cabbages failed.	
Data of planting or seeding	Don't know exact date of planting. Must be Oct. '85.	Beginning of December. Onions end of January. Cowpea in April.	October '85.
Date of harvesting	Harvest started end of February.	Begin February: turnip & okra. End February: tomatoes. Begin March: cabbage, eggplant, hot pepper.	From December '85 on. Onions are not yet harvested.
Seasons	Cold: vegetables; Hot: cowpeas, eggplant; Wet: corn.	Cold.	Cold.
Portion consumed/sold	Everything for sale. Women buy the surplus.	Women can't estimate.	500 gr. vegetables per member is consumed. Rest is sold.
Preferred vegetables		Tomatoes, cabbages and onions are most profitable & they form basis of meals.	Onions, carrots, cabbages.
Losses, which/how	Corn.	Beets & squash because of caterpillars and pump broke down in second month. They used men's pump.	Yes, from caterpillars & other parasites.

C. COMPOSITION OF THE GROUP

Language	Soninke.	Halpulaar.	Halpulaar.
Tribe	Soninke.	Halpulaar.	Halpulaar.
Relations	Family.	Open inscription.	Open inscription.

D. ORGANIZATION OF THE WORK

DIVISION:

Plant/seeding		Together.	Together.
Watering	The guard takes 1200 l. everyday. Women help him and complete the watering if necessary.	Take turns, 5 women, 2 times.	Together.
Weeding		Together.	Together.
Fencing		Together.	Together.
Prep soil		Together.	Together.
Harvest		9 women: 4 heads of the sub-	Together.

KAEDI**DJOVOL 1****DJOVOL 3**

Harvest (cont.)

groups + 5 women who sell.

Sale

5 women.

1 woman.

Others

FREQUENCY:

Plant/seeding

Several times.

1 time.

Watering

2 times/day.

Every day.

2 times/day.

Weeding

3 times till now.

1 time/month.

Fencing

Prep soil

Once.

1 time, took 25 days.

Harvest

Several times.

1 time/week.

Sale

Every day.

When necessary.

Other

Every afternoon the women are in the garden.

E. TECHNICAL DATA

Skills

Women themselves don't have skills in vegetable gardening. Technician tells them what to do. Bookkeeper knows prices of seed.

In the beginning they had no skills, but they learned a lot from Peace Corps. Now they can manage themselves.

No real skills.

Literacy

Illiterate.

Illiterate.

Illiterate.

Education

None.

None. They don't have the time to receive education.

PROPERTY:

Equipment

Well, buckets, tools, all belong to women's coop.

Traditional tools (hoe) belong to women individually.

Watering cans belong to coop.

Field

Prefect gave field to the women.

Gift from husbands to women.

Borrowed.

Means of production

Belong to the Soninke group.

Motor pump is a gift from Peace Corps.

Source of water

Well in the garden.

River.

Well, outside the garden.

Hand/motor

Hand.

Motor pump.

Hand.

Fertilizers:

Yes.

Yes.

No.

KAEDI**DJOVOL_1****DJOVOL_3****Fertilizers (cont.)**

Type, quantity, costs,
origin

NPK (101020), 250 kgs., 4500 UM
Urea, 250 kgs., 4500 UM

Pesticides:
type, quantity,
costs, origin

Yes.

Yes. Last year, SONADER gave pesticides to the 5 gardens in Djoval. This year they used the rest, but it was not enough. SONADER didn't have new, and the women didn't have the money to buy other pesticides.

No.

F. EXTENSION & FINANCING

Organizations which
help

CPF (Centre Promotion Feminine) gave 2 watering cans, 1 shovel, 1 hoe. Africa '70 gave 2 rakes, 3 buckets, 3 watering cans, fertilizer & pesticides. CNRADA distributed seeds, but the well was not finished at that time. Africa '70 gave also advice about vegetable gardening.

Peace Corps left in December. Helped with advice, gave motor pump, wire and chicken house. SONADER gave pesticides and credit to buy gas, oil, spare parts, fertilizer.

Peace Corps gave 4 watering cans and seeds. Well was built by "La Jeunes du Village". Husbands gave 1000 UM to repair fence.

Credit

Soninke credit.

SONADER gave 17000 UM to buy spare parts.

No.

G. PRODUCTION

History

1st year of this garden ('85). They had another garden, but was attacked by termites, so they had to move.

Garden has existed for 5 years.
'84: 150,000 UM
'85: 50,000 UM
'86: till now, 45,000 UM

Garden created in July '85.

Incomes

As of 4/7/86: 9766 UM

As of 4/10/86: 45,000 UM

As of 4/11/86: 4700 UM for carrots, cabbages & eggplants.

EXPENDITURES:

Fertilizer

Pesticides

Motor Pump

Gas/oil

Maintain

Buckets

14 at 200 ea.=2800 UM They use 3 buckets/month.

Spare parts: 17000 UM

14,000 UM

	<u>KAEDI</u>	<u>DJOVOL 1</u>	<u>DJOVOL 3</u>
Expenditures (cont.)			
Rope	33 meters.		
Seeds		7,043 UM (Dakar)	
Hired labor	Guard (who also gets the water) 2000 UM/month.		
Tools			
Fencing			1330 UM
Well			
Transport			
Other materials	5 watering cans at 550=2750 UM		
Others		Lease tractor, 6000 UM	
Net profits			
<u>H. MANAGEMENT</u>			
Distribution for consumption	Only if surplus, and is distributed to the women who pay for it.		Members take what they need for their own consumption.
Distribution for sale	3 women sell the vegetables at the Kaedi market.		Part which is not consumed is for sale.
Distribution of the revenues: how/when	Till this moment all the money stayed in the coop.	Normally money is shared among the members after harvest. At the moment there is not enough.	They have not yet decided how to distribute the revenues.
Who decides	President (or the men because in Soninke community there is a strong hierarchy).	President.	Together.
Entrance	500 UM in '85 (to pay for well). 100 UM in '85 (to buy fruit trees).	When coop started: 50 UM Now 1000 UM Resignation: woman gets part of the harvest.	200 UM/member.
Pool	50 UM/month to pay guard and buy buckets.	If problem: 20-50 UM This year 3 x 50=150 UM/woman.	
Money available	Women don't know, have to ask the bookkeeper.	40-50,000 UM; use for gas, oil and pump maintenance.	4700 UM
Bookkeeping	Yes, male bookkeeper. Weights and prices are recorded.	Husband of president keeps the books, records the sales.	No.

	<u>KAEDI</u>	<u>DJOVOL 1</u>	<u>DJOVOL 3</u>
Investments in garden	Well, fruit trees.	Spare parts.	Repair fence.
Other investments		Coop gives vegetables away to old people and visitors. They want to construct PMI, but don't have money for it.	
<u>I. MARKET DATA</u>			
Local situation: access; costs, quantities sold, local demand, local competition	Free access. 10 UM/day till 4/7; (see A:Quantities grown.) Not too high because everybody comes to Kaedi to sell their vegetables. Competition is high.	Free access (not much room); Free. They can sell almost everything. Competition also high from Senegalese villages.	
Regional market: which products, prices, costs		Kaedi: rarely. In Dondo & Worgo (Senegal) prices are low, so don't go often. Walk to markets.	
Intl. market: which products, prices, costs		Nouakchott. Onions, 2 years ago. Surplus at the market low. They borrowed a car for transportation.	
Number of markets where products sold and distance	1, Kaedi. 500-1000 meters.	1, Djoval, because no market problems & transportation costs. If prices higher elsewhere they will transport (if possible) their products.	
Knowledge of other markets	They don't know of other markets, but they know that if their production increases, they have to look for other markets to sell products.	Yes. Nouakchott is not lucrative, Kaedi only if no overproduction, then prices higher than in Djoval.	
Transportation: Possibilities, costs, constraints	No possibilities for the women, lack of money.	To local market or to Senegal carry on head or donkey cart free. To Kaedi: donkey cart: 800 UM round trip; van: 200 UM round trip (price for passenger's transport); on foot 18 km.	Transport to local market on head. No transport possibilities because lack of money.
<u>J. EARNING CAPACITY</u>			
Reason for growing vegetables		For consumption and sale.	It is profitable; improves social and economic standing.
Most lucrative vegetables	Cabbage & lettuce (if produced early), onions (to dry leaves and	Tomatoes, cabbages, onions, hot pepper, eggplant, okra.	Onions, carrots, cabbages.

