CONSULTANCY REPORT ON

A SOCIO-ECONOMIC BASELINE SURVEY

FOR THE

PILOT FRUIT AND VEGETABLE MARKETING PROJECT

CHAD

PROJECT NUMBER CHD-3#126

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II. LIST OF ACRONYMS

ACDI	Agricultural Cooperative Development International
BSA	Bureau of Agricultural Statistics
ONDR	National Rural Development Office
SECADEV	Catholic Development Aid

III. EXECUTIVE SUMMARY

The Karal ACDI project area falls into two zones, east and west, which differ both in soil types (according to farmers) and therefore the major crops grown and in the routes used to export the produce to the capital city of N'Djamena for sale. In the west farmers grow more tubers and gumbo, as well as melons, and export it over a road currently being upgraded, via Dandi to Djermaya and N'Djamena. In the east farmers grow more tomatoes, as well as gumbo and melons, for export over a rough sand and dirt track to Alkouk, Balbut, then Djermaya and N'Djamena.

The ACDI project was intended to increase farmers' income in these two zones by increasing production and, thereby, to lower consumer prices in the project zone and in N'Djamena for vegetables and fruits. The project intended to reduce the market and transportation insecurities which, it was felt, kept farmers from raising their level of production.

The constraints on production, however, involve more than farmers' unwillingness to produce because of market insecurities. The constraints identified during the baseline socio-economic survey are:

1. Recession agriculture, which limits the times vegetables and fruits can be produced and alters farmers' possibilities of production from year to year;

2. Low proportion of produce sold, either because of overproduction and competition in the project area and elsewhere and/or of lack of consumer demand;

3. Transportation breakdowns which mean produce begins to spoil and, in addition, gets to market after demand has begun to fall.

Farmers deal with these constraints in several ways.

1. Planting as much as possible: a) to increase the amount produced early and late in the season; and b) ensure that, should there be a demand, the farmer will have something to sell, especially to compensate for years of bad production;

2. Buying produce from other farmers in the field and reselling at higher N'Djamena prices in order to be prepared to meet any demand, or selling at field prices to ensure some income no matter whether the N'Djamena market is up or down;

3. Speed is the key once produce is harvested, moving produce in the cool of the night to be poised for early sale in the morning;

4. Voluntary Marketing Associations which set days and amounts for members to ship produce, to reduce flooding the market.

The ACDI project can increase farmers' income and increase the availability of fruits and vegetables to the consumer by increasing the quality of produce offered in N'Djamena, which will probably ensure that more will sell. They can do this by:

1. Improving harvest and post-harvest techniques so that better quality produce is shipped for sale;

2. Improving packaging so that less produce is damaged en route;

3. Helping transporters avoid breakdowns which lead to spoilage of produce shipped.

4. Opening more markets in N'Djamena to Karal produce so that competition in some markets is reduced and consumer demand in others is more readily met.

5. Transformation: conserving produce for sale when fresh produce is no longer available.

Transformation, however, faces two problems: a) many farmers prefer to risk no sale in N'Djamena for the chance to earn large profits in N'Djamena, and so will be unwilling to sell their produce in the Karal area for a low transformation price; and b) tomatoes dried in Karal do not have a long shelf life so that they do not last until dried tomato prices are high, which would motivate producers to engage in transformation. ACDI will have to improve conservation methods. It may also be wise to target people in N'Djamena to engage in conservation since more produce may be offered at low prices there than in the growing area itself. While transformation might be done as a household activity it may be preferable to consider the possibility of small businesses which can treat produce on a larger scale and afford equipment needed for conservation.

Storage is one solution that farmers, middlemen and ACDI sometimes propose as a possible solution to the inability to sell all their produce at N'Djamena. At the beginning and end of the season, when a limited amount of produce reaches the market, so that what remains unsold today may still be in demand tomorrow, storing produce to help retain its quality may be helpful. But during the height of the season, when fresh new produce is continually arriving, the produce which has not sold at the end of the day is of poor quality and will be unable to compete with new arrivals, even when stored, so that the storage is wasted. Therefore, before investing in expensive storage facilities ACDI should experiment to see if simply improving harvesting, post-

harvest treatment, packaging and transportation will retard spoilage enough to make a difference.

Producers and buyers in the Karal project area for the most part view vegetable and fruit production as a money-making activity, calculate their benefits and losses, and will likely be open to ACDI's attempts to improve marketing. The project should proceed in close consultation with the farmers, buyers and marketing associations, as well as SECADEV groupements to help farmers understand their marketing problems and ensure that possible solutions are acceptable to the people involved.

IV. SCOPE OF WORK

Introduction

This scope of work is specifically aimed at developing a framework for data collection and analysis which can measure the people level impact of the project. The study will include the economic and social variables which are expected to change as a result of the project. The project is also internally collecting baseline data on product prices, transportation costs, and marketing efficiencies, but these are outside the scope of work for this consultancy.

Purpose

The purpose of this baseline study and the subsequent monitoring and evaluation of the interventions and training is to provide ACDI, USAID and the Government of Chad with information about socio-economic conditions that are changing as a result of the project. This impact information will enable the responsible organizations to review the effects of this pilot effort and plan effective allocation of resources to achieve development goals in later phases of this project and in future fruit and vegetable marketing projects.

Objective

The objective is to collect quantifiable data by which socio-economic change, attributed to the project, can be measured over the life of the project. To do this, the design methodology and the analytical framework should be structured so that comparison of data in subsequent impact studies will be measurable and methodologically valid. Also, socio-economic surveys for similar projects in Chad should be reviewed so that, to the extent possible, data collection techniques, wording of questions and analytical formats will be compatible.

Background of the Project

Only recently have farmers in areas outside of N'Djamena started producing significant surplus quantities of fruits and vegetables to be marketed in the city. As the population of N'Djamena has increased so has the urban market demand for fruits and vegetables. This has led to shortages and high prices which have pushed items out of reach of many lower income consumers. Farmers in relatively distant areas from N'Djamena, such as Karal, have attempted to respond to the increased demand, but market inefficiencies and uncertainties have made the farmer's return low

and risky. The project was developed on the rationale that if market efficiency is improved, farmers will expand production and the supply to the N'Djamena market will be increased. This will improve the availability of produce and reduce the pressure on prices.

The primary goals of the project are to increase the income of small farmers from their horticultural enterprises and make fresh and locally processed fruits and vegetables available to consumers at reasonable prices. This is to be achieved by initiating a number of interventions which are designed to improve post-harvest technology, reduce transportation and market handling costs, and make marketing information more readily available.

Scope of the Baseline Study

The conceptual scope and implementation design of the baseline study should be oriented toward obtaining information about the most impact sensitive indicators and those which can be expected to show the greatest change in a relatively short time. This will require making in-depth studies of key socio-economic characteristics and attitudes in a small number of Focus Areas.

Data gathering and analysis will focus on the economic impacts on producer households and social impacts of both the producer and consumer. The expected impacts can be defined as:

Economic

* Increased producer household income. (Agricultural and non-agricultural income.)

* Increased employment opportunities. (Post-harvest value added services, labor, etc.)

* Expansion of private investment. (Agricultural inputs, transportation, processing, etc.

* Enhancement of private sector economic activities. (Secondary and tertiary services related to horticultural enterprises, micro enterprises.)

Social

* More effective producer associations. (Changes in structure and function of Groupements, establishment of formal or informal marketing groups.)

* Enhancement of women's enterprises. (Greater participation of women in post-harvest value added activities, increased income from sales in local markets, etc.)

* Improvements in nutritional status. (Improved family nutrition resulting from greater quantity and better quality of fruits and vegetables at affordable prices.)

Data Collection Locations

The project has selected three Focus Areas in which to undertake data collection in the Karal area: Guitte, Baltram and Djani. These areas are located at the Western extent, the Central area and the Eastern extent of the project site. In each Focus Area, a group of producing fields has been identified and the farmers cultivating these fields will constitute the survey population.

Implementation

The following are examples of some of the activities that will be undertaken in the study.

* A census of the Focus Area population will be taken and a sample for data collection will be drawn if the population number is too large.

* Information about the population will include household structure, size, ethnic composition and literacy.

* The study will identify the economic resources available to the households and determine the returns to these. Resources will include agricultural and non-agricultural enterprises, labor and capital resources.

* The study will investigate the levels of social interaction among the farmers vis a vis groupements and other formal and informal associations they may have.

* The study will investigate quantitative and qualitative levels of household nutrition in the project rural areas and in N'Djamena relative to the consumption of vegetable products.

End of Consultancy Outputs

1. A verbal debriefing to USAID upon completion of the field work and analysis of data.

2. A written report in English discussing study design and methodology, details of data collection techniques with copies of questionnaires and other instruments, presentation of data, conclusions and recommendations for subsequent studies.

Administrative Matters

1. It is estimated that the consultant will be in-country four to five weeks.

2. About three quarters of the consultant's time will be spent at the project site in Karal.

V. METHODOLOGY

One hundred and seventy male and female farmers in the project area were interviewed. Thirty-two in-depth questionnaires were administered to a randomly selected sample of male and female farmers. This sample will be used for monitoring during project activities and for the final evaluation. The socio-economic survey team did three weeks of fieldwork, of which three days were spent in N'Djamena interviewing merchants and middlemen. The total number of merchants interviewed is difficult to determine because many of the farmers also act as buyers/sellers.

The total sample consists of eight villages--6 project villages, 2 control villages--and 32 production units, divided equally between males (16) and females (16).

Fieldwork and questionnaires were designed to collect both qualitative and quantitative data about the socio-economic condition of possible project participants. The sample was drawn and questionnaires designed so that comparison of data in monitoring and impact studies will measure changes in a methodologically valid way. The questions asked for quantitative data so that change over time can be measured. The questions involved indicators which the anthropologist has found, after considerable experience, are the most reliable measures of change in similar societies. A follow-up questionnaire has been designed to elicit comparable data. Should the monitoring anthropologist find other indicators which are also reliable they should be added, as should questions concerning any areas of interest which emerge in the course of the project. To the extent possible, limited by the fact that vegetable production in the ACDI project area is recession production and therefore different from production on the Chari, Bahr al Ghazal and in wadis, the questionnaire was designed to produce data comparable to data from ORT and CARE/Chad vegetable projects.

The anthropologist was aided by the project logistical specialist and joined in the last week of fieldwork by an ONDR anthropologist who will monitor the project during the next two vegetable growing seasons. Total fieldwork in the Karal project area and N'Djamena took three weeks.

Drawn randomly on the basis of a 1988 ONDR survey of villages and male and female heads of production groups in the project area, a 10% sample covered 6 villages and 37 production units. Subsequently a more recent survey, done in 1990 by the BSA (Agricultural Statistics Bureau) was consulted; it revealed that the ONDR figures seriously undercounted the number of production units. The sample, therefore, covers only 1% of the production units in the project area. The random nature of the sample, however, means that it is still reliable; it would have been

physically impossible, in any case, to interview more people in the period allotted for fieldwork.

The project area is characterized by two different zones. In the west, the area along the Chari and the Lake, near Guitte, produces mainly tubers and melons, which are shipped out via Dandi to N'Djamena. The middle of the project area, around Karal and Baltram, produces tubers but more gumbo, melons and watermelons, along with some tomatoes, and ships them out via Dandi. Informal marketing associations have treated these areas as one zone, although the quantity of production from the Guitte area has grown to the point that they may set up a separate association. The other zone, in the east, covers Djani and Sidje and produces mainly tomatoes and melons. This zone evacuates its produce over a road from Djani to Alkouk, Balbut and Djermaya. The contrast between these zones and the shipment of vegetables will be increased by the paving or improvements to be done between Karal and the main N'Djamena road, whereas the abysmal Sidje-Djani-Djermaya road will remain a bumpy track. When the anthropologist drew the sample she drew it in equal parts from the Guitte-Karal-Baltram area and Djani-Sidje so that the two zones, which are so different in many respects, would be equally represented. To the six randomly selected villages she added a control village from each of the two zones, villages where the project would not intervene.

VI. FINDINGS

The ACDI Pilot Fruit and Vegetable Marketing Project was designed to reduce market inefficiencies and uncertainties which, it was felt, made Karal area farmers' returns so low and risky that:

1. Farmers produced only limited amounts of fresh fruits and vegetables;
2. They were not always able to get their produce to market.

