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"Improving the quality of life in rural Africa through the development of water resources, increased food production and the delivery of health services."

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TARA HYDRO-AGRICULTURAL PROJECT

TARA, NIGER

Submitted to:
U.S. Agency for International
Development/Niamey

Submitted by:
Africare, Inc.
October 21, 1982

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I. Project Summary

Africare is submitting this proposal to USAID for a grant of \$1,302,641 to support an integrated rural development program in Tara, Niger. The purpose of the project is to increase the productive capacity of the villagers in the Tara community through an integrated approach that combines broad-base, village-level management and non-formal education with intensive irrigated agriculture, fish production, and poultry production. This is to be accomplished through an integration of village-level interventions such as modification of the irrigation system and increased rice production; fish production; poultry production; non-formal education; cooperative organizational training; appropriate rural technology production and training; and strengthening the rural infrastructure including farm-to-market road maintenance and repair and building maintenance and repair.

Approximately 3,600 people from the village of Tara benefitted from Phase I, which started in August 1975 and was completed in September, 1981. Under Phase I much of the foundation and infrastructure upon which Phase II will be implemented was developed. During Phase II, the project will provide assistance that will consolidate and expand food production and related services in and around the village of Tara. Over a three-year period, the project will train 80 women in poultry production, train 60 men in fish production, and train 6 artisans in appropriate rural technology (animal traction equipment). Additionally, the project will improve the pumping station, compile vital data on rice production and improve overall water management of the perimeter.

At present in Tara, land is being cultivated and there is an awareness of the value of irrigated agriculture. Farmers realize that the pathway to modernize food production capabilities begins with the application of modern science and hydro-technology to the problems of farming. The quality of life

in Tara and in neighboring areas has been vastly improved as evidenced by increased numbers of radios, bicycles, mobylettes, ox-carts, clothes and house improvements as well as by increased availability of food. The nation as a whole has benefitted from the Tara model in that its successes and failures have served as a guideline for future agricultural development schemes.

II. PROJECT BACKGROUND

A. General Background

Niger is an immense plateau on the southern edge of the Sahara Desert, measuring roughly 1,000 miles from east to west and 650 miles from north to south. Total land area is approximately 490,000 square miles, about the size of Texas, Oklahoma and New Mexico combined. Over two thirds of the country is desert, most of the north-east being uninhabitable. Eighty percent of the population dwell in the narrow farming zone along the southern border where the majority are small farmers and herdsman. This area receives adequate rainfall for the cultivation of peanuts, millet, cotton, and rice. Millet and sorghum are the staple crops and peanut is the cash crop. Animal stock consists mainly of cattle, sheep, and goats.

The population of Niger is estimated to be 5,400,000 and growing at 2.9% annually. Nearly half (47%) of the population is under 15 years of age. Crude birth and death rates are 50 per 1,000 and 23 per 1,000 respectively. The principal urban areas (population) are Niamey (225,314), Zinder (58,436), and Maradi (45,852). There are four major ethnic groups in Niger: the Hausa, which are 53% of the total population; Djerma, 23%; Fulani, 10% and Beriberi-Mange, 9%.

The village of Tara is located in the southern part of Dosso Department, nine miles west of Gaya. The population of 3,600 is divided into 500 families. Annual rainfall at Tara is 40 inches. Millet, sorghum, peanuts, rice and garden vegetables are the main crops produced in the area. Poultry, sheep, goat, and fish are the main sources of meat.

Prior to July 1975, Tara had been the site of a peanut seed multiplication project conducted by the National Peanut Company, SONARA. In July 1975, the Government of Niger decided to develop Tara for small scale farming production. Africare conducted feasibility studies in August 1975 at the request of the

Government of Niger relative to an irrigated agricultural scheme at Tara. As an outcome of these studies, a \$3.5 million program was prepared and implementation began in September 1975. The project was predicated on the belief that maximum involvement of the rural people in the organization, management and implementation of its activities would achieve maximum results.

Three features were prominent in the formation of this project. The first was the concept that it should be executed by Nigeriens and their institutions with foreign assistance being oriented toward the reinforcement of these institutions and their capacity to implement the project. The second feature was founded on the understanding that the project, in order to sustain itself, could not address itself simply to the problems of agricultural production. An integrated approach to development would be required which would take into consideration all aspects of rural life, including such things as improved research, transportation, and health and education facilities. The third feature embraced villager participation in not only the food production, but in the organization and management of the project. This latter feature is of primary importance as it stresses the need for motivational, organizational, training and educational aspects as overriding elements of the implementation plan.

B. Beneficiaries of the Project

The beneficiaries of the project fall into two major categories: those families that are directly involved in the project and whose incomes are raised through the sale of their production; and those who benefit from the increased availability of food and services generated by the project.