KAEDI

make dry "onion-balls".)

Other sources of income

Most important source, why?

Expand production Why/why not? Yes.

Is outside help necessary?

K. CONSERVATION PRACTICES

Existence Dried leaves of onions.

Knowledge

L. IRRIGATION

Motor Pump:

Capacity

Power

Origin

Make

Time of watering

Area watered

Frequency

Distance to field

Are canals lined

Condition of canals

DJOVOL 1

No.

Garden. To pay debts first, then build a house or travel.

Yes, to earn more money.

In the beginning help was necessary. Once started, they can continue without help, but they always hope for more help.

At home when products aren't sold: onions, hibiscus, okra, carrots.

Don't have means or skills to start conservation project. They want to.

100 m²/hour.

1 cylinder.

United Kingdom.

Lyster 1.

4 ha.

Every day.

30 meters; 5 meters level difference.

No.

Lots of weeds and plants (grow fast after watering).

DJOVOL 3

Sewing.

Sewing. Garden just started so not much income yet.

Yes, they would like to grow cowpea and squash but don't have the money to expand.

Help is always necessary.

Onions, laid in sand in a dark room.

No other knowledge.

KAEDI

DJOVOL 1

DJOVOL 3

Hand watering

Distance to field

Frequency

Quantity

Basin capacity

Well is in the garden.

2 times/day.

At least 1200 liters/day.

10 meters.

2 times/day.

40 liters/plot/day.

REMARKS

Quantities sold & prices:

<u>Potatoes:</u>	UM/kg	UM
3/3/86 115kg	40	4600
3/7/86* 5kg		250
3/20/86 38kg	45	1710
<u>Eggplant:</u>		
2/27/86 .75kg	15	11
3/7/86* 1.75kg		250
<u>Cabbage:</u>		
2/23/86 14kg	15	210
2/27/86 39kg	15	585
3/3/86 37kg	15	555
3/7/86* 10kg	20	200
<u>Onions:</u>		
3/7/86* 4kg	40	160
<u>Carrots:</u>		
3/20/86 2.5kg	70	175
<u>Turnips:</u>		
2/23/86 2kg	40	80
2/25/86 1.5kg	40	60
2/27/86 13kg	40	520
3/3/86 4kg	40	160
3/7/86* 4kg		
3/11/86 2kg	40	80
3/20/86 4kg		160

Profits:	March	April
Carrots	1300	
Corn	3600	
Cabbage	12300	
Cowpea lvs.	3000	
Parsley	600	
Tomatoes	3700	2000
Onions	2700	4000
Hot pepper	600	1000

*The yield of 3/7 was used for the International Women's Day Fair.

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

M'BAGNE

M'POTO

SORI MALE

A. GENERAL

Size	1 ha.	1 ha.	
Location	Fonde.	Hollalde.	Fonde.
Soil type	Clayey.	Clayey.	Clayey.
Vegetables grown and quantities	Potatoes: 10 sacks (seeds); 5000 kg. (yield); Eggplant, onions, tomatoes, parsley, sweet potatoes, squash, beets, diakhatou, okra, cabbages, turnips 20 small seed packets of each vegetable, yield normally 20-25 kg./parcel.	Cabbages: 25 plots at 8 m ² Onions: 28 plots at 8 m ² Potatoes: 11 plots at 8 m ² Eggplant: 8 plots at 8 m ² Turnips: Beets: 1 plot at 8 m ² Carrots: Lettuce: 1 plot at 8 m ² Parsley:	Cabbages: 2 seed packets Potatoes: Carrots: 2 seed packets Eggplant: 1 seed packet Turnips: Tomatoes: 2 seed packets Lettuce: 2 seed packets Onions: 4 seed packets Squash: Manioc: Parsley: 2 seed packets
Reasons for growing those vegetables		Seeds were sent to them.	Turnip & squash and others are a gift from Agriculture, and from Peace Corps.
Origin of seeds	Nouakchott (last year from Matam). Potatoes also from Red Cross.		Boghé, Agriculture, Peace Corps.
Number of yields	Only 1 yield because watering the garden is so heavy that women prefer to finish the cultivation after 1st harvest.	750 kg.	
Individual/Coop	Coop.	Coop.	Coop.
Number of members	370 women.	149 women.	100 women.
<u>B. VEGETABLES GROWN</u>			
Quality	Was good, but later on problems with crickets & caterpillars.	Good quality except for tomatoes and potatoes.	Good quality. During harvest parasites came but didn't heavily attack the plants.
Date of planting or seeding	November '85: potatoes and other seeds.	End of October '85.	Nov. '85: Nurseries (for 25 days). Lettuce, cabbage and potatoes direct planting.
Date of harvesting	Begin Jan. '86: potatoes. End March: other vegetables.	Jan. '86: lettuce. Feb. '86: cabbage and beets. March '86:	From March '86: harvesting.

	<u>M'BAGNE</u>	<u>M'BOTO</u>	<u>SORI MALE</u>
Date of harvesting (Cont.)		carrots and turnips.	
Seasons	Cold.	Cold.	Cold.
Portion consumed/sold	Half and half.	All vegetables sold.	Parcel for coop: sold. Parcel for women: consumption and sale.
Preferred vegetables	Onions, carrots, turnips for nutritional value for CAC.	Onions, potatoes, cabbage.	Cabbages, onions, potatoes (consumption and very well sold).
Losses: which/how	Potatoes which were planted in Dec. were planted without roots so failed. Lettuce, turnips, onions, tomatoes, cabbages (almost all vegetables) were attacked by parasites.	Tomatoes and potatoes by parasites.	Lettuce, climate too hot.

C. COMPOSITION OF THE GROUP

Language	Halpulaar.	Halpulaar.	Halpulaar.
Tribe	Halpulaar and some Maure women.	Halpulaar.	Halpulaar.
Relations	Open inscription.	Open inscription.	Open inscription, all the women of the village.

D. ORGANIZATION OF THE WORK

Two women together have one parcel for themselves and one for the coop. Distribution of seeds by 8 women, who show others how to plant.

Each woman has a parcel for herself and one for the coop.

DIVISION:

Plant/seeding	All women.	Together.	All women.
Watering	All women.	Take turns.	7 groups take turns.
Weeding	All women.	Together.	All women.
Fencing	Women wooden fence, men iron fence.		All women.
Prep soil	All women.	Men.	All women.
Harvest	All women.	Chiefs of the groups.	All women.
Sale	All women.	1 woman.	1 woman sells potatoes, 1 woman sells other vegetables.

M'BAGNE**M'BOTO****SORI MALE**

Others

FREQUENCY:

Plant/seeding	2 times.	1 time.	1 time.
Watering	2 times/day.	2 times/day.	2 times/day= ^u hours.
Weeding		If necessary.	5 times.
Fencing			3 years ago.
Prep soil		1 time.	1 time, Oct.-Nov., took 4 days.
Harvest	1 time (except a few women).	2 times/week.	
Others			

E. TECHNICAL DATA

Skills	They know how to cultivate, the Peace Corps was here for 8 years and helped them. Some women show others how to work in the garden.	No technical skills or knowledge.	They have skills because they have been gardening since '59. In the beginning they had no knowledge at all.
Literacy	Most of them are illiterate. Next week a course will start with Pulaar, French and Arabic so they can learn bookkeeping.	Illiterate, except for 1 woman who has literacy certificate.	Only a few women are literate in Pulaar and French. They learned it in Sori Male and in Boghé.
PROPERTY:			
Equipment	None.	Belongs to coop.	1 watering can, 2 shovels, 3 rakes, belong to coop.
Field	Belongs to coop.	Belongs to coop.	Property of village.
Means of production	Motor pump belongs to coop.	Well belongs to coop.	Motor pump belongs to women (but they have no fuel).
Source of water	River (and for a very small part two wells).	Well.	River.
Hand/motor	Hand (motor pump never really worked).	Hand.	Hand.
Fertilizers: type, quantity, costs, origin	Some women use manure.	No.	No. Last year they used it, gift from American.

M'BAGNE

Pesticides:
type, quantity, costs,

They used pesticides but these didn't help. Now they turn the soil, which helps against insects.

M'BOTO

No.

SORI MALE

No. Last year American put it on the soil.

F. EXTENSION & FINANCING

Organizations which help

Government gave 3000 UM in '75. Ministry of Agriculture gave pesticides and advice about gardening. Peace Corps gave motor pump and technical assistance for 8 yrs.