The primary goals of the project are to increase the incomes of small farmers from their horticultural enterprises and to make fresh and locally processed fruits and vegetables available to consumers at reasonable prices. This is to be achieved by initiating a number of interventions which are designed to improve post-harvest technology, reduce transportation and market handling costs, and make marketing information more readily available.

The socio-economic baseline survey was conducted in October and November 1991, before the vegetable growing and selling season had begun. Therefore, all conclusions about production and marketing are based only on what producers, sellers and middlemen said about market inefficiencies and uncertainties, and not on observed behavior in production and marketing. The sociological findings, however, seem to indicate that some of the initial assumptions about the marketing of Karal fruits and vegetables need to be revised. The new assumptions which this report proposes need to be verified during the 1991-2 production/marketing season which is about to begin.

The assumptions which need to be revised are that:

1. Reducing market uncertainties and inefficiencies will encourage farmers to expand their production, leading to reduced shortages and reduced prices;

2. Farmers limit their production because their returns are low and risky;

3. Transportation shortages prevent farmers from bringing their produce to market;

4. Farmers lack market price information which would allow them to respond to the supply and demand for vegetables in N'Djamena.

The findings which indicate that these assumptions need to be revised are the following:

1. Project area producers' and N'Djamena middlemen have two major production problems:

   i. Farmers are unable to produce enough at the beginning and end of the season, when prices are driven up because of unmet demand. They are unable to meet this demand, in part because their production period is determined by the rise and fall of the lake level and, in part because they lack early and late maturing varieties of vegetables. Thus production at periods of high market prices is limited by technical factors and not by lack of farmer response to the market situation.

   ii. Farmers overproduce at the height of the harvest and flood the market with more vegetables than can be sold. It is this overproduction which drives costs down to the point where production and transportation costs may not be covered, not just the high costs of transportation and the poor quality of the produce shipped.

2. Vegetable production is not just a family enterprise depending on underemployed family labor. Many Karal area fruit and vegetable producers no longer work on a small-scale with family labor but do much of their farming and harvesting with migrant labor. They therefore have built-in costs of production which their vegetable sales have to cover. While many of these farmers are illiterate they calculate their gross and net revenues, costs, etc. The Karal area economy is becoming monetarized.

3. Much of the produce which does not reach the N'Djamena market does not do so for lack of transportation or for lack of market information but because it is deliberately kept off the market. A number of project area producers, supported by middlemen, have tried to regularize the quantities of produce shipped to N'Djamena at the height of the harvest season. Several marketing groups, formed since 1988, hope to limit price fluctuations and keep prices high enough to cover their costs.

4. Many farmers view fruit and vegetable production not as offering low and risky returns but as a golden opportunity to make a killing. Informants constantly used the analogy that fresh produce is a poker game ('gomar'); they go into the game because they hope to win and to win big, but sometimes they lose. Market uncertainties contribute to the chances they will lose but also to the chance they will win big. Some farmers sell their produce at field prices so that their risks are reduced. Their smaller profits are in part a result of reduced risk, not necessarily lack of information about market prices.

5. Many producers have ongoing arrangements with transporters, or with buyer/transporters, for regular, scheduled transportation of their produce to N'Djamena. Only a minority of producers have trouble finding transportation. Not enough information has been gathered on transportation costs to draw any definitive conclusions about how much transportation costs can be reduced. Producers and buyers interviewed, however, stated unanimously that they considered automobiles to be the most efficient form of transport for fruits and vegetables.

6. Farmers, buyers and middlemen all identified their problems, not as lack of production, lack of transportation, or lack of market information but as lack of seeds to produce high quality and early and late varieties and as lack of demand for fruits and vegetables at peak production periods.

The assertion that certain assumptions need to be revised will be supported by the ethnographic information presented below in our findings, which illustrate points 1 through 6.

The Farming System

A. The farming system in most of the project area is based on recessional production of corn, tubers, fruits and vegetables. The system in the easternmost part of the project zone, around Gredaya, depends instead on rainfed millet, fruit and vegetable production. Fresh fruits and vegetables from this zone are transported in small quantities, usually by animals, to local markets at Gredaya or Tourba for sale, not to N'Djamena. The rest is dried. Farmers from this zone who engage in vegetable/fruit production for sale in the capital have, for the most part, emigrated to areas towards Sidje where they acquire recession fields and use the farming system typical of most of the project zone. The farming system of the Gredaya area is not, therefore, explored in this report.

The driving force in the project area farming system is the rise and fall of the Lake Chad and Chari River levels. The rise and fall depend on the rainy season in the CAR and Chad, because the water takes time to flow from its sources, so it rises in the Lake between October towards the southern shore to January on distant parts of the northern shore. Hence demand for labor in the recession season and rainy season, from June to September in this area, do not conflict. The beneficial effects of the rise and fall depend both on quantify and timing. The higher the water rises the larger the area inundated by the flood waters and the larger the area of moistened soil which can be cultivated once the waters recede. However, high water may mean early flooding, which can threaten to drown last year's crops which have not yet been harvested, or can mean late recession of the flood waters, which delays land preparation and planting and shortens the growing

season. **Farming on the Lake shore is an unpredictable and risky business in which a farmer may have a bumper crop one year and lose the next crop to flooding or lose the use of his field when it is not inundated.** On the other hand, when a farmer has an inundated field his level of corn production is higher and less risky than rainfed millet in the same zone. And **vegetable and fruit production do not have to bear the costs of irrigation pumping or perimeter construction and should be, therefore, very competitive.**

The farming system involves only recession corn, fruit, tuber and vegetable farming. Unlike areas along the Chari, Bahr al Ghazal or in the greater Kanem there are no complementary activities except, for a few people on the Chari River, fishing.

1. Fishing: Fishing used to be an important part of the farming system, bringing in considerable cash and contributing to the family diet. Year after year of drought has lowered the number of fish and many sampled farmers who originally were primarily fishermen or depended on fishing for cash said they had almost given it up for vegetable farming. Our fieldwork was done at the time of year the lake would be nearest the villages, making it easy for many people to fish, yet fresh fish was rarely available in the market or in villages. Only 2/32 people had eaten fresh fish in the last day (and only 14/32 dried fish).

2. Rainfed farming: It is possible for farmers in the project zone to grow rainfed millet, since the rainy season does not overlap with recession agriculture (see Figure 1). Practically no one, however, except in areas far from the lake shore, like Gredaya, plants rainfed millet. In contrast to other parts of Chad, where conversations about "cereal" use the local words for "millet" or "sorghum", "cereal" here meant "recession corn".

3. Livestock: Keeping livestock is not complementary activity, either, or an important part of the daily routine. Although 25% of the sample owned cattle [1] and 28% goats (versus only 20% of wadi farmers on the north side of the Lake), most cattle are not present in the homestead. Because of the numerous mosquitoes owners confide their cattle to pastoralists who take them away to pastures with their own animals. The cattle are, therefore, an investment but do not contribute to the family sustenance or activities.

4. Wage labor: Farmers claimed they hired local people as well as migrant laborers during the vegetable/fruit season. Only one person, in the sample of 32, however, hired himself out as a

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[1] Actually 28% of the sample claimed they owned cattle, but several men were displaced persons who had left their animals behind many years ago in the Guera or Batha provinces. Since they had no real access to their animals they were not included.

laborer in others fields, where he worked for four days a week and spent the remaining three in his own vegetable fields. From general conversation it appears that people who live farther from the lake, towards Chedide and Gredaya, are poorer and more likely to seek jobs as farm workers. They have less access to recession fields and depend more on rainfed farming, which leaves the recession season free for them to supplement their income with additional wage labor. No one in the sample or involved in conversations emigrated elsewhere during the year for wage labor.

5. Crafts or commerce: Few people in the sample depended on crafts or petty commerce. However, 38% supplemented their income with crafts or petty commerce, especially of vegetables. Several people along the Chari cut wood, which grows more thickly there, for sale.

B. The ethnographic evidence indicates that **people in the project zone depend primarily on recession agriculture for their livelihood.** Inquiry about people's primary source of food and of income also showed that **most people do not distinguish between subsistence cereal farming and cash crop cultivation. Both cereal and fruits and vegetables are cash crops which bring in income to buy food and services. The local economy is becoming monetized.** When people were asked where they got their food, most replied from cereal and vegetable and fruit farming. When asked where they got their money most replied from cereal and vegetable and fruit farming.

Table 1: Number in sample depending on sources of food.

	corn/vegs	field/stream	field/strm/wood	fld/craft	fld/wage
ttl	25	1	1	4	1
men	13	1	1	0	1
wmn	12	0	0	4	0

Table 2: Percentage of sample having various sources of income.

	vegs/corn	vegs/fruit	vegs/fish	vegs/craft or commerce	corn	craft
ttl	25	19	9	38	3	6
men	25	25	13	31	0	6
wmn	25	13	6	44	6	6

If the variety of employment related to fruit and vegetable production increases, the number of people involved in these activities may increase.

Table 3: Percentage of sample depending on major source of income.

	vegetables	corn	other	No answer
total	59	13	22	6
men	63	6	19	12
women	56	19	25	0

Almost half the sample, 44%, sold some of their corn. As a result only 1/32 people in the sample kept enough home-grown cereal to eat for the whole year; except for this one farmer everyone else who sold grain kept less than a 6 months' supply. On the other hand, just more than half of those who sold no grain had less than a 6 months' supply and almost half were able to eke out part of the remaining half of the year.

Table 4: Percentage of sample who ate home-grown corn for x months.

	less than 1 mo	1-3 mo	4-6 mo	7-9 mo	10-12 mo	1yr+	%
ate	3 *	34 +	28	16	16	3	100
sold	8	34	50	0	0	8	100
held	0	38	19	31	12	0	100

* had less than 20 days' worth; his field flooded
+ of which 13% had fields where water level did not rise enough to flood all fields

The people who had less than one-year's supply were obliged to buy cereal in the market, usually at a higher price than they sold their cereal. North of the lake and in many other parts of Chad it is the poorest farmers who sell their recently harvested cereal because it is their only possible source of cash, other than their labor; therefore, they cannot wait until the price rises several months after the harvest. In the project area, however, it appears from the data that those who had a lower income were less likely to sell their corn than those with a slightly higher income.

Table 5: Percentage of sample farmers at each income level who sold or held corn.

	0-20,000 CFA	21-50,000	51,000+
sold	33	50	44
held	67	50	56

The income level of those most likely to sell their corn, however, is below the median income of 67,500-80,000, a level which half the sample earns more than. Those most likely to sell also fall into the modal income range of 21-40,000 CFA, or the income range in which the largest number of farmers falls. One informant said that he sold his cereal to have money to hire laborers in his vegetable fields; however the sample shows that farmers who hired laborers were no more likely to sell their grain than those who did not hire laborers.

# hire/sell	hire/not sell	not hire/sell	not hire/not sell
8	8	3	5

In other words, people with very little money (income from vegetables and fruit) are not selling their corn to get money. People who get more money from vegetables and fruit are more likely to sell their grain, but not those who get <u>lots</u> of money from vegetables/fruit. It would appear that those who are selling their grain are doing so in order to be able to afford to grow vegetables and fruits, but they are not spending the money on hired labor. The anthropologist would hazard the guess that people at this income level who are selling their grain are doing so to buy the basics of vegetable farming, like seeds (65% of the sample used bought seeds). Those with a higher income from vegetables have

cash from vegetables available to pay for seeds and labor. It would appear that some people are growing corn not just for subsistence but to be able to participate in cash cropping. They must, therefore, be able to cover their costs of vegetable farming and make a profit in order to buy the cereal they need for subsistence. This reinforces the view that many people in the project zone no longer have a subsistence mentality and that the economy is becoming monetized. Table 4 on the length of time farmers had corn to eat also reminds us that recession farming is high risk-high reward, with good years and bad years, whether of cereal or of fruits and vegetables. A farmer must think about making profits not just for this year but must worry about the future as well.

Population and Beneficiaries in the Project Zone

A. Total Population: The project zone covers two cantons in the Rural Sub-Prefecture of N'Djamena: Cantons Mani and Assali. The most recent figures available on the population are the 1989 lists of eligible voters, ages 18 and older, who were mobile enough to register to vote. In many cantons in Chad, these lists appear to be fairly comprehensive. According to these lists the approximate adult population was:

Canton Mani	25,000
Canton Assali	26,000
Total	51,000

B. Production Units: A 1990 survey by the Agricultural Statistics Bureau (BSA) indicated that there were the following number of villages and production units in Cantons Mani and Assali.