Those directly involved include primarily the people of Tara, along with certain members of neighboring villages. Two hundred and fifty-two families, about 1,800 people, will increase their incomes through the sale of rice that

they will produce on the Tara irrigation scheme. Eighty fishermen and their families will benefit from the adoption of modern fishing practices and more efficient marketing. One hundred twenty women and their families will receive income from raising poultry for meat and eggs. In addition, 12 artisans and their families will receive income from the construction of animal traction plows and carts and hand tools.

Aside from those directly involved, the region as a whole benefits from the project. Local peanut and millet farmers are able to market their goods in larger markets as a result of the Tara-Gaya road and the transport services provided by the farmers with ox carts. They can also benefit through increased yields and reduction of labor requirements in dryland farming by taking advantage of the plowing services offered by oxplow owners. Area families will improve their poultry flocks by purchasing fertilized eggs of superior breeds from the poultry cooperative at Tara.

The production of rice, eggs, chickens and fish under the project will be made available on the markets in and around Tara, Gaya and Dosso. This will contribute to the overall economic development of the region by providing markets for associated goods and services, and by creating a demand for other consumer goods. The increased availability of foodstuffs on the market will contribute to improved nutrition of the local population.

C. Africare Experience

Africare is a private, non-profit, tax-exempt organization dedicated to the improvement of the quality of life in rural Africa with major concentration in the areas of food production, water resource development, rural health care delivery and emergency assistance to refugees. In 1971, when Africare was founded, West Africa was experiencing one of the worst droughts in its history.

Africare has undertaken both short and long-term programs designed to protect against further encroachment of the Sahara Desert and to restore the physical vitality and human dignity of millions of people affected by the drought.

Short-term assistance has been in the form of foodstuffs, medical supplies, small equipment, wells and nutrition recuperation centers. Long range projects include water resource development (wells, dams and irrigation systems), food production, range management, maternal and child health programs, paramedical training, and construction of rural dispensaries and rural health department buildings.

Presently, Africare's major involvement is in integrated rural development projects. The Tara Hydro-Agricultural project in Niger and the Seguenega Integrated Rural Development project in Upper Volta are representative of Africare's large-scale capability in this field.

Since 1976, Africare has worked to strengthen and expand the government system through the Niger Basic Health Services Delivery Project. Focused on Diffa Department, a rural area inhabited by about 145,000 people, the project's activities have included: construction, and material and equipment supply of an administrative garage complex; vehicle procurement; the development of education materials and seminars; Village Health Team training, re-training, and supervision; gathering of statistics upon which to project needs; epidemiological training; the recruitment of technical personnel; and infrastructure coordination. Virtually all project goals have been accomplished. Now in the maintenance phase, the Basic Health Services Delivery Project was due to terminate in September 1980; however, it was extended until March 31, 1981.

At the request of the Nigerien government, the remaining personnel (a public health Doctor, a Mechanic, and an Administrative Officer) has been merged with the technical assistance team of the Rural Health Improvement Project,

a bilateral project between the Government of Niger and the U.S. Agency for International Development. Africare was awarded a contract to provide the technical assistance team for this project. Africare has, as requested, recruited and posted to Niger the following six technicians: two Sanitary Engineers, a Medical Equipment Technician/Trainer, and three Auto Mechanic/Trainers. Within the Rural Health Improvement Project, Africare is providing logistical and administrative back-stopping to the technical assistance team of eight people.

The Africare Development team, which includes an agricultural engineer, an agricultural economist, rural health specialists, a sociologist and an agronomist, represents many years of development experience in Africa, and provides the technical backstopping to Africare's projects overseas.

D. Host-Country Experience

In the GON Five-Year Plan (1978-83), irrigated rice culture is expected to increase by 1,000 hectares per year to meet the deficit in other cereals. Agricultural production provides about 44% of Niger's Gross Domestic Product, and about 16% of its foreign exchange earnings, as well as the basic food needs of its growing population. The rate of increase in agricultural production is barely keeping up with population growth, estimated at 2.7% annually. Since 1975 there has been an upward trend in cereals production.

Niger has a limited potential for irrigation development. At present, about 26,000 hectares, largely in small plots, are irrigated by traditional methods. Some 5,000 hectares, located mainly in the Niger and Komadougou Valleys, are under managed irrigation.

Although improvement of the irrigation potential will not be neglected in the new five-year plan, this potential has been evaluated at only 150,000 hectares. Soils of the valleys and depressions that are suited for irrigation are

higher in fertility, have a greater water-holding capacity, and consequently, are much more productive than upland soils, particularly under irrigation.