Agriculture Sector of M'Bagne provided extension services.

Agriculture Sector of M'Bagne provided seeds (carrots, cabbages, lettuce, turnips). Gave advice 4 times and gave motor pump. Peace Corps gave fence, seeds & advice. SONADER only visited the garden.

Credit

No.

No.

G. PRODUCTION

History

'84: 300 members
'85: 340 members
'86: 370 members
The women heard the motor pump was going to be repaired and all want to become a member. Garden started in '75. Woman from government, People's Party, came & told the women to unite. She gave 3000 UM and the women pooled 15,000 UM together. They started with 40 women.

Started in '84-'85. This year better larger size and better production.

Started in '59 when a man from Agriculture came with onions, cabbages, carrots, lettuce, potatoes, and turnip seeds. Since then they have continued without extension services.

Incomes

1st year: 40,000 UM + 70,000 UM ('76) sale provisions.
'80: 100,000 UM in cash.
'86: not yet calculated.

16,000 UM

1959-60: potatoes - 5000 UM
 onions - 500 UM
1983-84: 1700 UM
1984-85: 2000 UM

EXPENDITURES:

Fertilizer

Pesticides

Motor pump

Gas/oil

Maintenance

Buckets

Rope

	<u>M'BAGAE</u>	<u>M'BOTO</u>	<u>SORI MALE</u>
Seeds	Potatoes: 10,000 UM seeds: 5000 UM		5910 UM
Hired labor			
Tools			
Fencing	5300 UM	800 UM	
Well			
Transport	5000 UM	1500 UM	
Other materials			
Others	Member's tickets: 20,000 UM	Misc.: 14,000 UM	
Net profits		5000 UM	
<u>H. MANAGEMENT</u>			
Distribution for consumption	Each 2 women have 1 parcel for consumption. They can sell it if they want.	No consumption.	Each woman has own plot for consumption and if she wants for sale.
Distribution for sale	Each 2 women have 1 parcel destined for sale for coop.	Woman who is charged with sale also decides which products must be harvested.	Each woman has one plot for coop to sell.
Distribution of the revenues: how/when	No distribution. Women already have vegetables for consumption (and sale if they want to) with their "own" parcel. Money stays in cash to buy seeds if they don't receive them free next year. After harvest money in cash.	No distribution at this moment. Money stays in cash.	They wait till the end of the season to calculate whether revenues will be distributed or not. Money in cash will be used to buy new seeds.
Who decides	Together.	Together.	Together. 2 times/month the women come together to discuss the garden. 4 women in management committee; 1 bookkeeper; 2 officers; 1 secretary.
Entrance	220 UM (200 for member's ticket and 20 for "entrance").	20 UM	200 UM
Pool	No.	20 UM/month.	3 x 20 UM/member/year.
Money in cash	15,000 UM (Harvest this year not yet counted).	5000 UM	12,000 UM

M'BAGNE**M'BOTO****SORI MALE**

Bookkeeping	1st year of bookkeeping.	No.	Yes.
Investments in garden	'75: 2500 UM fence '83: 10,000 UM 1st well '85: 3500 UM fence '86: 7000 UM basin, 2000 UM well	Fence, well.	No means to invest (i.e. for tube motor pump or tools).
Other investments	'81: CAC 11,600 UM '85: PMI 20,000 UM They want to construct a CPF.	No.	Women pooled 100 UM/each to build CPF.

I. MARKET DATA

Local situation: access, costs, quantities sold, local demand, local competition	Free access; free.	No local market.	Each woman sells her own vegetables. Free access; free. 30-50 UM/day. High local demand because neighboring villages don't produce themselves. No competition.
Regional market: which products, prices, costs	Never went to Kaedi because they need contact person to be able to sell vegetables. Also Boghé is more easy to reach than Kaedi, but never went there.	M'Bagne, and other local markets. Only surplus is sold in M'Bagne.	
Interregional market: which products, prices, costs	Nouakchott. Vegetables which were not sold in M'Bagne: tomatoes, eggplant, carrots, onions. They sold through a relative who had a big shop. He died this year, so they had to stop. No costs.	No.	Nouakchott. If their production is higher & transport possibilities better they would go to Nktt.
Number of markets where products sold and distance	1 at the moment because they stopped going to Nktt.	Several. M'Bagne is 12 kms. away. Other villages in area.	1.
Knowledge of other markets	No. They need contact persons.	No.	No knowledge. Never leave their village.
Transportation: possibilities, costs, constraints	Transportation possibilities to Nktt. or Boghé easier than to Kaedi. M'Bagne-Nktt: 800 UM by van, 1000 UM by taxi (passenger only). 200 UM for luggage. Transportation to Nktt. was often free because of relatives, but they always took a present.	Donkey cart to M'Bagne.	No transportation. Neighbor villages come to buy vegetables. Sori Male to Nktt.: 1000 UM (without luggage).

M'BAGNE**M'BOTO****SORI MALE****J. EARNING CAPACITY**

Reason for growing vegetables	For the health of the children (CAC).	No rain: traditional cultivation of other products became impossible.	To improve their health, especially children. For sale and consumption.
Advantage of growing vegetables	Lucrative.		Lucrative.
Most lucrative vegetables	Potatoes (sold via prefect which does very well).	Onions.	Onions, cabbages, potatoes.
Other sources of income	Most of the women don't have other sources of income. Some women work for CPF.	No.	Little commerce.
Most important source -why	Garden only source.	Garden only source.	Little commerce because continuous activity. Vegetables only one season.
Expand production, why/why not?	Yes. They already expanded this year. Surplus always sold well in Nktt. (5-8000 UM profit per year). Only water is serious problem.		They would like to but don't have the means. They would like to grow other vegetables and sell them.
Is outside help needed?	They are not against help, but they can do without. They are not going to wait for it.	Help is always necessary.	

K. CONSERVATION PRACTICES

Existence	Onions were dried or kept in sand (for 5 months), okra, hibiscus.	No.	Onions, hibiscus, okra.
Knowledge	No other knowledge.		No other knowledge.

L. IRRIGATION

Motor pump	They have a motor pump but no tube. Now the men will buy a tube (they started a garden next to women's garden) so they can use it together.		
Hand watered:			
Distance to field	2 wells in the garden which are sandy & don't give enough water. River is 500 m. "downstairs".	150 meters.	Not a great distance, but garden is higher than river.

M'BAGNE

Frequency

2 times/day.

Quantity

120 l./parcel/day.

Basin capacity

Remarks:

Falo is also cultivated (corn, squash, hibiscus, okra, sweet potatoes, cowpeas) by several men and women. These vegetables are mainly consumed. Sometimes a small part is sold. This is done by women only, who give the money to their husband, who uses it for family purchases.

M'BOTO

2 times/day.

180 l. for 8 plots 8 m²/day.

SORI MALE

2 times/day.

90-180 liters/parcel/day.

Garden is more lucrative than falo because all the women participate.

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

	<u>BOLO DOGO</u>	<u>TIENEL</u>	<u>SIYE</u>
<u>A. GENERAL</u>			
Size	2400 m ²	2 ha. for women. Data are for women's garden. (2.5 ha. for men).	1 ha.
Location	Fonde.	Hollalde.	Fonde.
Soil type	Clayey.	Clayey.	Clayey.
Vegetables grown and quantities	Cabbage, 1 seed packet Onions Tomatoes, 2 seed packets Eggplant Okra, 1 seed packet Potatoes, 10 kgs. Hibiscus, 1 teaglass yield: cabbages, 200 kgs. potatoes, 1 bucket (30 l.)	Potatoes, 56 kgs. Cabbage, 10 seed packets Carrots, 500 gr. Turnips, 500 gr. Eggplant, 600 gr. Hot pepper, 400 gr. Hibiscus, 200 gr. Okra, 200 gr. Lettuce, 10 seed packets Tomatoes, 500 gr. Parsley, 10 seed packets Sweet pepper, 400 gr. Beets, 150 gr. Mint, manioc. (Seed packets very little and calculated for women's & men's garden).	Tomatoes and cabbages (largest quantity), turnips, carrots, onions, hibiscus, okra.
Reasons for growing those vegetables	Those were the only seeds they could find.	They found those seeds in Boghé.	Those vegetables grow well. Peace Corps and CARITAS brought them.
Origin of seeds			Dakar (Peace Corps), CARITAS.
Number of yields		Continuous.	Continuous.
Individuals/Coop	Coop.	Coop.	Coop.
Number of members	88 women.	67 women.	42 women.
<u>B. VEGETABLES GROWN</u>			
Quality	Good quality except for tomatoes and potatoes which were attacked by parasites.	Not very well because of crickets and parasites.	Good, except for turnip, tomato and cabbage were attacked by insects.
Date of planting or seeding	November '85.	End of Nov./Beginning of Dec. '85 (later than other years). Jan. 6, '86: 2nd planting of potatoes.	Oct. 5, '85: Sowing nursery. Nov. 15, '85: Replanting nursery (tomatoes, onions, cabbages). Nov. 15, '85: carrots and turnips.