Table 6: BSA survey of villages and production units.

	villages	male and female production units
Canton Mani	197	9,404
Canton Assali	232	9,337
Total	429	18,741

SECADEV, in its own survey, found 189 villages in Canton Mani and 214 in Canton Assali, which corresponds fairly closely.

Not all production units, however, engage in recession agriculture. Out of the sampled production units 9% did not produce recession vegetables, tubers or fruits. For the entire canton Mani and Assali areas, this would mean that approximately 17,000 production units might benefit from the ACDI project and its spread effect. The number is probably smaller, since the baseline survey did not sample the entire cantons but only the areas where the project would focus and it was impossible to determine the total number of production units in just those areas.

C. "Groupements": The ACDI project intends to work with SECADEV groups. In the project focus area there are 41 groups with 561 members (or about 3% of the total number of production group heads). The number of household heads in the villages in which there are SECADEV groupements, according to the BSA figures, is approximately 2,000.

Table 7: SECADEV "groupements" and members in the project zone.

area	# groups	# members
Karal	10	124
Baltram	8	134
Guitte	6	67
Mitterine	4	44
Sidje	5	118
Djani	5	74

Among the baseline survey population, which was chosen in six groupement villages, 60% of the men were groupement members (and all officers in their groupements); all the women were groupement members.

D. Marketing Associations: There are also informal marketing associations in the Sidje-Djani, Baltram and Karal-Guitte areas. Some of those who participate in "groupements" also participate in the informal associations. There was not enough time during fieldwork to begin to determine the size of the informal marketing associations.

Ethnic Groups

A. The project area contains not only an indigenous population but also a number of recent immigrants. During the famine of the 1980s a number of displaced persons were voluntarily resettled, with Government and SECADEV help, in the Karal area, and given food aid, seeds, land, and some utensils with which to begin farming, as well as food aid. These displaced persons (and a number of others who had earlier immigrated to N'Djamena and who seized this opportunity to better their situation by joining the participants in resettlement) formed the core of the SECADEV "groupements". The project area population and participating groups are, therefore, an ethnic mixture. In projects along the Chari River such ethnic hodge-podges have frequently led to project failure. This is a possibility which seems less likely here, for three reasons.

1. The population is primarily indigenous;

2. "Groupements" appear to contain only indigenous or immigrant members;

3. The immigrants appear highly motivated to cooperate in making vegetable farming a profitable enterprise [2].

According to the survey sample, the population is still mainly local.

72% of the sample was local;

28% immigrants.

B. **Claims to land:** The immigrants in the sample say they have gained legal title to their fields in both the eyes of the State and of traditional authorities. On the other hand, SECADEV says that many of the immigrant farmers rent their land. This may demand clarification at a later date if disputes begin to break out over land.

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[2] It is a possibility that at some point in the future, if these motivated immigrants make more of a success of vegetable farming than the indigenous population that the local people may try to reclaim the land which has been legally given to the immigrants, both by State and traditional law. Conflicts over land tenure have arisen in similar circumstances in Lake Alaotra in Madagascar. 27% of the local people have also acquired new fields as the lake shores retreated, however, that the chance of this happening seems weaker, since similar claims could be made against the local "immigrants".

Table 8: Percentage of sample gaining access to land through:

inheritance	31	bought	3
chef de canton	22	through marriage	6
village chief	25	NA	13

C. **Ethnic Groups:** The majority of the population in the sample is Arab in origin. The traditional residents of the area are the Arabs, Kotoko, Bornouans and Hausa. In the sample:

62% Arab;
13% Kotoko;
0% Hausa.
0% Bornou

In addition there was one household in the sample from each of the following ethnic groups, many of them displaced persons from the Guera and Batha Prefectures:

Hadjerai	Bilala
Dadjo	Kanembou
Mimi	Fulani
Kouka	

The number of Arab households belonging to various clans were as follows:

Abu Kreder	5
Babalia	3
Assali	2
Hamadie	1
Sedie	1
Salamat	1
NA	1

The traditional composition and size of the household and production units varies by ethnic group.

Households and Production Groups

The household structure and production group size are important to knowing the number and skill of workers which can be mobilized. However, one must remember that the household size usually indicates the number of people who will work for household

subsistence, ie grain, but some of these people may work independently when it comes to cash crops.

A. Household structure

1. AGE: The average head of household in the project area is middle-aged. There are, however, a large number of fairly young household heads. There is as yet no indication that there are "conservative" and "progressive" farmers or that there is any difference between farmers of different ages.

Table 9: Age of household heads.

	Males	Females
range	25-76	15-60
average	43	36
median	42	35
mode	20-29	20-29 30-39

2. MARRIAGE: All the men in the sample are currently married; all but one woman, who is a widow, are also currently married. The minimum number of farm workers in the household depends, however, on whether the wives are sequestered or not. Seventy-eight percent of the women work in vegetable, fruit and tuber fields (see Table 12) so that 78% have at least two workers (see Table 11).

Marital status among the men is as follows:

75% married to 1 wife;

19% married to 2 wives;

6% married to 3 wives.

100% TOTAL

13% previously divorced from 1 wife;

6% previously divorced from 3 wives;

6% wife deceased.

Among the women it is as follows:

69% married to a husband with only 1 wife;

25% married to a husband with 2 wives;

6% widow (married 3 times);

19% previously divorced from a husband.

Overall, counting all the marriages both men and women in the sample have experienced, their marital careers are as follows:

55% with 1 wife;

17% with 2 wives;

3% with 3 wives;

10% end in death of spouse;

15% end in divorce.

78% of households can count on their wives in the labor force but 75% have only one wife who can be an additional worker.

3. ETHNICITY: Different ethnic groups have different household and production group structures and the variation can be striking. Among the Hausa, for example, most household heads are old, white-haired men who head up huge households of dependent sons and their families. Among the Arabs, on the other hand, young men set up independent economic units somewhere between the ages of 17-20. Thus decision-making power lies with different people in different ethnic groups.

a. Hausa: The traditional Hausa production group is the extended family, presided over by the father/grandfather of all the men, each of whom heads his own household. In cereal production all the households cooperation cultivating a common field and stocking a common granary under the control of the father/grandfather. Each household head also farms his own small field of grain on land given to him by his father. He stores this grain in his own granary to use for clothes, pomade, etc. Vegetable, tuber, and fruit production is done by individual households who have individual control over their profits.

b. Arabs (except Hamadie): A boy marries in his late teens, a girl in her early teens, but she does not join her husband for several years, until she matures. As soon as she moves to her husband's village the new couple sets up an independent household, with a milk cow and calf which her family has given them. The new household gets its fields from the boy's father; if he cannot

afford to give them any land they can get it from the village chief, or the canton chief.

c. Hamadie Arabs: A newly married household does not automatically split off if father and son get along well. The new household is economically independent but also helps the father. If there is any surplus from the father's production--money or animals--the father divides it up among the sons who helped him. This is not counted as part of a future inheritance.

d. Hadjerai: Resemble Arabs and are being assimilated, with Hadjarai men often marrying Arab women. Hadjarai women work in the fields whereas most Arab women, unless they are very poor or very virtuous, do not.

e. Bornouans: They resemble Arabs.

f. Bilala: It is unclear whether inheritance of lands and goods is traditionally patrilineal but goes equally to sons and daughters, or ambilateral, ie going from father to son and mother to daughter, but women have rights to land and own their own fields. In their zone of origin they do rainfed millet and recession berber farming.

g. Kouka: They resemble to some extent the Bilala but we do not know about their household structure and inheritance. In the area from which they came they practiced rainfed millet and recession berber farming.

h. Dadjo: They resemble Hadjerai.

i. Kanembou: They resemble Arabs.

j. Fulani: No information.

B. Household Size and Household Labor Force:

The household size in the sample ranged from 2 people to 25. The average size was 7.2 people, with the average number of children/household at 5. 29/32 households had children and 2 did not have children. The number of children at home ranged from 0-14; the most common number was 4 and the median was also 4. The most common household size was 6 and the median was 7. This all indicates that the household most frequently consists of two adults and the rest are children. The number of laborers a household can galvanize, therefore, depends in large part on the age of the children. Otherwise there are only 1 or 2 workers, depending on whether the wife works in the fields.

The size of the household varies by ethnic group (although there are so few representatives of some of the ethnic groups in the sample that one can draw no real conclusion).

Table 10: The average household size of ethnic groups.

Immigrants		Natives	
group	size	group	size
Kanembou	4	Arab	6
Fulani	25	Kotoko	9
Hadjerai	11	Hausa	NA
Dadjo	5	Bornou	NA
Mimi	6		
Kouka	10		
Bilala	11		

To be more certain of the size of the household workforce, which has a bearing on the amount of production and on labor bottlenecks, the baseline survey inquired about the number of household members who worked in vegetable growing.

Table 11: The number of workers provided by household.

# workers	# households	% households
1	8	25
2	9	28
3	4	13
4	4	13
6+	7	21

It would, therefore, appear that over 50% of the households have a very limited household labor supply while almost 1/4th has quite a number of people (six or more) who can help. Twenty-five percent of the households depend only on the household head for labor, usually because the wife does not work and there are no children of suitable age. For 34 % of the families, however, labor should be no constraint, since they have 4 or more family members who do vegetable/fruit farming.

Although the 25% figure of single farmworker families is similar to the figures for the wadi area north of Lake Chad, where 30% of households have only one wadi worker, people in the Karal project area compensate for this by hiring laborers. Fifty percent of the sample hires additional wage labor, versus only 7% in the wadis. This is another indication that vegetable/fruit farming is becoming a true business activity. The other 50% of the sample depended on family labor; only one person in the sample hired himself out as a farm laborer. **The labor problem for half the farmers in the project area is finding a) the money to hire workers, and b) reliable farm workers.**

It was not possible, during the time in the field, to determine whether lack of hired labor was a bottleneck to production. Since corn and vegetable/fruit production do not overlap there is in principle no labor bottleneck.

C. Role of women

Since the project area is a Muslim one some women may not be permitted to work in the fields or to go to market to sell vegetables. Women's comments about their activities and men's statements about the jobs their wives performed showed that:

78% of the women work in vegetable/fruit/tuber fields;

22% of the women do not work.

The jobs women do were as follows:

Table 12: The work women are involved in.

job	%
cultivate	78
harvest	78
transform	63
sell	56

Most of the selling women do involves local markets, not the capital city. Farming (cultivating and harvesting) is considered somewhat demeaning for women; men who can afford it, who are particularly status-conscious or pious, and men with young wives keep them at home. The fact that fewer women engage in

transformation (63%) than in farming (78%) seems to indicate that people are not really interested in it. Women transform their vegetables for household consumption, not usually for sale, but feel themselves often overburdened with other work which is more important. According to the figures the 22% of women who do not spend their time in farming do not spend the time thus freed up in transforming their families' produce, since those who transform are always those who farm as well. Therefore, **transforming vegetables for sale will have to be very attractive** to get more women involved. Women interviewed said they put more effort into drying extra gumbo [3] than tomatoes. Dried gumbo and corn are the two staples of the diet whereas dried tomatoes are a "spice". Locally dried tomatoes, according to all women interviewed, do not keep for more than a few months, so that women feel there is little point in drying all their tomatoes or in acquiring more to dry.

D. Production Unit Resources

1. Land: Although 28% of the farmers sampled were immigrants, everyone in the sample who gave an answer had legal access to land (see Table 8) But various comments immigrants made indicated that they feel that they are poorer and have fewer resources, especially livestock, than the indigenous farmers.

Although everyone seems to have secure access to land, 31% of them have fields which are so far from their village homes that they sleep in the fields. Since these people are already in their fields changing the hours at which they harvest could be done. The remaining 59% of farm workers (10% gave no answer) may find shifting the hours at which they harvest their produce to be more difficult. Only 28% live close enough to their fields to return home in the middle of the day; the others spend considerable time getting to and from their fields, which means it may be difficult for them to shift the daylight harvest hours or to harvest more frequently than every 3-4 days, which is the custom.

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[3] Sellers in N'Djamena will bring back unsold gumbo to the village (transport is free) to cut and dry, but not unsold tomatoes.

Table 13: The time traveled to/from the field.