	<u>BOLO DOGO</u>	<u>TIENEL</u>	<u>SIYE</u>
Date of harvesting	Jan. '86: cabbage, potatoes.	Feb. 15, '86: Cabbage, lettuce, parsley, hot pepper, eggplant (normally in Jan.).	
Seasons	Cold.	Cold season: all vegetables. Rest of year: mint, eggplant, onions, okra, hot pepper, diakhatou.	Cold.
Portion consumed/sold	Everything is consumed by members who pay for it.	3/4 consumed; 1/4 sold.	Largest part is sold.
Preferred vegetables		Mint (grows all year), cabbage (lucrative if harvested early), carrots (for vitamins), eggplant.	Onions and cabbages for taste, carrots for nutrition.
Losses: which/how	Tomatoes & potatoes to parasites.	Parsley & cabbage to parasites, potatoes because motor pump broke down.	Carrots & turnips not thinned, tomatoes & cabbages partial loss to parasites.
<u>C. COMPOSITION OF THE GROUP</u>			
Language	Halpulaar & Hasanya.	Halpulaar.	Halpulaar.
Tribe	76 Halpulaar.	Halpulaar.	Halpulaar.
Relations	12 Maure.	Open inscription.	Open inscription.
<u>D. ORGANIZATION OF THE WORK</u>			
DIVISION:			
Plant/seeding	Together.	Together.	Together.
Watering	Take turns, 6 groups.	Take turns, 6 groups.	Take turns, 4 groups.
Weeding	Together.	Together.	If necessary.
Fencing	Together.	Men.	Hired a man.
Prep soil	Together.	Together.	All women. For canals they hired a man.
Harvest	All women.	Together.	4 women (tomato yield-all women.)
Sale		1 woman for coop share.	4 women.
Others			They hired labor to cut the trees or let family members do it.

BOLA DOGOTIENELSIVE

FREQUENCY:

Plant/seeding	1 time.	2 times.	
Watering	2 times/day.	2 times/day.	Nurseries: 2 times/day. Later, 1 time/week.
Weeding	1 time/week: Fridays.	If necessary.	
Fencing	If necessary repairs.	2 times (ruined by camels).	
Prep soil	1 time.	1 time.	
Harvest	Individual.	After "big" harvest, continuous.	Continuous if mature.
Sale		Every day.	1-2 times/week.
Others			

E. TECHNICAL DATA

Skills	Some of them have experience with home gardening.	Knowledge attained by experience.	Not much knowledge about gardening. Men say what and when to plant. Only some women have experience.
Literacy	Illiterate, except for one woman who has primary school.	Illiterate. An old man writes for them.	Illiterate.
PROPERTY:			
Equipment		No equipment.	Traditional tools belong to women.
Field		Belongs to one villager.	Field borrowed from men.
Means of production		Motor pump belongs to men (SONADER rents it to men).	Motor pump borrowed from men.
Source of water	River.	River.	River.
Hand/motor	Hand.	For 2 months by hand because pump broke down. (It was just repaired).	Motor pump.
Fertilizers: type, quantity, costs, origin	No.	Not this year. SONADER did not provide, and women don't know where and how to buy it. Last year 1 sack Urea from Senegal, 1050 UM	Urea & NPK (101020) mixture. Three sacks of 50 kg., 2700 UM
Pesticides: type, quantity, costs, origin	No.	No. Last year they got a bottle from Min. of Agriculture, but they didn't use it because consumption is possible only after 15 days.	Men sprayed four times on tomatoes and cabbages.

BOLO DOGOTIENELSIVEF. EXTENSION & FINANCING

Organizations which help	Peace Corps Volunteer from neighboring village sometimes gives advice.	Agriculture: pesticides and list of heat-resistant vegetables. Advice during their first 2 years and provided potatoes and some seeds. SONADER gave motor pump to mer. USAID gave a fence.	Peace Corps provided seeds (5000 UM) and advice. CRS gave motor pump (367,000 um), cash & calculator.
Credit	No.	No.	No.

G. PRODUCTION

History	Garden started in '85. 1st year. Before the women had home gardens.	Men's garden started in '67. Women's garden in '84.	'84-'85: little (25 x 50 m.) garden for all (126) women in village. '85-'86: 1st year this garden.
Incomes	7000 UM	3100 UM	They have no idea. The treasurer just had a baby and others have no idea.

EXPENDITURES:

Fertilizer			3000 UM (2700 + 300).
Pesticides			
Motor pump			
Gas/oil			
Maintenance			
Buckets			
Rope			
Seeds	500 UM (tomatoes, eggplant, onions, cabbages).	8115 UM	Onions, 3000 UM. Onions & cabbages: 970 UM. Canals, 1500 UM
Hired labor			
Tools			
Fencing			3000 UM
Well			
Transport			
Other materials	500 UM (watering cans).		

BOLO DOGO**TIENEL****SIVE**

Others		Total expenses since starting 10,000 UM	
Net profits	6000 UM		Can't estimate yet.
<u>H. MANAGEMENT</u>			
Distribution for consumption	Coop fixes the prices, about 200 UM/plot. Members pay for it.	President and 8 women (staff) distribute the vegetables. Quantity depends on size of the family.	1st yield of tomatoes (1 bucket) was shared. Now every woman that comes along and helps in the garden gets some vegetables.
Distribution for sale		1/4 is for sale.	2 times/week harvest for sale.
Distribution of the revenues: how/when	No distribution. They want to save money to buy a motor pump and a mill.	No distribution. They decided together to keep the money in the coop.	Never distributed money and won't.
Who decides		President and 8 women.	Together.
Entrance	300 UM	No new members.	Only at the beginning of new season. New members must be able to work. Last year all women paid 10 UM and part of fence.
Pool	10 UM/member/month.	10 UM/member/month. 200 UM/member for seeds. 200 UM/member to repair motor. 75-200 UM/member /quarter for gas/oil.	No, because they still have money.
Money in cash	6000 UM	15,950 UM	34,575 UM (costs still have to be paid).
Bookkeeping		Men keep the books.	Yes, daughter of treasurer.
Investments in garden		They want to each pay 1000 UM for a new motor pump (men willing to buy fruit trees).	Fence.
Other investments	Construction CAC.	Construction CPF.	Not specially paid by women of the garden but by all women of the village's cooperative (CPF).
<u>I. MARKET DATA</u>			
Local situation: access, costs, quantities sold, local demand, local competition	No local market.	Little market. Free access; Almost all products are sold in Tienel. Big enough. No real competition.	Little local market. Free access; Women sell husbands products Don't know whether demand for vegetables is daily.

	<u>BOLO DOGO</u>	<u>TIENEL</u>	<u>SIVE</u>
Regional market: which products, Prices, costs	Boghé. Never been there.	Boghé, surpluses. Higher prices, 5 UM/day.	Matam, Senegal. 30 UM/day.
Interregional market: which products, Prices, costs		Mer. sell mint to merchants who come to Boghé from Aleg & Magta Lahjar (400-700 UM/sack).	Nouakchott. Don't know prices.
Number of markets where products sold and distance		2. Boghé is 3 kms.	
Knowledge of other markets	No.	No.	
Transportation: Possibilities, costs, constraints	Donkey's backs.	Walk to Boghé (3 kms.) No other transportation.	Transportation is very difficult. Big problem. Donkey cart round trip to Matam: 200 UM/person + 100 UM per 100 kg. They go each week with 3 sacks. Without luggage: 60 UM/person. Van to Sive-Kaedi: 800 UM/person, luggage 2 UM/kg. Sive-Nktt: 800 UM/person, luggage 4-5 UM/kg. Kaedi-Nktt.: 800 UM/person + 7-8 UM/kg luggage.