% leave at:	5h	6h	7h	8h		NA
	3	38	47	6		6
% return at midday	28					
% return at:	15h	16h	17h	18h	22h	
	8	21	29	38	4	

2. Tools and Transport: **None of the farmers in the sample had animal drawn plows or carts for transport.** Therefore, any pilot activity using carts for transport will start from ground zero. In the Mitterine area there are a few carts which project participants might be able to rent. The survey asked farmers how they got to their fields and how they transported their fresh produce from the fields. **The majority moved their produce directly from the fields to market in motorvehicles [4].** Those who transported by head, donkey or bike were small producers who sold mainly in the local markets. Forty-one percent owned donkeys for transport and 6% (all in areas with hard ground) had bikes.

Table 14: Percentage of transport to and from fields.

	transport to fields	transport from fields
foot/head	41	18
donkey	41	13
bike	6	6
car	9	63
NA	3	0

[4] The person who is going to sell the produce loads it directly into the vehicles in the field, paying 50 CFA/ case loaded. The vehicle and seller then take the car to a convenient village where the driver and seller say their evening prayers and eat, then leave directly for N'Djamena.

The sampled farmers all cultivate with a short-handled hoe. This is a limit on land preparation and weeding, overcome it would appear in this zone by hiring labor rather than plowing.

3. Seeds: Where farmers get their seeds and how much, if anything, they pay for them gives us an idea not only of the quality of their produce at present but also of the potential for improvement and the input supply networks one should target.

Table 15: Percentage of farmers using seeds from x source.

own seeds	bought	bought & own	NA
25	56	13	6

Table 16: Percentage of farmers buying seeds locally or in capital.

N'Djamena	local	N'Djamena & local
5	62	33

At least twice as many farmers were buying seeds as were producing their own; indeed the shortage of seeds for sale was a major complaint of the farmers interviewed as the planting season approached. Farmers had pinned their hopes on ONDR and SECADEV bringing in good quality seeds; those who had given up hope or were more enterprising had already attempted to purchase seeds in Nigeria, Cameroon or N'Djamena, where they could not find all they needed. While it appears that some of the farmers who produce only limited quantities of commercial vegetables and fruits use their own seeds because their revenues are so limited that they do not wish to invest heavily in inputs, most farmers interviewed claimed that they used purchased seeds as long as they were available. When they could not longer find seeds for sale they would plant their own; 13% of the farmers in the sample had not been able to purchase all the seeds they needed and had used some of their own. Were high quality, early and late varieties, and bruise-resistant varieties available, 69% of the farmers might be interested in purchasing them.

Only 5% of farmers went to N'Djamena to buy seeds; a few others went to Nigeria or Cameroon. Some of these farmers brought back seeds for sale to their neighbors, so that some local sales also involved high-quality seeds. However, most seeds were purchased and produced locally; this leaves open the possibility of

getting local farmers involved in quality seed production. Such involvement, however, would have to be only a sideline, since most vegetable/fruit farmers are interested in higher profits than they would get simply from a seed farm. Not all farmers are willing to expend a lot of money on seeds.

The total amount farmers spent on seeds ranged from:

range	200 CFA -39,500 CFA;
median	3,600 CFA
mode	1000-2000 CFA
mean	8,445 CFA

A large number of farmers' are buying seeds but a large number are also not spending very much (see the mode). What they are spending money on is tomato seeds, which they prefer to purchase in packets which guarantee quality. Farmers also pay for quality in locally produced seeds. Watermelon seed, for example, sells for 5000/coro for the best variety, 2750/coro for 2nd quality, and 2500 for 3rd quality. Gumbo seeds are also priced by quality as well as quantity. Some farmers are known for their good quality seeds.

		Average price	range
gumbo	glass	100	100-500
	coro	4975	2300-7000
tomato	packet	350	200-500
watermelon			
	glass	175	150-200
	coro	3415	2500-5000
melon	glass	375	150-600
	coro	3000	3000
peanuts	coro	925	500-1350

Thus, there is a demand for high quality seeds but, for most farmers, at low prices. On the other hand there are some farmers spending hugh sums for seeds. Half the farmers spent less than 3,600 CFA yet the average spent was far higher, 8,445 CFA, and half the farmers spent somewhere between 3,600 and 39,500 CFA for seeds.

4. Knowledge and techniques: Three important facts emerged from the baseline study of knowledge and techniques of vegetable/fruit harvesting, storage, transportation and marketing:

1. There is a wide range ignorance of and sophistication;

2. Some people possess a sophisticated knowledge but do not apply it because they are dealing with quantities which surpass their ability to apply their knowledge.

3. Very few farmers are literate in either French or Arabic.

a. Post-Harvest Techniques: From 1 and 2 we can conclude that many of the techniques ACDI wishes to introduce into the area to improve fruit and vegetable harvesting and handling are intellectually comprehensible and acceptable to farmers and that a concerted extension effort should have a positive impact. However the problem is not only one of ignorance, of lack of knowledge of certain techniques, on the part of some farmers, but of the cumbersomeness of the way farmers apply the techniques, given the level of technology presently available to them and the quantities of vegetables and fruits they must treat. Some farmers, for example, washed the small quantities of tomatoes that they intended to sell in the local market, in order to remove field heat but not the cases of tomatoes exported to the capital. The way farmers treat gumbo is illustrative.

i. GUMBO:

Table 17: Percentage of farmers storing their gumbo in x

hangar(shade)	sack(shade)	no answer
63	16	21

Once they had taken their gumbo into the shade, 62% of the farmers who answered said they temporarily stored their gumbo on damp mats or sacks, or in damp sacks, to keep the gumbo fresh, 27% in dry. The rest put it in bowls to take home. One farmer said he put his gumbo in dry sacks during the rainy season but in damp ones the rest of the time to keep them humid.

The farmers who grew gumbo last season described their harvest methods. Half cult off the gumbo with a knife, half pulled it off, sometimes with the hand wrapped in a cloth or glove to avoid the spines.

ii. TOMATOES:

Tomatoes were picked by pulling them off the vine. According to the farmers the time to pick tomatoes was when they were hard, but they did not all agree on the color which indicated they were ready to harvest.

Table 18: Percentage of harvesting tomatoes at different stages.

yellow	yellow/red	red	NA
5	3 0	40	23

Over-ripe tomatoes were not left on the vine, because they would damage the plants, but some farmers, 30%, mentioned that they put the over-ripe ones on the ground, going back to pick them up if they had time to cut and dry them or to turn them into seeds. Thirty percent said they put the soft tomatoes into a separate basin, to be taken back to the hangar to be cut and dried. Forty percent did not mention what they did.

Among the farmers 35% mentioned that they separated the different quality tomatoes as they picked them, and put them in different basins. Fifteen percent did the triage once they had taken them to the hangar; 10% waited for the buyer to come do triage, and 35% did not answer. Five percent took them home before doing triage.

The most often differentiated qualities of tomatoes subjected to triage were:

"Chinoise" --Roma;

"Contre-Chinoise" or "Marmande" or "big" ---Marmande or good quality tomatoes;

"locale"-- local or decadent hybrids.

iii. WATERMELONS:

Watermelons were recognized as ready to pick by all the sampled farmers when the little antenna was dry. They were either left in the sun until loading into the cars or not picked until the car arrived and loaded directly.

iv. MELONS:

Melons were usually loaded in cases. Fifty-three percent put the cases in the shade; 26% left them in the sun. Not enough farmers answered to give an accurate view of the stage at which melons were picked. Some harvested them when they were yellow, some when "red". Sixty-one percent of farmers felt the melon should be pulled off the stem, 7% that the stem should be dry first, and 30% gave no answer.

v. HARVESTING FREQUENCY:

Farmers harvested crops only every three or four days. This is the period of time they felt gave the fruits/vegetables enough time to mature. Harvesting any sooner (say every 2 days) they felt would mean they did not have enough ripe produce to ship to N'Djamena. The "tour" of the informal marketing groups are arranged on the basis of a 3-4 day harvest schedule, so that an area's turn to export produce falls every 3-4 days. The farmers interviewed with whom harvest frequency was discussed felt strongly that the 3-4 day interval was the correct one: a) to give produce a chance to mature; b) to get enough produce to export; c) to keep from disrupting the system of "tours"; d) give people, especially women, time between harvests to do other necessary work.

vi. LITERACY:

From the third point above we can conclude that most diffusion of information must be verbal or by demonstration for rapid dissemination. Posted N'Djamena market prices, for example, will be read by only a few people who pass by the boards and who can read, although the information is likely to be passed on verbally. Radio announcements would be more available to all.

Table 19: Number in sample of 32 who are literate.

	French	Arabic	
		Males	Females
schooled	0	7	4
can read	0	4	0

34% of the sample have been to Coranic school;

13% can read and/or write Arabic;

0% have been to French school;

0% can read or write French.

Nine buyers of produce (not in sample) could read Arabic ie it appears that people who commercialize fresh produce are more likely to be able to read than farmers are.

Contacts--transporters and middlemen: A crucial kind of knowledge cited by everyone interviewed in the ACDI and ORT project zones,and by the middlemen themselves, is knowing 1) where to go to find transporters and 2) to have contacts with middlemen. Without this contact producers cannot get their produce regularly to market or sell it when they get there.

E. Marketing

Some farmers in the project area grow vegetables to sell fresh, some to sell dry and some both.

Table 20: Percentage of farmers selling fresh or dried tomatoes and/or gumbo.

fresh only	fresh & dry	dry only
40	53	7

Only a very small number, mostly small farmers, women, and people with limited access to recession fields, grew vegetables which they dried before selling. **Most farmers intended their vegetables for sale as fresh produce.** Fifty-three percent dried some or all of the produce they could not sell fresh, and sold some of the dried goods. The other 40% did not bother.

1. GROWERS: Vegetable/fruit and tuber growers fall into 3 categories. Farmers may move from one category to another, depending on their ambitions and previous experiences.

a. sell to others for field price;
b. sell/consign own produce to get market price;
c. sell own and buy others produce to get market price.

It is unclear whether there are merchants who only buy others produce, without themselves being farmers who sell their own produce. Among the sample only one person, a widow raised vegetables for home consumption only.

Table 21: Percentage of farmers who commercialize produce by x.

sell others & own	consign own	sell own	sell own locally	sell fields
23	10 *	10	23 +	34

* number determined by informal marketing association arrangements prevalent in area.

+ 2 had tried previously to sell their own produce in N'Djamena but had lost too much capital to continue.

From these figures we can deduce, from the place of sale, that:

43% get the N'Djamena market price;

34% get the field price;

23% get local market price.

Farmers move from one category to another, depending on their ambitions and experience, as was mentioned. A farmer who usually sells his produce in the field may decide to try taking it himself to N'Djamena to sell at the N'Djamena market price. He may succeed and continue to sell in the capital, perhaps eventually buying produce from others to sell along with his own, or succeed for a while, or fail, at which point he goes back to selling at the field price. Some farmers prefer to sell their produce at the field price or to consign it because they do not have enough time to go to N'Djamena and farm as well, or because they do not have the contacts necessary with transporters or commission agents.

In conversation with the 170 farmers no one said that N'Djamena merchants came regularly to buy vegetables. Sometimes N'Djamena merchants tried, but they would give up the first time the lost money. All the regular merchants, farmers claimed, were local people, although some of them lived part of the time in N'Djamena. For our interviews, the fieldwork team had to go to N'Djamena to find some of the merchants, who were there at the time.

a. field price:

Further study is necessary to understand the way in which the field price is a function of the N'Djamena price. There is a definite relationship, the field price moving in some way in response to the N'Djamena price, but there was not enough field time to discover how. Those who talked about the field price agreed that the price was known by everyone, because people constantly discussed it, and made a point of finding out the prevailing price before harvesting the next day. Farmers seemed to feel that the concept of a field price was a fair one and that they were not being shortchanged by it. Nor did they feel they needed to know the up-to-the-minute prices in N'Djamena. There appeared to be general acceptance on the part of producers and merchants of the field price system. What caused concern was the feeling that individual buyers were not always honest.