J. EARNING CAPACITY

Reason for growing vegetables	To improve health and for CAC.	Because of drought no more traditional vegetables, so they started garden.	1st garden imitation of Senegalese women. 2nd garden they liked to work together & garden gives them ideas (Coop: CPF).
Advantage of growing vegetables			
Most lucrative vegetables		Mint, especially after cold season. Cabbage is not lucrative.	Cabbages, if harvested earlier than in Senegal. Onions.
Other sources of income	No.	No, if they want to grow rice & corn they need new motor pump.	No.
Most important source, why?		Garden only source.	
Expand production? Why/why not	Yes, to commercialize the production.	Yes, vegetables are most lucrative.	Yes, they want to be fatter and gives them more income. Next year they'll have 4 ha. Maybe marketing a problem.

BOLO DOGO

Is outside help
necessary?

Help (material & financial)
is necessary in the beginning.

TIENEL

In the beginning help was
necessary. Later on also.

SIVE

Help is necessary, men always helped
them. If they have the equipment
they can manage.

K. CONSERVATION PRACTISES

Existence

Dried onions.

Hibiscus: dried. Onions in sand
for 7 mos. Cowpea: dried leaves.
Okra dried.

Okra, dried. Onions in sand (5 mo).

Knowledge

Okra.

No, they want to sell fresh.

L. IRRIGATION

Motor pump:

Next year own motor pump

Capacity

90 m /minute.

Power

2 cyl.

1 cyl.

Origin

Italy.

Make

VM 2 cyl.

Time of watering

3 hours/day.

2 hours.

Area watered

About 4 ha. (men & women
together).

1 ha.

Frequency

2 times/day (1 time through
canals, 1 time hand watered).

1-2 times/week.

Distance to field

Women's field behind men's field
and difficult to reach with
water. 1/2 ha. fallow because
pump is not strong enough.

Canals lined or not

Not lined.

Not lined.

Condition of canals

Fine.

Hand watered:

Distance to field

100 meters down to the river.

500 meters for women when they
hand watered the garden when
the pump was broken.

Frequency

2 times/day.

2 times/day. Now pump is
repaired, 1 time/day.

Quantity

180 l./plot/day (1 plot about
16 m).

BOLO DOGO

TIENEL

SIVE

Basin capacity

Remarks:

Gardens of Sive won the 2nd price in the vegetable fair in Kaedi, March '86. Women didn't think of growing vegetables in other seasons (like cowpeas, okra, melon, hibiscus). Expansion next year to 4 ha., if they get the field. They would like to export the vegetables with their own car; or when the costs of transport are not too high and production higher.

Prices:	Jan.	Apr.
Cabbages	40/kg.	10-14/kg.
Carrots	50/kg.	20-25/kg.
Tomatoes	5/pile	3/pile
Onions	40-60/kg.	10-15/kg.
Turnips	30/kg.	10/kg.
Okra		20/cup
Hibiscus		1/pile

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

SIVE

(Men's garden)

MAGHAMA

(Men's garden)

MAGHAMA

(Women's garden.)

A. GENERAL

Size 5 ha.
 Location Fonde.
 Soil type Clayey.

Vegetables grown and quantities

	Seed quantities:	Yield
Onions	3000 gr.	20000 kg.
Cabbages	1000 gr.	5000 kg.
Turnips	1000 gr.	1000 kg.
Carrots	1000 gr.	3000 kg.
Eggplant	300 gr.	1000 kg.
Diakhatou	200 gr.	500 kg.
Hot pepper	400 gr.	500 kg.
Tomatoes	300 gr.	2000 kg.
Sweet potato		30000 kg.
Beet	150 gr.	500 kg.
Manioc	2 plants	300 kg.

8190 m².
 Dieri.
 Sandy.

	No. Plots at 5 m ²	Yield thru
Onions	9 plots	4/22/86 35 kg.
Cabbage	9 plots	3 plots
Carrots	4 plots	1 plot
Turnips	3 plots	not harvested
Tomatoes	5 plots	
Hot pep.	1 plot	

Don't know.
 Dieri.
 Sandy.

Onions (1st in importance)
 Cabbages (2nd)
 Tomatoes (3rd)
 Lettuce (4th)
 Potatoes (5th)
 Carrots, turnips, beets,
 mint, eggplant, hibiscus, hot
 pepper, okra, parsley, sweet
 potatoes, cowpeas, manioc.

Reasons for growing those vegetables Because they know those vegetables. They bought them.

Those were the seeds they could find.

They want to try all vegetables. They bought them and got some free. Agriculture explained that sweet potatoes, onions, and cowpea would grow well in this kind of soil.

Origin of seeds

Djovol, Senegal.

Senegal (carrots, tomatoes, cabbage, turnips, onions). 3 kg. total. CARITAS provided 4 kg. cowpeas & 3 kg. corn. CARITAS sold a lot of little seed packets.

Number of yields

1.

Several: cabbage 2-3 times; potatoes 3 times; tomatoes continuous.

Individuals/Coop

Coop.

Coop.

Coop.

Number of members

48 men.

13 men.

About 450 women.

B. VEGETABLES GROWN

Quality Good. Only tomatoes & cabbages attacked by parasites.

Not very good because of parasites.

Good quality although some problems because lack of water.

Date of planting or seeding

Sept. 10, '85.

Sept. '85: nurseries.

Nov. '85: nurseries.
 Dec. '85: replanting/sowing(2 times)
 End Mar.'86:sweet potatoes,cowpeas.

	<u>SIVE</u>	<u>MAGHAMA</u>	<u>MAGHAMA</u>
Date of harvesting	1st January.	End March.	Feb. '86: tomatoes, cabbage, lettuce, potatoes. 4/22: everything except sweet potatoes & cowpeas is harvested.
Seasons	Cold.	Cold.	Cold.
Portion consumed/sold	1/5 consumed. 4/5 for sale.	Everything for sale.	Most is for consumption.
Preferred vegetables	Sweet potatoes: all seasons without marketing problems; onions: consumption & conservation; carrots: no parasites & highly consumed.	Onions, carrots, cabbages (vegetables most consumed).	Onions (leaves can be dried & onions conserved), tomatoes, cabbages.
Losses: which/how	Cabbages & tomatoes, parasites.	Everything that is not harvested (turnips, tomatoes, hot peppers, and part of cabbage and carrots) parasites.	Tomatoes & cabbages attacked by crickets in the very beginning, thus sowed twice. Potatoes: lack of water, they got conflicting advice.

C. COMPOSITION OF THE GROUP

Language	Halpulaar.	Halpulaar.	Halpular & Hasanya.
Tribes	Halpulaar.	Halpulaar.	Halpulaar is majority, some Maures.
Relations	Open inscription.	Neighbors.	Open inscription.

D. ORGANIZATION OF THE WORK

Every member has his own plot.

Garden is divided in zones with its own organization of the work. Each woman has own parcel.

DIVISION:

Plant/seeding	All men.	Together.	10 women. Nurseries: hired labor.
Watering	All men.	Together.	All women.
Weeding	All men.	Together.	All women.
Fencing		Together.	Together, women gathered wood.
Prep soil	All men.	Together.	All women.
Harvest	All men.	Together.	All women.
Sale	All men or their wives (local market) take turns.	Together.	1 woman (unless yield too big, then all women).

SIVE**MAGHAMA****MAGHAMA**

Others

FREQUENCY:

Plant/seeding

1 time.

4 times.

Watering

1 time/week.

2 times/day.

2 times/day.

Weeding

If necessary.

Every 3-4 days.

Fencing

1 time.

1 time.

Prep soil

1 time before sowing.

1 time.

Harvest

Continuous.

If vegetables mature.

Continuous.

Sale

Continuous.

If vegetables harvested.

Continuous.

Others

E. TECHNICAL DATA

Skills

They have experience in cultivating and selling products.

1 member has experience after a 9 month stay in Senegal.

No experience, 1st year. Regularly somebody from CARITAS comes to advise them.

Literacy

2 literate persons (CM2-level). Rest are illiterate.

1 member is literate (CM2-level). Rest are illiterate.

2 women literate (1st year college). Rest are illiterate.

PROPERTY:

Equipment

Belongs to coop.

Belongs to coop.

2 pikes, 2 shovels, 1 rake, 1 watering can, buckets belong to the women.

Field

Belongs to coop.

Gift from Prefect.

Means of production

Motor pump rented from SONADER.

Belongs to coop.

Source of water

River.

Well, motor-driven.

Well, motor-driven.

Hand/motor

Motor pump.

Hand.

Hand.

Fertilizers: type, quantity, costs, origin

NPK (101020), 5 sacks of 50 kg., 900 UM, bought from CARITAS. Superphosphate, 10 sacks of 50 kg., 900 UM, bought from SONADER. Urea, 10 sacks of 50 kg., 900 UM, bought from SONADER.

No.

Some women bought fertilizers. CARITAS explained how to use it.

Pesticides: type, quantity, costs, origin

5 liters, gift from SONADER.

HCH, 1 sack, gift from Regional Inspection.

Yes. CARITAS lent them the equipment and gave the materials to spray.

SIYE**MAGHAMA****MAGHAMA****F. EXTENSION & FINANCING**

Organizations which help

SONADER gave them fertilizer, gas/oil & seeds in '81-'82. SONADER sold fertilizers, gave pesticides. Peace Corps gives advice. CARITAS rents motor pump for 30,000 UM/season.

Peace Corps gave wire in '82. Regional Inspection gave pesticides.

CARITAS gave pikes, seeds & shovels; sold seed and gave explanation. Agriculture gave 8 seed packets.

Credit

No.

No.

No.

G. PRODUCTION

History

They started in '81-'82, when activities in Fom Gleita started.

Started in '85 after CARITAS and Agriculture came to talk about how to start a new garden. They payed 20 UM/member to buy seeds.

Incomes

46,000 UM after harvest of '85.

1 zone of 30 members got 3,350 UM

EXPENDITURES:

A part of these costs (motor pump) will be paid by the women's garden. Probably about 20,000 UM

Fertilizer

2700 UM

Pesticides

Motor pump

Rent 30,000/season.

Oil

3300 UM

Gas/oil

4800 UM

Maintenance

Buckets

Ropes

Seeds

3000 UM + all women bought other seeds individually.

Hired labor

Pumpist, 1500 UM

Watering nurseries: 1000 UM, soil preparation: 1300 UM

Tools

Fencing

700 UM

Well

SIVE**MAGHAMA****MAGHAMA**

Transport

Other materials

Others

Net profits

Spare parts, 1000 UM

54,000 UM

Water: 40,600 UM

Individual profit 8000 UM
(used for family purchases).

None.

H. MANAGEMENTDistribution for
consumption

Individual.

No consumption.

Normally everybody takes from her
own parcel what she needs.

Distribution for sale

Individual.

One person is responsible for
the organization of the work,
also for sale.

Each zone distributes for sale.

Distribution of the
revenues: how/whenEach member receives share after
harvest.

No distribution (no profits).

No distribution.

Who decides

Together.

Together.

President.

Entrance

When garden started they paid
300 UM/member to buy seeds.

2500 UM

Several months, calculated from
beginning (one month is 20 UM).

Pool

No.

20 UM/month.

20 UM/month to buy something big.

Money in cash

6535 UM

Nothing.

32,000 UM

Bookkeeping

Yes, there is a bookkeeper.

Yes, there is a bookkeeper.

No, there is only a report of
CARITAS.

Investments in garden

No.

No.

Some material to repair the wooden
fence.

Other investments

Bricks for construction of common
house.

No.

No.

I. MARKET DATALocal situation:
access, costs,
quantities sold,
local demand,
local competitionLittle local market. Free
access; 2000 kgs. sold;
demand for all vegetables;
no competition.Free access; 10 UM/day; can't
estimate; demand for all vege-
tables; competition with other
coops.Free access; 10 UM/day; little
quantities; products often not sold
in 1 day; competition especially
from other villages: Matam and
Senegal.Regional market:
which products,
prices, costsKaedi and Matam. All vegetables.
In Kaedi prices higher than in
Sive and Matam.

No.

Matam. Difficult to sell vegetables
there; surplus.

Interregional market:

Nouakchott, 1500 kg. onions,

No.

Markets in Senegal. Higher than in

	<u>SIVE</u>	<u>MAGHAMA</u>	<u>MAGHAMA</u>
Inter. market (Cont.) which products, prices, costs	25-40 UM/kg.		Maghama but sometimes huge competition.
Number of markets where products sold and distance	4. Sive-Kaedi=70 km.	1. Own village.	1. Own village.
Knowledge of other markets	Kaedi is important market because many consumers.	No.	They know Matam, but more for other products than vegetables.
Transportation: possibilities, costs, constraints	Donkey cart Sive-Matam: 50 UM/ 50 kg., 30 UM/person. Van Sive-Kaedi: 150 UM/50 kg., 400 UM/person. Transport Sive-Nktt.: 2 1/2 UM/kg.	Donkey carts.	From Maghama to Matam there is rarely transportation.
<u>J. EARNING CAPACITY</u>			
Reason for growing vegetables	Consumption and income.	Because they don't have other activities.	Buying vegetables from Senegalese was too expensive.
Advantage of growing vegetables		Growing of vegetables is lucrative.	
Most lucrative vegetables	Onions.	Onions.	Cabbages, tomatoes, onions (conserved).
Other sources of income	Growing of cereals.	No.	Some women: sell other products at the market; making carpets; selling milk; dyeing cloth. But most don't have other source.
Most important source, why?	Growing of rice.	Garden only source.	They don't know if they win or lose with garden, so can't define most important source.
Expand production: why/why not	Yes, they want to expand growing sweet potatoes, during all seasons.	Yes, to gain more money.	Yes, if water and fencing problem is solved.
Is outside help necessary?	Always necessary, especially to obtain seeds.	Always necessary.	They always want help, even the garden was not their own idea. Till now they did it on their own.
<u>K. CONSERVATION PRACTISES</u>			
Existence	Sweet potatoes in wet sand, onions in field without watering.	No.	Onions, okra, hibiscus.
Knowledge	No other knowledge.	Conservation in store-houses.	No other knowledge.

SIVE**MAGHAMA****MAGHAMA****L. IRRIGATION**

Motor pump:

Capacity

Power

2 cylinder.

Origin

United Kingdom.

Make

Lyster 2 cylinder.

Time of watering

7 hours/week.

Area watered

4.5 ha.

Frequency

1 time/week.

Distance to field

10 meters.

Canals lined or not

Not lined.

Condition of canals

Good.

Hand watered:

Distance to field

25 meters.

225 meters.

Frequency

2 times/day.

2 times/day.

Quantity

80 l./plot/day.

2-5 oil drums (at 200 l.)/day.

Basin capacity

No basin.

Remarks:

SONADER 2nd prize
at the vegetable fair in Kaedi,
March '86. Growing vegetables
helps them to pay the
debts to SONADER (debts for
garden itself and for rice
perimeters).

Lack of water in village. Water
is sold because wells are motor
driven and thus very expensive
to get water.

Prices:
Cabbage: 10 UM/piece
Onions: 3-10 UM/piece
Tomatoes: 5-10 UM/pile
Lettuce: 5 UM/head

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

FOUM GLEITA

(Mixed)

FOUM GLEITA

(Women)

FOUM GLEITA

(Sira Ba's garden)

A. GENERAL

Size	(10 ha.) 7 ha. cultivated.	5300 m ²	2300 m ²
Location	Walere.	Old river bed.	Old river bed.
Soil type	Heavy clay.	Heavy clay.	Heavy clay.
Vegetables grown and quantities	Corn, tomatoes, onions, okra, carrots, beets, cowpea, sweet potatoes.	Onions, cabbage (largest quantity), tomatoes, lettuce eggplant, hibiscus, cowpeas, pumpkin, turnip, carrots, beets, radishes.	Onions, cabbage, tomatoes, okra, lettuce, eggplant, hibiscus, cowpea, pumpkin, turnips, carrots, beets, radishes.
Reasons for growing those vegetables	Extension Service Agent (SONADER) bought them in Dakar.	Peace Corps, Prefect & Agriculture brought these seeds.	Peace Corps, Prefect & Agriculture brought these seeds.
Origin of seeds	Dakar.		
Number of yields	No harvest yet.	Continuous.	Continuous.
Individual/Coop	Coop, each woman has own parcel.	Coop, each woman has 2 plots.	Coop.
Number of members	280 women.		