Farmers and merchants who buy at the field price usually have a special, on-going relationship. The merchants give the farmer little gifts, a sugar loaf, some tea, etc. every month or so to reassure the farmer that the merchant is thinking of him. Farmers count on their merchants for regular purchases of their produce and for arranging the transport from the fields, merchants for an assured supply. The farmer does not have to take the risk of selling his produce for less than the cost of transportation and commission fees since the buyer bears this risk; the sale price is set before his produce leaves the field. This client relationship between farmer and merchant is so important some merchants said they continued to buy produce from a farmer even though they knew they did not need it because they already had more than enough to ship to N'Djamena on a particular day. **Both parties want to keep a continuing relationship; the merchants therefore have some leverage over the farmers in getting them to meet certain quality standards** [5]. Once the anthropologist perceived a pattern in producer/buyer relations she began to ask how long

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[5] The President of the informal marketing association described his relationship with his farmers. He provides them with vegetable and fruit seeds to assure the quality of their produce. Since many of the farmers need to borrow money during the corn-growing season to hire workers, he advances his farmers money which they repay during the vegetable season. If he sees that the farmer has had a disastrous year, because of pests, lack of water, etc. he has forgiven the debts. Since the anthropologist received this information only at the end of the field period she was unable to determine how prevalent this sort of informal credit and input relationship is. The President said that he knew that a number of other fellow merchants also provided seeds and advanced money, although he could not speak for their forgiving loans.

a merchant and farmer had been in a relationship, because so many had commented on how eventually the merchant began to cheat. The most common answer was two years, though some went on longer before the relationship went downhill and the farmer would look for another buyer. The most frequently mentioned reason for a break-up was that the merchant would try to make money at the farmer's expense. The most common claim was that the buyer would claim that he had not been able to sell his produce in N'Djamena at a good price, and playing on the farmer's sympathies, try to wheedle a price below the prevailing field price on the next lot of produce. Farmers understand that a buyer may have poor luck one day but a consistent pattern, or hearing via the grapevine that the merchant sold his produce at a better price than he claimed to his producer, leads a farmer to break off his relationship with the buyer.

b. selling or consigning own produce for N'Djamena price:

* Selling: Some producers sell their own produce independently in N'Djamena. Large producers, or a group of several, have enough to fill a car going to N'Djamena and so they arrange for their own transporter to make regular trips; small producers who hope to make more money by taking the risk of selling at N'Djamena try to rent places in "occasion", bush taxis, to transport their produce and themselves. According to the informal marketing groups and middlemen in N'Djamena these independent producers are the "rogue" and irksome element in the marketing system. Large independent producers can tip the scale between demand being greater than supply or vice versa. The small producers may have difficulty finding a place in a bush taxi, so that their produce may well be wilted when it gets to the capital; moreover they are desperate to make a large profit and so may be unwilling to sell at a price which will move their produce, which sits taking up precious storage space in the middlemen's hangar and yet brings no commission. On the other hand, the independents' selling in N'Djamena, playing "poker", is the way to make (or lose) big money.

* Consigning: This is done by some of the informal marketing groups in the Guitte-Mitterine area, and perhaps elsewhere, and by some merchants for relatives with whom they are willing to share benefits. By consigning his produce the farmer takes the risk of winning or loosing at the N'Djamena poker game without having to be at the table. Certain members selected by the informal group take all the produce to N'Djamena, including their own, and pay the producer the price at which it sold when they return; they get no money for this service.

* Commis de charge: Only one or two farmers mentioned using this method for selling their produce. A farmer who has a good relationship with a transporter may arrange for him to sell the produce in N'Djamena in exchange for the cost of transport and a fee/case (10% of the transport fee), in addition to the usual fee/case which goes to the commission agents=middlemen=dalali(n). While the farmer may make more than the field price, if the price in N'Djamena is high, his profit is diminished by the fees he is obliged to pay even if his produce goes for less than the field price.

c. selling own and other's produce at N'Djamena price:

Independent buyers and informal marketing groups purchase produce from their clients at the field price and transport it to N'Djamena where they place it with middlemen. The buyer takes all the risks since he must pay the producer and transporter whether or not he makes a profit. For every case sold he must pay the commission agent a fee (see below) and for every case not sold he must pay 50 CFA/case to have it thrown away or reloaded to take home for drying. These buyers usually have verbal contracts with a transporter (an independent or an owner of a number cars or trucks) for a certain number of trips/week for the entire vegetable growing season. The among a buyer ships is, therefore, limited by the amount he can fit into the trucks he has hired and the number of trips a trucker can make/week. The buyers ship their own produce and other produce they buy at the field price from other growers. They are obligated to pay the other growers, if they bought on credit, and the agreed fees to the transporter, plus costs to the commission agents for cases sold, no matter whether they make or lose money. In the informal marketing groups the buyers are given quotas on how much they can ship out when it is their turn ("tour") no matter how much produce they have.

Out of the eleven people in the sample who actually took produce to N'Djamena, nine had regular contracts with transporters, and two depended on finding an available bush taxi.

The costs for any buyer (categories b and c) who ships his produce to N'Djamena are as follows:

Table 22: Buyer and Transporter Costs.

Buyer's Costs/case		Transporter's Average Costs	
Sultan's right	100 CFA	60 l. fuel	10500
Load/unload	100	12 barriers@375	4500
Town Hall	20	Karal barriers	1500
Middleman	250	Ave. Nimiery	500
Transport	1250	Market	1500
Tomatoes/field price	750-3000	Town Hall	1500
	2470-4720		20000

Transporter's Income

Gross income:
35-40 cases/Toyota
@ 1250/case 50000

Net income/trip
(3-4 days work) 30000

Net income for
2 trips/week for
4 months =32 960000
A new Toyota costs 9 million CFA

Further study needs to be done of the degree to which reducing transportation costs will help reduce the selling price of produce. In an informal attempt to see the effect on price of moving vegetables from the field to a central collection point by some means other than automobiles, using approximately estimated costs, the anthropologist did the following calculations.

CFA

9000 Round trip fields-N'Djamena takes about 60 l. of gas or diesel @ an average of 150f/l.
Assuming reduced fuel consumption by 20 l. reduces fuel prices by
3000
or the round trip costs to
6000
A Toyota carries 35-40 tea chests/trip, so the cost of fuel/chest @9000/trip is
225
The cost of fuel/chest @ 6000/trip is
150

A tea chest contains 35-40 kg of fresh tomatoes; they are usually sold by volume (coro) and the average number of coro/tea chest has not yet been determined. However, a coro holds about 2.5 kg of grain. Assuming that it will also hold about 2.5 kg of tomatoes, then the tea chest holds 16 coro of tomatoes.

The price of fuel/coro @ 225/tea chest is

14

The price of fuel/coro @ 150/tea chest is

9

So the savings/coro is 5 CFA. 5 CFA is the smallest unit of money used; since the coro will probably be divided into piles of 4-5 tomatoes to be sold retail, the price reduction due to reduced fuel costs cannot be passed on any further. The people who will benefit from the reduced costs are those few consumers who buy large quantities of tomatoes by the coro or the retailers who sell small quantities of tomatoes in piles to consumers, not most consumers. A question which remains to be addressed is how much alternate transportation from field to a central collection point will reduce the savings in fuel costs/coro. It will probably mean that less than 5f/coro can be saved, which means that the fuel savings will be registered only at the level of tea chest sales, so that it is the producer/buyer, not the average consumer, who will benefit from the slightly reduced costs.

2. TRANSPORT AND PRICING: Loaded trucks and cars leave about 20h in the evening so that the produce is transported during the cool hours of the night. Once the cars arrive at the barriers outside N'Djamena, which are closed for the night, the transporter and passengers find a place to sleep until the barriers reopen at 06h. The aim of the transporter and sellers is to get through the barriers quickly and into the markets as early as possible, before large amounts of produce have arrived and therefore demand outruns supplies and prices are high. Breakdowns or other problems en route mean that some transporters may arrive later in the day, or even after several days, so that the quality of their produce and demand have probably both fallen, as have prices. It is also important to arrive early because the merchants have special relationships with middlemen in certain markets only; if they discover that the market where they usually deliver their goods is saturated they need to drive on to another market, which takes time.

Because of the harvesting and transport schedule, there is a lapse of two days between the N'Djamena price farmers and buyers sell and buy at in the project zone and the price they sell at in N'Djamena. Farmers and buyers will be aware of the N'Djamena price/field price obtained on Tuesday, for example, and on Wednesday will negotiate their sales and purchases on the basis of the Tuesday price during Wednesday while the produce is being

harvested. Wednesday evening the produce is transported to N'Djamena and sold on Thursday, for whatever the current prices are in the Thursday market. Unless farmers and buyers are willing to put off negotiating prices until, eg. Wednesday evening after everything is loaded and the Wednesday N'Djamena prices are known, or until Thursday after the goods are sold in N'Djamena--which is what consigning produce does--the Tuesday price, by our example, is the most current price farmers and buyers can negotiate with.

In the N'Djamena markets the prices buyers are willing to pay change about three times a day. The early morning price, which prevails between 07h and 08h, when produce first arrives and is fresh, is often the highest price because not much produce is yet available and wholesalers and retailers want to get out into the markets with produce to sell. By 10h it is clear how much produce will arrive in the markets and so the price tends, at that time, to rise or fall, according to the supply. By the afternoon, about 13h, commission agents and some sellers want to unload the produce and so the price drops. Some who bought in the morning and have sold well buy more now to lower their average purchase price. At the end of the day the seller can decide what to do with any unsold produce. He can take it away to cut and dry, leave it at the market to be sold the next day at the price he sets, or pay 50 CFA/case to get it thrown away.

Although there is a prevailing price at any moment during the day, set by supply and demand, each case is offered at a set price. The seller tells the middleman what he wants to get for his produce and the middleman tells him what he thinks he can sell it for,given the prevailing price. The seller and middleman agree on the price at which the case will be offered. The price of Roma tomatoes is always about 1000 CFA more than for other tomatoes. In other respects the price of the produce is unrelated to its quality. The seller can set a case of firm, ripe tomatoes at the same price as a case of soft, broken tomatoes. The cases are then offered to the wholesalers and retailers who select among the cases for the best quality produce being offered at the price they want to pay. Thus poorer quality produce is less likely to sell. The farmers do not get a higher price for better quality produce; on the other hand, the better the quality of their produce the more likely they are to sell it rather than throw it away. As the midday and afternoon prices shift, the seller can decide to alter his prices in order to move his goods; some refuse to lower the price because they want/need to make a certain profit. The longer their produce stays on the market the less likely it is to sell since new, fresh produce is arriving and being offered at competitive prices.

3. INFORMAL MARKETING GROUPS: Marketing groups were first set up in 1988, a good recession year with high levels of production. The amount of produce arriving in the market was so great that many producers could not sell their goods. The large producers from Karal, Baltram, Sidje and Djani sent delegates to N'Djamena where

they agreed on a series of "tour" or turns for the whole area to regularize arrivals in the market; a "tour" consists of a set number of vehicles which export produce on set days of the week from any one area. An agreement was signed in the 2nd and 4th Arrondissement to fine producers 25,000 CFA if they broke the agreement and the Chef de Canton of Assali also supervised it. The Baltram area sent its produce to the Grande Marche and the Karal/Guitte area to Cholera. A hangar was bought to store produce. Wholesalers and retailers at other markets in N'Djamena would buy at these markets and move the produce with taxis or carts. The "tour" was set at 40 cases/ vehicle and 5 vehicles/day with 8 people/ vehicle ie 5 cases/person. The system started breaking down in the next year, because large producers were unwilling to keep produce off the market if it was not their turn, and small producers were hoping to break into the market. By 1990, the regional system had split up into "tour" in the production zones discussed in the Methodology. Baltram/Karal/Guitte take turns among themselves sending their produce and Sidje/Djani/Alkouk producers set up turns among themselves. Baltram and Karal/Guitte send vehicles, currently set at 4 vehicles every Monday and Thursday for Baltram, and 4 for Karal/Mitterine on different days but if they have less produce than can fill their vehicles they cooperate in taking produce from the other area, so that effectively it works out at 2 vehicles/day from each area. The number of days between "tour" from each village is set at 2-3 for tomato growing areas, and 3-4 for gumbo areas.

In the Karal/Baltram area, there are about 30-40 producers included in the informal group; 10-15 are big producers. Who is a big producer depends in large part on the way the lake waters rise each year. In Baltram, Sidje and Djani each large producer in the group is given a number of cases, usually 10, he can ship when it is his turn; if his own produce is insufficient he can buy produce from other farmers to fill up his quota, of it is too much he can sell to others or leave it behind. Since each producer has an identification number written on the case the buyer and the middleman can tell who grew certain produce and can demand changes in quality or refuse to buy from a poor producer.