B. VEGETABLES GROWN

Quality		Good. Carrots straight, beets are big.	Good. Carrots straight, beets are big.
Date of planting or seeding	Dec. '85. Too late, but they had to wait for the President who planned a visit to Foum.	End of Jan.-Beginning of Feb. '86.	End of Jan.-1/2 of Feb. '86.
Date of harvesting	No harvest yet.	April '86 start harvest of eggplants and turnips. Onions and rest end of May '86.	April '86 start harvest of eggplant and turnips. Onions and rest will be harvested end of May '86.
Seasons		Cold (Peace Corps wants to continue okra, melon & hibiscus.)	Cold.
Portion consumed/sold	Both, if they can't consume it all.	All for sale.	Consumed and sold.
Preferred vegetables	Cabbage: taste. Carrots: taste. Onions: already known by consumers.		

FOUM GLEITA (mixed)**FOUM GLEITA (women)****FOUM GLEITA (Sira Ba's)**

Losses: which/how

Yes, a lot. Onions because women cut the leaves. Rest because too much water.

Cabbages: insects. Lettuce: too bitter.

Cabbages: insects. Lettuce: too bitter.

C. COMPOSITION OF THE GROUP

Language

Hasanya & Halpulaar.

Halpulaar.

Hasanya & Halpulaar.

Tribe

Majority is Maure, rest are Halpulaar.

Halpulaar.

Maure 2/3; Halpulaar 1/3.

Relations

Open inscription.

Coop existed already with sewing and knitting.

Open inscription.

D. ORGANIZATION OF THE WORK

Everybody has her/his own parcel, and does all the work.

They have no communal plots because then only a few women always do the work. Thus all women have 2 plots.

DIVISION:

Plant/seeding

All.

All women.

Together.

Watering

All.

All women.

Together.

Weeding

All.

All women.

Together.

Fencing

All.

Together.

Prep soil

All.

A few women (not volunteers).

Together.

Harvest

All.

Together.

Sale

All.

Others

FREQUENCY:

Plant/seeding

1 time.

Watering

1-2 times/day.

Weeding

Fencing

Prep soil

4 weeks.

Harvest

FOUM GLEITA (mixed)**FOUM GLEITA (women)****FOUM GLEITA (Sira Ba's)**

Sale

Others

E. TECHNICAL DATA

Skills None.

Not very many skills.

Not very many skills.

Literacy Illiterate.

5 women literate, rest illiterate. Illiterate.

PROPERTY:

Equipment

5 watering cans, 3 shovels,
5-6 pikes, 10 hoes, 4 rakes,
belong to coop.5 watering cans, 3 shovels, 5-6
pikes, 10 hoes, 4 rakes, belong to
coop.

Field

Gift of Prefect.

Gift of Prefect.

Means of production

Canals belong to SONADER.

Canals belong to SONADER.

Source of water

Canal.

Canal.

Hand/motor

Till 4/10/86 by hand. Now they
have pipe to siphon the water.

Hand.

Fertilizers: type,
quantity, costs, originManure (goat & sheep). Pounding
necessary because it is too dry.
Soil is fertile but needs more
sand.

No, soil is very fertile.

Pesticides: type,
quantity, costs, origin

Powder, but wind blew it away.

No.

F. EXTENSION & FINANCINGOrganizations which
helpFood for Work gave 80 kgs.
sorghum, 7 kg. milk powder,
6 liters oil, for labor on
canals and fences. SONADER
provided extension services.CARITAS provided tools (for
15,000 UM, came from Kaedi).
SONADER gave pipe (32,000 UM),
Agriculture gave seeds & pesti-
cides. Peace Corps gave seeds
for 2000 UMCARITAS Kaedi: gave tools for
15,000 UM Prefect gave fields.
Agriculture gave seeds & pesticides.
Peace Corps gave seeds for 2000 UM

Credit

No.

No.

G. PRODUCTION

History

Started in '85. SONADER
extension helped. All women
paid 400 UM for expenses.Started in '85. Oct. '85
fences, etc.

Started in '85. Oct. '85 fences, etc.

Incomes

FOUM GLEITA (mixed)

FOUM GLEITA (women)

FOUM GLEITA (Sira Ba's)

EXPENDITURES:

Fertilizer

Pesticides

Motor pump

Gas/oil

Maintenance

Buckets

Rope

Seeds

See below.

Hired labor

Guard (1 month): 650 UM

Guard (1 month): 650 UM

Tools

Fencing

Well

Transport

Other materials

Others

Tube and seeds together:
27,400 UM

Net profits

H. MANAGEMENT

Distribution for consumption

5 women decide about distribution and time of harvesting.

Probably every women has own parcel with own vegetables.

Distribution for sale

5 women decide about distribution and time of harvesting. Money from sale goes to the coop.

Every woman has own parcel with own vegetables.

Distribution of the revenues: how/when

No distribution; money will be used for other purposes.

Probably they have their own incomes from their parcels.

Who decides

Together; there are 3 subgroups to coordinate.

5 women decide. Peace Corps volunteer helps in making decisions.

4 women. Garden is rather independent.

	<u>FOUM GLEITA</u> (mixed)	<u>FOUM GLEITA</u> (women)	<u>FOUM GLEITA</u> (Sira Ba's)
Entrance	400 UM/woman.	Only to start the coop. No special entrance fees for garden.	To start they pooled 25 UM/woman to pay the guard.
Pool	No.	No.	No.
Money in cash	12,000 UM	Cash of coop.	No cash.
Bookkeeping	The extension service agent is bookkeeper but he doesn't explain.	No, only list of members.	No.
Investments in garden		Not yet.	
Other investments		Money used for the coop: sewing knitting.	

I. MARKET DATA

Local situation:
access, costs,
quantities sold,
local demand,
local competition

No market; women asked for market place. Many people are not used to vegetable consumption.

No local market. People are not used to vegetable consumption but they like vegetables.

Regional market:
which products,
prices, costs

M'Bout.

M'Bout.

Interregional market

Number of markets
where products sold
and distance

Knowledge of other
markets

Transportation:
possibilities,
costs, constraints

Van: Fom Gleita-Kaedi- 800 UM per person. Luggage is not calculated.

J. EARNING CAPACITY

Reason for growing
vegetables

SONADER and extension agent stimulated interest.

Women see it as a social activity. Some women don't work very hard.

It is a social activity.

Advantage of growing
vegetables

Most lucrative
vegetable

FOUM GLEITA (mixed)**FOUM GLEITA (women)****FOUM GLEITA (Sira Ba's)**

Other sources of income Maurish women: no. Halpulaar
 women: working with cloth.
 Before they were herders.

Most important source,
 why?

Expand production?
 Why/why not

Is outside help
 necessary?

K. CONSERVATION PRACTISES

Existence	Okra.	Okra.	Okra.
Knowledge	No other, but they are interested.	No other, not even onions.	No other.

L. IRRIGATION

Motor pump:

Capacity

Power

Origin

Make

Time of watering

Area watered

Frequency 2 times/week.

Distance to field

Canals lined or not

Condition of canals

Hand watered:

Distance to field

Till 4/10/86 hand watered,
 10-50 meters. Now they have a
 pipe to siphon the water.

Canals 10-50 meters.

Frequency

1-2 times/day.

1-2 times/day.

Quantity

FOUM GLEITA (mixed)

FOUM GLEITA (women)

FOUM GLEITA (Sira Ba's)

Basin capacity

Remarks:

Overwatering.

Garden started too late. Peace Corps volunteer wants women to water less: once in 3-4 days, because soil is very clayey and holds water.

Problem with Foun Gleita is that the people who are used to eating vegetables (people who work for SONADER) often have their own private vegetable gardens near their houses. So marketing the vegetables will be a problem.

SUMMARY OF THE RESULTS OF THE VEGETABLE SURVEY

BABABE

A. GENERAL

Size 8 ha. vegetables; 3 1/2 ha. fruit.

Location Fonde.

Soil type Clayey.

Vegetables grown and quantities Okra, potatoes, onions, squash, melon, eggplant, hot pepper, sweet pepper, sweet potatoes, tomatoes, diakhatou.

Reasons for growing those vegetables Good taste; successful; marketable.

Origin of seeds CNRADA; (Next year tropical seeds PFP); Red Cross=bad quality.

Number of yields

Individual/Coop Coop.

Number of members 15 families.

B. VEGETABLES GROWN

Quality

Date of planting or seeding

Date of harvesting

Seasons Cold: vegetables. Wet: corn, sorghum and millet.

Portion consumed/sold First for family consumption then for sale. Large part is sold.

Preferred vegetables

Losses: which/how

BABABE

C. COMPOSITION OF THE GROUP

Language Halpulaar.
Tribe Halpulaar.
Relations Family and neighbors.