In the Karal/Guitte area (and perhaps elsewhere) some group members work on consignment. In the consignment system the producers can still buy/sell produce to meet their quotas but each producer is allowed a smaller number of cases and designated members convey their own and others' produce to N'Djamena, and give the owners the N'Djamena price when they return. At Malloum Ri, for example, 5 members take turns conveying the village's produce to N'Djamena; the villagers and SECADEV agree that this arrangement works because the villagers are all members of one extended family.

In the Sidje/Djani/Alkouk area, the "tour" are more frequent because the area produces tomatoes, which ripen and rot faster than the gumbo of the Baltram/Karal area. Sidje-Gredaya-Badjina has 1

vehicle; Alkouk, Djani and Djani-Ile 3; Alguissim 1. Someone who breaks the "tour" is supposed to be fined 50,000 CFA. A lesser punishment is to be kept out of the market until after the 10h price change. In the Djani area, there are 20 major producers/buyers who buy from about 800 smaller farmers, according to the two local association representatives. But by the end of the 1990 season large numbers of producers were taking their own produce directly to N'Djamena rather than passing by the association's "tour".

The officials of the Djani/Sidje/Alkouk zone are:

Barka Ahamet (Alkouk/Sidje) President, deputies Issen Abdoulay and Ousman Assan
Sakin Adoum (Alkouk) Vice-President
Djida Omar (Alkouk) Secretary
Siddik Adoum (Alguisim) member
Malloum Ali (Alguisim) member
Adoum Issa (Sidje) member
Mayo Dabouka (Djani) member

The officials of the Baltram/Karal zone are:

Hassan Khalla, President
Abba Dourba (Karal) Vice-President
Kalla Yaya (Baltram)
Mahamat Abakar (Guitte)

4. COMMISSION AGENTS: Fresh produce is sold in N'Djamena through commission agents (Arab: dalali(n)), or middlemen/women. Commission agents, according to one of them, are not officially licensed or registered. The producer/merchants who bring their produce to N'Djamena place it with the commission agents who sell it to the wholesalers and retailers in N'Djamena. The relationship between middlemen and producers is frequently an ongoing one, involving trust and respect; indeed some of the middlemen/women are relatives or from the same village as the producers. This personal relationship appears to be a constraint on the selling of vegetables, since farmer/buyers take their produce to the market where "their" middlemen are located rather than heading to markets where less produce may have been delivered. If the market is flooded the transporter and farmer/buyer may continue on to another market where they have contacts.

Commission agents receive 250 CFA from the seller who brought the produce to N'Djamena for every case the agent sells. It is, therefore, in the interest of the commission agents to sell as many cases as possible to collect commissions. By this scenario the agent is more likely to sell at a lower price, to move the merchandise, than to try to get a high price for the seller. Conflicting information indicates that the seller and commission agent agree on a price; if the agent sells the case for more (s)he

keeps the extra; if (s)he sells it for less, without having negotiated a lower price with the seller, (s)he must bear the loss. In this scenario the commission agent gets a set 250 CFA fee but can make or lose more money when (s)he sells the case for more or less than the price agreed on with the seller, and it is in the agent's interest to sell the produce for as much as possible. Further research is necessary to resolve the contradiction.

5. LOCAL MARKETS: A limited number of farmers and a number of women take fresh vegetables to sell in the local markets, transporting the produce on their heads or by donkeys. Regional merchants come from Tourba to buy produce which they take back on camels. According to farmers and women the local market price is somewhere between the field and N'Djamena prices, but they do not sell more locally because the market could not absorb the large quantities they produce. We were unable to gather any more information on local prices or how saturated the markets are.

F. Economic Resources

The economic resources available to the households in the project zone do not distinguish between resources devoted to and derived from subsistence agriculture and cash cropping (see VI. A).

1. FOOD: The major source of food for 75% of the sample was cereal and commercial vegetables and fruits.

2. CASH: The major source of cash for 72% came from cereal and vegetables although vegetables were most important for 59% and corn for 13%. Very few depended on other sources of income. Among the 16 men only 1 got a living from farming and fishing; one from farming, fishing and firewood--though firewood contributed 50% of his cash income-- and one from farming, fishing, and wage labor. Of the 16 women, 2 got income from petty commerce as well as farming and 2 from crafts such as pottery as well as farming and petty commerce. For the majority of people in the sample, then, the major economic resources at their disposal came from corn, vegetable, fruit and tuber farming. Livestock as a source of disposable income was available to 28% of the sample.

3. CREDIT: The amount of time available for fieldwork was insufficient to get a true view of the informal credit situation as part of the economic resources available to a household. Thirty-one percent if the sample had taken out cereal bank credits with their "groupement", but no other kinds of credits with SECADEV. However, it appears that the cereal bank credits are helpful to a fair number of farmers; 25% got cereal on credit and will repay with cereal, 6% got money and will repay in cereal.

4. LABOR: The number of workers the household can provide is not always a limit to production in the project zone since hiring labor is a common practice.

50% of households provide a limited number of farm workers (see Table 11);

25% of households have only the household head who farms;

34% of households provide more than 4 farm workers;

50% hire additional farm labor.

Thus the "natural" limit to production, the small number of farm family laborers which characterize half the sample households, is superseded by the financial limit on the number of workers a family can afford to hire.

The quality of information received on hired labor was too unreliable, since it was all recollected, to determine the amount of work hired labor does. During the next growing season the project needs to gather information on the number of man days hired workers provide to the sampled farmers. Sampled farmers volunteered the following information (which means that the true figures may well be higher because some people may not have mentioned that they hired labor):

Table 23: Percentage of Hiring Labor.

land preparation	sowing	weeding	harvesting
25	56	69	63

The 5 sampled farmers (16%) who discussed hiring large numbers of workers calculated their labor costs and could recite their gross and net revenues after deducting labor costs. Their costs were as follows:

Labor	Other	Gross
3000		29,500
5000	5000 rent of land	135,000
42,850		175,000
125,000		400,000
250,000	includes transport	600,000

Wages and hours are fairly standardized, although farmers will negotiate lower rates if there are many workers looking for jobs. Land preparation usually pays 750 CFA but Nigerian workers who prepare potato beds get paid more because they are better workers. For sowing and weeding wages are usually paid for time: Morning till 11h runs 300 CFA, morning till 13h 500 CFA, whereas morning till afternoon runs 750 CFA and the afternoon from 16-18h is 150 CFA. Harvesting varies: some farmers pay for time, some for each case or sack filled; some pay in kind and some in cash.

5. INCOME: Fruit and vegetable income last year was as follows:

The range ran from 3,000 to 600,000/ family in the sample.

The average net fruit and vegetable income was 107,141 CFA.

The average gross fruit and vegetable income was 123,874 CFA.

Farmers are already spending an average of about 17,000 CFA in capital resources on inputs, labor, etc to produce their vegetables and fruits. A few farmers are willing, it appears, to expose themselves to considerable financial risk in order to make a profit from fresh produce, one spending as much as 250,000 on inputs, labor and transport. The average farmer is spending 14% of his gross capital income on growing fresh produce and has an operating return of 86%. The farmer with the greatest income (600,000) is expending 42% on inputs and transportation and has an operating return of 58%.

The modal, or most frequent income from fruits and vegetables fell between 0-50,000 CFA.

The median income,the level of income at which half the sample got more and half less, was 80,000.

There is considerable variation among the sample villages in income. If we divide them according to the two major production zones we find the following:

Table 24: Produce Income Per Village.

Zone	Village	Range	Average
Karal	Baltram	80-400,000	237,500
	Karal	40-710,000	272,000
(Guitte)	Malloum Ri	50-115,000	85,000
	Allahgaye	34-175,000	104,500
Sidje/ Djani	Sidje	29-135,000	77,333
	Ngarkowa	5-600,000	213,333
	Kaffou	28-200,000	129,375
(Gredaya)	Am Salaka	3-50,000	22,900

Clearly there is a huge range of income from fresh produce, ranging from 3,000 to 710,000 among the sampled farmers. Equally clearly, some farmers are receiving large cash revenues and manipulating sizeable sums, most without the benefit of any bookkeeping skills. The low incomes in the Gredaya area stand out; as has been noted above, this zone does not participate in the export of fresh produce to N'Djamena. The Guitte area shows a lower average income from fresh produce than the Baltram-Karal area with which it has been grouped up till the present in informal marketing groups; marketing associates state, however, that the amount of fresh produce coming out of the Guitte area, other than potatoes and sweet potatoes, has been increasing; it will be interesting to see if the average increases disproportionately during the project period. Perhaps further research can reveal why the Sidje/Djani area average incomes are slightly less than the Karal-Baltram ones.

6. NUTRITION: In order to judge whether the ACDI project improves the nutrition of people in the project zone farmers were asked what they had eaten for their last meal and the last time they had eaten fresh vegetables. The end-of-project sample results will be compared for any change. At present, 38% had eaten fresh vegetables sometime in the last week. In increasing length of time between the sample and the last time the respondent had eaten fresh vegetables:

Table 25: Percentage of sample having eaten fresh vegetables.

today	16
in last week	22
last 15 days	6
last month	19
last 2 months	16
over 2 months	9
NA	12

Of those eating fresh or dried vegetables in the last meal, 59% at gumbo from their own fields, 30% bought; 33% ate their own dried tomatoes and 50% bought.

In the N'Djamena area improvement in nutrition will be measured indirectly by the increased quantities sold from the project area.

7. PRODUCERS' INTERACTION WITH GROUPEMENTS AND MARKETING ASSOCIATIONS: All of the women interviewed for the sample belonged to women's "groupements". The men were selected at random from villages where a "groupement" existed, except for the two control villages where there were no "groupements". In villages with "groupements" 60% of the sample belonged to a "groupement" and 40% did not. Working with "groupements" in SECADEV villages, therefore, should reach directly about 60% of the male farmers in "groupement" villages.

Since the existence of informal marketing associations was not discovered until fieldwork was well underway we were not able to sample what proportion of the population participated in the associations. The representatives in the Sidje area claimed that about 800 farmers sold through the local association. The association probably includes some people who also belong to "groupements" but we did not determine the degree of overlap or the percent of the population covered.

The SECADEV representatives in N'Djamena felt that the members of the "groupements" did not see them as primarily agricultural but as fulfilling other needs, primarily for health, nutrition and clean water. This did not appear to be entirely the case, judging from the sample's responses. The majority of the respondents' views of what a "groupement" could do involved cereal banks.

Table 26: Number in sample's view of purpose of "groupement".

	Male	Female
cereal bank	7	7
communal fields	2	2
work together	3	1
make money	2	3
not know	0	2

Clearly these responses involve agriculture, especially given the close link between agriculture and cereal and money in this monetized economy. This indicates that the 'groupements" may be a good conduit through which ACDI can work on agriculture. SECADEV's feeling that the Karal area "groupements: are less agriculture-oriented may come, the anthropologist would suggest, from the lack of response to SECADEV's offers of agricultural credit for plows and carts in the Karal area. Since 1986, when equipment loans were first offered in the area, SECADEV has sold:

cattle carts	0
ass carts	11
ox carts	1
horse carts	0
donkey plows	3
	15

which is a stark contrast to the results in the east in Bokoro were 350 units have been sold and Yao 107. The repayment rate in the Karal area is also worse, 66% vs 74% in Bokoro and 76% in Yao.

The comparison between Karal and the east seems to indicate either that the Karal farmers cannot afford animal traction equipment, which would be surprising given the high incomes many farmers have, or that they are uninterested in the equipment. Sampled farmers were almost unanimous in proclaiming vehicles to be the most efficient way to transport their produce, which would explain the lack of interest in carts. The lack of interest in plows is parallelled by the low investment in land preparation (see Table 21), only 25% hiring labor for help in clearing and plowing the land. This lack of interest may be due to the nature of recession cultivation, where the slow retreat of the water gives farmers time to prepare the land bit by bit with household labor, so that the plow's time-savings is not important.

No one had any negative comments about the "groupements" although it must be said that the SECADEV representatives set up the meetings and were often present.

8. FARMER MOTIVATION: Each person in the sample was asked about his "felt needs".

34% were concerned about money;

22% were concerned about food and money;

22% were concerned about food.

As we have seen food and money are closely intertwined in this monetarized economy.

Breaking down the responses more specifically shows:

Table 27: The Felt Needs of the Farmer

Need	%
money	36 (2 to buy cars for transport)
food & money	23
food	23
good health	3
groupement	3
happiness	3
provide for children	3 (meaning food and money)
no needs	3
NA	3

The largest number of people were interested in money, which suggests that the project will interest them if it can show how to increase vegetable/fruit income. The close link between food and money may also lead those concerned primarily about food to be interested in the project.