D. ORGANIZATION OF THE WORK

DIVISION:

Plant/seeding

Watering

Weeding

Fencing

Prep soil

Harvest

Sale

Others

FREQUENCY:

Plant/seeding

Watering

Weeding

Fencing

Prep soil

Harvest

Sale

Others

E. TECHNICAL DATA

Skills

Literacy There are people who are
 literate, also in French.

BABABE

PROPERTY:

Equipment Belongs to coop.
Field Belongs to coop.
Means of production Belong to coop (a part is wealthy & pays for materials, another part pays through working in the garden).
Source of water River.
Hand/motor Motor.
Fertilizers: type, quantity, costs, origin Yes, and manure.
Pesticides: type, quantity, costs, origin Sprayed.

F. EXTENSION & FINANCING

Organizations which help USAID: paid 50% of the fence and a motor pump (via Peace Corps). PFP gives advice.

Credit

G. PRODUCTION

History Garden started in '84. Before they had little plots.
Incomes '84-'85: 8000 m yield. 40% not sold (car broke down on way to Nouakchott), 46 UM per m = income.
'85-'86: Not yet calculated, but higher incomes.

EXPENDITURES:

Fertilizer

Pesticides

Motor pump

Gas/Oil

BABABE

Maintenance

Buckets

Rope

Seeds

Hired labor

Tools

Fencing

Well

Transport

Truck: 1.5 million UM
Peugeot: 900,000 UM

Other materials

Others

Net profits

H. MANAGEMENT

Distribution for
consumption

Distribution for sale

Distribution of the
revenues: how/when

Who decides

Entrance

Pool

Money in cash

Bookkeeping

Investments in garden

Motor pump, new trees,
transportation.

Other investments

BABABE

I. MARKET DATA

Local situation: In Bababe itself they sell access, costs, quantities sold, merchants or consumers. local demand, Also people from neighborhood come to buy. local competition

Regional market: Kaedi. Bananas, potatoes (large quantities), hot peppers, onions, costs squash. Rest small quantities, sold via merchant they know.

Interregional market: Nouakchott, 1 member of coop which products, prices, is there with shop, sells to costs merchants. High quantities. Prices lower than in Bababe.

Number of markets where products sold and distance 3.

Knowledge of other markets

95 Transportation: They have their own transportation: possibilities, costs, refrigerator truck and some cars. constraints

J. EARNING CAPACITY

Reason for growing vegetables

Advantage of growing vegetables

Most lucrative vegetables Eggplant: high quantities and grows all seasons. Potatoes, sweet and hot peppers.

Other sources of income

Most important source, why?

Expand production? Yes, especially in hot Why/why not season, and maybe hot peppers for Europe. To increase income.

BABABE

Is outside help
necessary?

K. CONSERVATION PRACTICES

Existence

Knowledge

No, they want to learn
about canning.

L. IRRIGATION

Motor pump:

2nd hand (a new pump is
already available).

Capacity

Power

2 cylinder.

Origin

United Kingdom.

Make

Lyster 2.

Time of watering

Area watered

Frequency

Distance to field

Canals lined or not

Condition of canals

Hand watered:

Distance to field

Frequency

Quantity

Capacity of basin

Remarks:

Prices:

Potatoes Bababe: 40 UM/kg.

Nktt: 30 UM/kg.

Eggplant: 10 UM/1-1.5 kg.

(sell everywhere)

Onions Nktt.: 20 UM/kg.

RABABE

Remarks (cont.):

In Rababe this is biggest
vegetable producer.

They won 1st prize at
vegetable fair in Kaedi,
March '86. They got
6000 UM

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET*

Average UM/kg and date	-1985-					
	13/11 min-max	21/11 min-max	27/11 min-max	4/12 min-max	11/12 min-max	18/12 min-max
Beet						
Cabbage	98-147	93-128	110-120	113-125	71-97	80-97
Carrot						
Diakhatou	67-80	68-74	30-40		70-83	70-83
Eggplant	44-50	43-50	23-33	30-35	18-30	18-30
Hot pepper	247-303	218-255	173-217	210-245	200-245	200-245
Lettuce (head)	6-10				8-10	6-10
Mint						
Okra	28-33	38-45	38-47	31-40	35-43	35-43
Onion	58-70	45-53	45-53	44-55	62-70	62-70
Parsley	50-60	41-49	52-55	50-56	42-49	42-49
Potato	60-70	48-54	52-57	51-59		
Squash						
Sweet pepper (piece)				4-5		

* Prices in UM

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET

Average UM/kg and date	-----1985-----					
	13/11 min-max	21/11 min-max	27/11 min-max	4/12 min-max	11/12 min-max	18/12 min-max
Sweet potato						
Tomato Kaedi						
Tomato Senegal						
Turnip				58-64	62-73	62-73
	-----1986-----					
	7/1 min-max	15/1 min-max	22/1 min-max	29/1 min-max	6/2 min-max	12/2 min-max
Beet						
Cabbage	63-77	62-70	62-70	62-70	62-70	43-70
Carrot	62-70	62-65	62-65	61-65	60-65	5/pile
Diakhatou	47-57	52-57	47-57	52-57	52-57	40-48
Eggplant	22-28	22-28	22-28	22-28	22-28	25-37
Hot pepper			200-245			327-417
Lettuce (head)			5	5		5

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET

Average UM/kg and date	-1986-					
	7/1 min-max	15/1 min-max	22/1 min-max	29/1 min-max	6/2 min-max	12/2 min-max
Mint					5/head	
Okra			35-43	35-43		
Onion	53-58	53-60	50-60		53-60	
Parsley		52-57	42-49	2/head	52-57	10/head
Potato	52-57	52-58			50-60	
Squash						
Sweet pepper						
Sweet potato						
Tomato Ka di						50-58
Tomato Senegal						
Turnip	62-73	62-73	50-58	50-58	58-73	40-48

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET

Average UM/kg and date	-----1986-----					
	19/2 min-max	26/2 min-max	5/3 min-max	6/3 min-max	12/3 min-max	26/3 min-max
Beet				45-54	42-48	
Cabbage	42-47	42-47	20-25	17-24	20-25	25-30
Carrot	60-65	60-65	50-55			
Diakhatou	52-57	52-57	20-25		17-22	20-25
Eggplant	22-23	22-28	13-18		12-18	10-15
Hot pepper						
Lettuce (head)	5			5		
Mint						
Okra				23-30	24-28	
Onion	53-60	53-60	25-32*	48-55	55-55	35-40
Parsley	52-58	52-58				
Potato	50-60	50-60		48-55	42-48	40-50
Squash				2/piece		
Sweet pepper						

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET

Average UM/kg and date	-1986-					
	19/2 min-max	26/2 min-max	5/3 min-max	6/3 min-max	12/3 min-max	26/3 min-max
Sweet potato	60-65	60-65	30-38	40-45	40-45	35-40
Tomato Kaedi	50-50	50-58	20-25	33-40	22-28	20-25
Tomato Senegal						
Turnip	52-60	52-60	32-35	25-30	23-32	25-30

Average UM/kg & date	-1986-								
	27/3 min-max	2/4 min-max	9/4	11/4	12/4	15/4	16/4 min-max	22/4	23/4
Beet							35-40		
Cabbage	24-30	25-30	33	35	30	40	25-40	60	
Carrot			55	66	60		33-40		
Diakhatou			20	10	78				
Eggplant (piece)	8-13	10-13	15	30/kg	40/kg	13	5-10	15-30/kg	15
Hot pepper			5(pile)	60/kg	15(pile)				

APPENDIX E

PRICE FLUCTUATIONS IN THE KAEDI MARKET

Average UM/kg & date	-----1986-----								
	min-max	27/3 min-max	2/4 9/4	11/4	12/4	15/4	min-max	16/4 22/4	23/4
Lettuce									
Mint									
Okra									
Onion	41-47	45-50	37	35	28	35	25-30	30	28
Parsley									
Potato	41-48	45-50	50	53	60	48	48		
Squash			65		30				
Sweet pepper									
Sweet potato	30-35	25-30	40	40	42	45	35-60	40	40
Tomato Kaedi	34-42	29-34	40	38	40	30	32-37		40
Tomato Senegal							15-20		
Turnip							24-29		
Hibiscus			40	15	45	15	10	20	
Dried onions *			3	40	17	25	15		25