9. WOMEN'S ENTERPRISES: Drying surplus vegetables is not a woman's job only. At present both men and women do cutting for drying, sitting in the shade in the field in the heat of the day. Some women do drying at home if they bring it back, or if sacks of gumbo come back from N'Djamena unsold. Unsold tomatoes are sometimes dried in N'Djamena but most people interviewed said they had neither the space or time to do it and so threw them out. At Cholera market, a few women were said to come at the end of the day to buy leftover tomatoes cheaply to cut and dry. This bears further inquiry.

Both women and men sell fresh produce in the local markets and women act as businessmen, as buyers, just as men do; female buyers should be treated along with male buyers in any project activities.

VII. CONCLUSIONS AND RECOMMENDATIONS

1. Some of the assumptions underlying the ACDI project should be modified, and some of the project's interventions as well. However, the project area's farmers' reliance on recession farming of vegetables, fruits and corn for money and for food means that farmers will probably be interested by project activities and not distracted by subsistence agriculture. The assumptions which should be adopted are that:

a. Many farmers already overproduce at the height of the season, so that expanded production may not lead to reduced shortages and lower consumer prices.

b. Only a few small producers limit their production because their returns are low and risky. Most farmers' returns are limited by technical constraints such as the time recession cultivation is possible, and technical problems such as lack of seeds for good quality produce and early and late varieties, which keep the farmers from meeting the market demand; these technical problems are, therefore, also marketing problems.

c. Transportation shortages do not appear to be an important constraint; on the other hand breakdowns are a problem since they result in produce arriving in the market when prices are low or when the produce has become less saleable.

d. Farmers are already aware of the market or field price prevailing on the day before they harvest. More up-to-the-moment price information may not keep farmers from harvesting and shipping their produce since i) perishable produce must be harvested anyway, ii) farmers may continue to gamble that they will be among the lucky few to sell their produce at a high price, and iii) the alternative uses of highly perishable produce are not economically attractive enough to outweigh the chances of winning at vegetable poker.

2. The ACDI project assumes that market inefficiencies and uncertainties make farmers' returns low and risky so that they limit their production, which leads to shortages and high prices for the consumer. The aims of the project are to reduce the cost of vegetables and fruits to the consumer and to increase farmer income. The changed assumptions require that we reexamine possible project interventions.

Various factors determine the cost to consumers; some of these can be more easily tackled than others in the project zone.

i. farmers' production costs: Household labor-free and cannot reduce costs.

Hired labor-cannot reduce costs unless reduce need for labor or wages paid. Present low investment in hired labor for land preparation and animal traction indicates that family labor is used, so that plowing costs cannot be reduced. Weeding and harvesting are labor-intensive and costs may be hard to reduce. Farmers hire considerable labor for sowing; perhaps low-cost simple mechanization can reduce costs of sowing.

Seeds-can reduce costs by increasing the percentage of seeds germinating and by getting kinds of produce that keep and sell well.

ii. farmers' transportation costs: part of cost, at barriers, etc, is uncontrollable. Check if can reduce cost significantly by reducing distance travelled vs other forms of transport. Best bet is to increase the number of cases sold/number of cases transported (thus increasing the profit/case transported), which can be done by triage, packing, quality and fewer breakdowns.

iii. farmers' profits: trace daily and hourly prices and costs of production to see if profits excessive or commensurate with risk.

iv. administrative costs: some legal, some illegal. Is action possible or desirable?

v. distribution costs: Check role of middlemen to see if increases prices disproportionately. Better initial distribution among markets in N'Djamena would reduce costs of moving produce from market to market.

3. Farmers get a low return on their investment, according to them, because they cannot sell part of their production. They cannot sell because supply outstrips demand. Oversupply may be due to:

i. farmers overplanting in order to get heavier production at the beginning and end of the season when each plant is producing less; planting early and late varieties and marketable varieties could resolve this problem.

ii. They may also be overproducing because each farmer is trying to maximize his own possibilities of profit. More coordination through the groupements and associations may help to even out distribution.

iii. They also get a low return because the quality of their produce is poor; the project can help here by

improving harvest and post-harvest treatment of fruits and vegetables to ensure less damage and better conservation during shipping.

iv. They get a poor return because they distribute their produce in only a limited number of N'Djamena's markets, since distribution depends on personal relations. At the same time other markets may be short of fruits and vegetables.

v. They get a poor return because there are technical and cost constraints on transforming fresh produce which has not been sold.

4. Because some interventions are more likely to reduce costs for consumers and leave farmers with an adequate income certain activities are more attractive than others.

A. In the Karal project area, the project should concentrate on teaching producers and buyers improved harvest and post-harvest technology. Concentrating on teaching the buyers/producers better harvest and post-harvest technology will probably have better economic consequences than simply trying to reduce transportation costs. There are a number of reasons why this is so.

i. Whether or not transportation costs/case can be reduced, the amount of money lost on transportation costs can be reduced by increasing the number of cases sold out of the total number shipped. This can be done most easily by improving the quality of the produce contained in each case, which increases the chances that, once 1250CFA has been spent to transport a chest of produce, it will be sold.

ii. Some farmers already recognize and apply many of the techniques which the project will recommend. These techniques are likely, therefore, to seem logical and acceptable to the farmers. On the other hand, farmers are unwilling to give up automobile transport from the field to market, which would help reduce transportation costs to some extent. The price of automobile transport, moreover, seems to be very competitive. Farmers do not all apply the recommended techniques because of ignorance (some think melons are not mature until they are completely yellow, tomatoes until they are red, etc.) and because the technology they use cannot cope with the amount of produce harvested (eg. removing field heat). These problems can easily be addressed by the project. Buyers in the fields select their produce before purchase; training them in sorting will improve the quality of produce they ship, increase the number of caisses sold/shipped, and decrease the overall amount of

unsaleable produce sent to market at the height of the season.

iii. Improved harvest and post-harvest technology and triage will increase the quality and quantity of produce retained in the project area for transformation. It will improve the quality of produce delivered to N'Djamena and may mean that sellers are able to sell more of the produce they deliver to N'Djamena. However, most people who buy in the field want to do their own triage in order to assure quality; this need investors have for quality control should be taken into account in developing triage systems.

5. Since half the project area farmers depend on hired labor for harvesting and other jobs, any harvest and post-harvest changes the project introduces must be acceptable not only to the producer but to the workers, or enforceable by the producer. Changes which increase producers' labor costs must result in increased value to cover these costs.

6. However, the manpower to teach farmers improved harvest and post-harvest techniques may pose a significant problem for ACDI. The project must develop cheap and simple ways to remove field heat, preferably in the producers' fields, which will take trial and experimentation with the farmers. Producers and buyers must by trained in harvesting and sorting and the advantages of the new techniques must be proven to farmers by actual comparison tests. SECADEV agents, through whom the project is to work, must be trained in these techniques and then must do the extension work; this may be more than SECADEV is willing to accept. The project and SECADEV should define manpower requirements. If these go beyond SECADEV's capacity, the project and AID should reconsider the present manpower allocation and budget.

7. Post-harvest transformation could offer a solution to market-glut and consumer-consumption of vegetables by processing oversupply for use during periods when fresh vegetables are not available. However, farmers will have to be convinced that transformation is economically rewarding and certain technical and economic problems must be resolved; resolving these should also be of primary importance to the project.

A. Technical: tomatoes dried in the Karal area have a short shelf life, according to local women. Although there is a plentiful supply of cheap tomatoes, they do not dry them all because they spoil before they are used. As a result households run out of their homemade supply of dried tomatoes after a few months and must buy in the market dried tomatoes and tomato powder imported from Abeche and N'Djamena.

B. Economic:

i. Karal area men and women do not see dried tomato production as a profitable venture. They see fresh tomatoes and gumbo as much more lucrative than dried. They would, therefore, prefer to sell it fresh. However, the amount of dried gumbo derived from fresh is <u>not</u>, for them, significantly smaller, whereas the bulk and value lost in drying tomatoes is substantial. They are therefore much more willing to dry gumbo than tomatoes. Surplus gumbo is often dried in the fields whereas producers prefer to ship surplus fresh tomatoes for possible sale rather than drying them in the field.

ii. Since their dried tomatoes do not keep for long, Karal producers are unable to store dried tomatoes for sale until the time prices rise significantly. Therefore, they are unwilling to invest money in drying tomatoes. Surplus household labor is used to dry tomatoes, which limits the amount of tomatoes dried.

iii. Men and women feel that the amount of effort it takes to cut and dry tomatoes for other than household use is excessive and are uninterested in investing their labor.

For transformation to be interesting to project area producers a number of problems must, therefore, be addressed.

1. The shelf-life of dried tomatoes could be increased to the point were the value-added makes the drying process economic.

2. The amount of work involved in drying tomatoes could be reduced so that more people are willing to dry their surplus.

3. Other sorts of transformation, such as puree or bottled tomatoes, which add more value to the surplus tomatoes and therefore make their transformation economic, could be developed.

8. Post-harvest transformation should also be targeted for development in N'Djamena as well as the project zone. Surplus which remains in the Karal area could be transformed there. However the value of fresh tomatoes is so great that producers gamble on bringing to N'Djamena more produce than is sold at the end of the day. This surplus, which is usually thrown away, could be targeted for transformation by a small businesses in N'Djamena. N'Djamena also offers a more sophisticated and richer market than the Karal area so more expensive transformed produce could be offered in the capital.

9. The women's groupements interviewed about transformation of surplus production were mildly interested in the possibility but were worried about the additional time and labor that would be demanded of them to produce a fairly low-value product. The organization of such transformation must be carefully considered in conference with the women who are going to undertake it and the value received must compensate them for their effort. Moreover, as we found, men as well as women cut and dry the tomatoes and gumbo in the fields; men should not automatically be excluded and transformation should not be targeted only for women's groupements. Indeed,...

10. There are a number of reasons why it may be wise to consider undertaking the transformation process as a small business rather than as a household activity.

A. The large amount of surplus produce in the area which could be transformed may be more economically treated in large quantities.

B. The difficulty of a household's transporting fresh tomatoes from the field to the transformation point.

C. Adding enough value to tomatoes may require more sophisticated technology and investment than a household can provide.

D. Small businesses can use anyone interested in working, both women and men. They can also use hired migrant labor which comes during the harvest time, which gets around the problem of a work force for seasonal transformation and conservation.

E. A small business may succeed in N'Djamena where a household activity might not.

11. The project should focus in N'Djamena on marketing.

A. The project needs to create more consumer demand for fresh vegetables at the times of peak production. N'Djamena consumers' demand for fresh vegetables appears [6] to be extremely elastic. Fresh vegetables are a substitute for traditional meat or dried vegetables and it may be, in fact, that poorer consumers are willing to give up fresh produce before it sinks to a price which will still cover Karal

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[6] The socio-economic survey did not include any attempt to determine N'Djamena consumers' preferences. This statement is based on a number of years of informal observation of N'Djamenois' eating habits.

farmers' production costs and transportation costs. In any case, according to farmers and middlemen, consumption of fresh vegetables is high mainly in the holiday Ramadan season. ACDI and perhaps other NGO fruit and vegetable projects and health projects could coordinate efforts to increase consumer demand in the capital area through advertising the advantages of fresh vegetables and fruits in order to modify consumer preferences and increase the demand.

B. The project should help sellers diversify the markets they serve, with new relationships with middlemen, the CFLT vegetable and fruit cooperative, etc. in order to meet demand in other markets more efficiently. Everyone interviewed felt the middlemen serve a critical and fairly recompensed role.

C. One possible use for market information and radios would be to inform transporters and sellers at the barriers of the number of arrivals in different markets, so that they could take their produce to less busy markets.

12. AID could reconsider its view of what constitutes "production" and what constitutes "marketing". Farmers do not produce high quality produce and early and late maturing produce because they cannot acquire appropriate seeds. As a result they produce fruits and vegetables which cannot be sold. This is a marketing, not just a production problem. Experience gained by AFRICARE in Abeche, CARE in the Kanem and Bongor/Kim and ORT in the Lake could help SECADEV and ACDI introduce appropriate varieties.

13. If ORT develops a training module for farmer accounting in the Lake area SECADEV and ACDI may find that training Karal area farmers in the same skills using the ORT modules may help them manage and increase their income.

14. The project should work with both "groupement" and with marketing associations. Various test interventions should be tried simultaneously in appropriate parts of the project zone. Various possibilities imaginable are:

A. In the Mitterine area where farmers can rent some carts and where the ground is hard, a collection and post-harvest treatment center could be set up.

B. In the Sidje area, where transport is difficult, participating transporters could participate in a fund to purchase such necessities which many travel without, such as "Tip-Top", "Col-Fort", etc. Perhaps it would be able to arrange simple automobile maintenance lessons for them.

C. In the Djani or other amenable area some buyers could both pick up today's crates of produce and drop off an extra set

for the next harvest day, which would make their morning tourney of the fields unnecessary. This would show whether prices could be reduced in this way.

D. In the Gredaya area farmers could be oriented more towards the local markets.

E. Since the consignment system requires a certain amount of selflessness and cooperation, where a groupement or marketing association functions well the consignment system, whereby the producers get the N'Djamena price without having to take their produce to N'Djamena, could be expanded.

F. In the control villages the field price, buyers and independent sellers should be monitored to determine whether the price differences realistically reflect differences in risks.

G. In one area women's groupements could work at transformation, in another a small business could be set up. The area around the town of Karal might try less traditional kinds of transformation since the market is frequented by administration and others with more income and sophisticated tastes.

15. ACDI personnel should gather certain information to judge what project interventions would be helpful.

A. In N'Djamena:

i. Track daily market prices in different markets to see a) if they vary between markets and b) whether the trends are predictable enough for today's market price to determine whether produce should be brought to market the day after tomorrow.

ii. Using field price information gathered in the Karal area and N'Djamena market price data, plot the relationship between field prices and N'Djamena market prices to determine if up-to-the-minute market information would help producers.

iii. Track the early morning, morning and afternoon price changes to judge sellers' risks and to determine prices at which surplus produce must be bought to make it attractive for farmers to sell for transformation rather than fresh.

iv. Track the number of cases sold/number shipped by the sample group to determine the extent of losses and reasons for losses.

v. Study in more depth the relationship between various producers and the specific markets where they sell and with their middlemen, to determine if it is possible for producers to target other N'Djamena markets.

B. In Karal:

i. At the beginning, middle and end of each production season administer the questionnaires contained in the annex to develop comparable data.

ii. Try to determine farmers' costs of production: how much they spend for labor, seeds, transport, etc, to determine the price below which they cannot be expected to economically sell their produce. Compare that price with N'Djamena prices and consumer demand.

iii. A brief study of the laborers hired by farmers: their origins, reasons for hiring themselves out, salary, other employment, etc. to determine whether a) project interventions will have a negative impact on them and b) the project interventions create increased employment not for the local population but for the migrant laborers, and c) the size of the potential labor pool for transformation industries.

iv. A study of the kinds and numbers of transportation problems the sample group encounters during a production season.

VIII. **ANNEXES**

Appendix 1
1991 Baseline Survey Questionnaire
Page 64

BASELINE SOCIO-ECONOMIC SURVEY, OCT 1991
ACDI, KARAL

1. Canton: 2. Date: 3. Village:

5. Nom Enquete: 6. Sexe: M F

7. Age: 8. Marie/e a l'age de:
9. No. annees ensemble avec epoux/se:

10. Ethnie: 11. Immigre O N Quand:
Pourquoi:

12. Ecole francais O N
Coranique O N
Sait lire Arabe O N
Sait ecrire Arabe O N

13. Marie/e No. Celibataire Veuf/ve Divorce/e

14. No. habitants a la maison:
Qui sont-ils?
Age des enfants:

15. Quels sont vos besoins les plus importants?

16. Membre groupement: O N Nom groupement:
17. Detenteur de fonction: O N Fonction:

18. Que fait le/un groupement?

Utile O N Pourquoi?

Avez-vous un credit avec le groupement? O N
Pour quoi: Rembourse sur

19. Sources de nourriture pour la famille?

20. Sources d'argent et importance relatif:

21. Travailleurs dans les champs legumes:
Qui dans la famille:
Main d'oeuvre O N Preparation sol semis culture recolte

No. ouvriers: No. jours: prix:

22. Epouse travail au champs LEGUMES O N
Travaux d'epouse: cultive recolte transforme vente
Epouse sequestree? non sortie de la maison
parte seulement au marche du village
libre

23. Legumes cultives pendant la derniere decrue:
Vendu frais sec

24. Revenues des legumes de la derniere decrue (nette ou brute?)

25. Depenses pour main d'oeuvre:
Depenses pour semances: Ou les avez-vous trouvees?

26. Decrivez votre facon de recolter et stocker:
Gombo:

Tomates:

Melons:

Pasteques:

27. Decrivez votre methode de vente la plus frequente?
Producteur/confie producteur/vend sur champ
Producteur/N'Djamena
Producteur/prend produits confies
Producteur/acheteur acheteur

28. Facon de vendre (lieu; cash/credit; prix de champ; confier; commis de charge, etc.)

29. Savez-vous le prix d'N'Djamena courant O N
Prix du champs O N
Autres methodes?

30. Pointe de vente: champs village marche local marche regional N'Djamena

31. Moyens de transport du champs au pointe de vente:
tete ane charette vehicule bicyclette

32. Travail au champs les jours de recolte:
quitte maison a arrive champs a

quitte champs a arrive maison a

33. Dort au village village satellite champs

34. No. sacs de cereal vous avez recolte l'an dernier?

35. Ce cereal vous a suffi pour combien de temps?
No. sacs vendus?
Comment combler le vide?

36. Dernier marche: qui est alle? Ou?
quoi vendu a combien quoi achete a combien

37. Depenses depuis un mois pour baptemes, mariages, funerailles, sacrifices, maraboutage?

38. Ingredients dans la sauce du dernier repas, provenance des produits secs (champs, marche) et qualite de huile (arachide, beurre):

39. Derniere occasion d'avoir mange des legumes frais?

40. Avez-vous des boeufs chevres.

Appendix 2
Random sample to be monitored during project.
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LISTE DES PAYSANS A SUIVRE

CANTON ASSALI

Village:	Paysans:
Am Salaka	Abdoulaye Mahamat Amina Moussa Saleh Ousman Toma Abdoulaye
Baltram	Ali Bouba Mariam Ali Sabousa Ouerelle Yacoub Matar
Kaffou	Aisata Mahamat Amita Djida Harouna Djibrine Yaya Daoud
Karal	Halima Dina
Ngarkowa	Abderahman Moussa Amrai Mahamat Doungous Abakar Maimouna Mahamat
Sidje	Alimi Ramadan Brahim Ousman Kaltouma Djimet Oumar Mahamat

CANTON MANI

Allagaye	Abouna Dalatou Bara Milimi Diga Abani Zara Yabi
Malloum Ri	Hadidje Issa Idrissa Younous Oumar Hassan Toma Abderahman

Appendix 2
Random sample to be monitored during project.
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FOLLOW-UP SOCIO-ECONOMIC SURVEYS
ACDI, KARAL

1. Canton: 2. Date: 3. Village:

4. Nom Enquete: 5. Sexe: M F

6. Marie/e No. Celibataire Veuf/ve Divorce/e

7. No. habitants a la maison:
Qui sont-ils?
Age des enfants:

8. Quels sont vos besoins les plus importants?

9. Membre groupement O N Nom groupement:
Detenteur de fonction O N Fonction:

10. Que fait le/un groupement?

11. Utile O N Pourquoi?

12. Avez-vous un credit avec le groupement O N
Pour quoi: Rembourse sur

13. Sources de nourriture pour la famille?

14. Sources d'argent et importance relatif:

15. Travailleurs dans les champs legumes:
Qui dans la famille:

16. Main d'oeuvre O N
Preparation sol semis culture recolte
No. ouvriers: No. jours: prix:

17. Epouse travail au champs LEGUMES O N
Travaux d'epouse: cultive recolte transforme vente

Appendix 2
Random sample to be monitored during project.
Page 69

18. Epouse sequestree?
Non sortie de la maison
Parte seulement au marche du village
Libre

19. Legumes cultives pendant la derniere decrue:
Vendu frais sec

20. Revenues des legumes de la derniere decrue (nette ou brute?)

21. Depenses pour main d'oeuvre:

22. Depenses pour semances: Ou les avez-vous trouvees?

23. Decrivez votre facon de recolter et stocker:

Gombo:

Tomates:

Melons:

Pasteques:

24. Decrivez votre methode de vente la plus frequente?
Producteur/confie Producteur/vend sur champ Producteur/N'Djamena
Producteur/prend produits confies
Producteur/acheteur acheteur

25. Facon de vendre (lieu; cash/credit; prix de champ; confier; commis de charge, etc.)

26. Savez-vous le prix d'N'Djamena courant O N
Prix du champs O N

27. Autres methodes?

28. Pointe de vente: champs village marche local marche regional N'Djamena

29. Moyens de transport du champs au pointe de vente:
tete ane charette vehicule bicyclette

30. Travail au champs les jours de recolte:
quitte maison a arrive champs a

quitte champs a arrive maison a

31. Dort au village village satellite champs

32. No. sacs de cereal vous avez recolte l'an dernier?

33. Ce cereal vous a suffi pour combien de temps?
No. sacs vendus?
Comment combler le vide?

34. Dernier marche: qui est alle? Ou?
quoi vendu a combien quoi achete a combien

35. Depenses depuis un mois pour baptemes, mariages, funerailles, sacrifices, maraboutage?

36. Ingredients dans la sauce du dernier repas, provenance des produits secs (champs, marche) et qualite de huile (arachide, beurre):

37. Derniere occasion d'avoir mange des legumes frais?

38. Avez-vous des boeufs chevres

39. Commentaires sur les activites du project ACDI:

Appendix 3
Socio-economic monitoring questionnaire
Page 71

MONITORING SOCIO-ECONOMIC SURVEY DOCUMENT
ACDI, KARAL

1. Enqueteur:

2. Canton: 3. Date: 4. Village:

5. Nom Enquete: 6. Sexe: M F

7. Marie/e No. Celibataire Veuf/ve Divorce/e

8. No. habitants a la maison:
Qui sont-ils?
Age des enfants:

9. Quels sont vos besoins les plus importants?

10. Membre groupement O N Nom groupement:
Detenteur de fonction O N Fonction:

11. Que fait le/un groupement?

Utile O N Pourquoi?

12. Avez-vous un credit avec le groupement O N
Pour quoi: Rembourse sur

13. Sources de nourriture pour la famille?

14. Sources d'argent et importance relatif:

15. Travailleurs dans les champs legumes:
Qui dans la famille:

16. Main d'oeuvre O N
Preparation sol semis culture recolte
No. ouvriers: No. jours: prix:

17. Epouse travail au champs LEGUMES O N
Travaux d'epouse: cultive recolte transforme vente

18. Epouse sequestree?
Non sortie de la maison
Parte seulement au marche du village
Libre

19. Legumes cultives pendant la derniere decrue:
Vendu frais sec

20. Revenues des legumes de la derniere decrue (nette ou brute?)

21. Depenses pour main d'oeuvre:

22. Depenses pour semances: Ou les avez-vous trouvees?

23. Decrivez votre facon de recolter et stocker:
Gombo:

Tomates:

Melons:

Pasteques:

24. Decrivez votre methode de vente la plus frequente?
Producteur/confie Producteur/vend sur champ Producteur/N'Djamena
Producteur/prend produits confies
Producteur/acheteur acheteur

25. Facon de vendre (lieu; cash/credit; prix de champ; confier; commis de charge, etc.)

26. Savez-vous le prix d'N'Djamena courant O N
Prix du champs O N
Autres methodes de vente?

27. Pointe de vente: champs village marche local marche regional N'Djamena

28. Moyens de transport du champs au pointe de vente:
tete ane charette vehicule bicyclette

29. No. sacs de cereal vous avez recolte l'an dernier?

30. Ce cereal vous a suffi pour combien de temps?
No. sacs vendus?
Comment combler le vide?

31. Dernier marche: qui est alle? Ou?

quoi vendu a combien quoi achete a combien

32. Depenses depuis un mois pour baptemes, mariages, funerailles, sacrifices, maraboutage?

33. Ingredients dans la sauce du dernier repas, provenance des produits secs (champs, marche) et qualite de huile (arachide, beurre):

34. Derniere occasion d'avoir mange des legumes frais?

35. Avez-vous des boeufs chevres