The major constraints in expanding irrigation are the very limited water resources outside the Niger Valley, the excessive cost of developing the irrigation systems, and the limited areas of suitable soils along the Niger that can be irrigated by gravity. The Niger River is the country's only permanent stream. In 1978, only about 3,684 hectares composed of several areas of varying sizes, were under controlled irrigation in the Niger and Komadougou Valleys. In addition, about 1,380 hectares were irrigated from small ponds and reservoirs.

III. PROJECT DESCRIPTION

In August 1975, at the request of the Government of Niger, Africare investigated the feasibility of establishing an irrigated agricultural program at Tara along the bank of the Niger River. Based on these studies, a \$3.5 million program was prepared and implementation began in September 1975. The project was predicated on the belief that maximum involvement of the rural people in the organization, management and implementation of its activities would achieve maximum results.

Phase I consisted of twelve major components: dike and irrigation system, rice production and research, cooperatives, credit, fisheries, adult literacy, poultry production, appropriate rural technology production, community development farm-to-market road, primary health care training, and agricultural extension.

The Tara Hydro-Agricultural Project is approximately 140 hectares of land protected by 4 kms of dike along the Niger River. The land is irrigated from a pumping station consisting of six Lister pumps with theoretic output of $420 \text{ m}^3/\text{hr}$. and a series of canals and drains which serve the individual plots of the farmers. The size of the plots vary from 0.25 to 0.50 hectares. Two hundred fifty-six farmers are organized in a rice cooperative from which they receive credit for seed, implements and animal traction units and training in modern farming techniques. The farmers produce the rice using only family labor. After harvest the debts are paid for any credit received. A total of 1,350 tons of rice was produced between 1978 and 1981.

In July 1981, an evaluation team visited the Tara Project and met with government officials and technicians. The team concluded that "a Phase II Development Plan for Tara be pursued." A complete listing of the recommendations are attached under Appendix 1. One of the primary recommendations

of the evaluation team was that "an engineering study be made to determine the cost of moving sufficient soil material to lower the surface of the high parcels and raise the surface level of the low (wet) parcels." A second primary recommendation was that "an engineering study be made of the water requirements for all potentially irrigable land in the rice scheme and that the pumping station and accessory facilities be redesigned, reconstructed and re-equipped to assure that sufficient water will be available for all parcels during both of the rice campaigns (high and low water levels in the river) each year. A careful study to determine the cost of implementing this recommendation is needed." In response to these recommendations, an engineering team from Blunt and Evans was engaged to make an assessment of the engineering problems at Tara. The engineering assessment report made a number of recommendations relative to the improvement of the irrigated perimeter (see Appendix 2).

Subsequent to the assessment of the Blunt and Evans Engineering team, a World Bank Engineering team, commissioned by Office National Aménagement Hydro-Agricole (ONAHA) conducted a study of all the irrigated agricultural schemes along the Niger River to determine corrective measures needed and the cost estimates associated with each measure.

The recommendations of the evaluation team and the engineering teams that will be implemented are:

1. A detailed soil survey of the entire Tara scheme will be made. This survey will include a detailed description of the internal drainage characteristics, the textural and structural properties of the soil profile (1 meter in depth) and an assessment of the potential productivity for rice for each parcel.
2. The design and implementation of a system of record-keeping of statistical data related to soil management and irrigated rice production. These records will be kept for each parcel and include the following data:

- date of seed-bed preparation (plowing)
 - method of seed-bed preparation
 - date and method of planting
 - variety of rice planted
 - population density
 - dates and amounts of water applied
 - methods and kinds of fertilizer applied
 - dates of weedings
 - observations of crop conditions during growing season (diseases, insects)
 - dates of harvest
 - yield
3. The installation of a basic meteorological station at the Tara site, to collect the following data: maximum daily temperatures, precipitation (recording rain gauge, and incoming radiation (albedo).
 4. A topographical survey of the river bed at Tara during the season of minimum flow. The survey should include existing levels of intake basin sill, lowest pumping point, pump center line, dike top at point of water channel, output sill and inverts of numbers 1 and 2 irrigation channels.
 5. The installation and operation of 2 and 3 river stage gauges along the line of the river cross section.
 6. Repairing and maintaining present pumps. Based on the results of 4 and 5 above, a borewell or some other type of pumping system will be constructed.

Through the implementation of the above recommendations, which will increase the volume of water available year-round for irrigation and through the introduction of improved farming techniques, rice yields are conservatively expected to increase by 74% by the end of the project.

Other activities to be undertaken in Phase II are as follows:

- 1) The rice cooperative has a multi-purpose center which was constructed and furnished under Phase I. It consists of office space for project personnel, classrooms, storage facilities, library, and health rooms. Planning for the expected increase in rice yields requires that additional transportation and dehulling facilities be provided under Phase II. Maintenance and repair to the existing co-op center also will be supported under Phase II.
- 2) Seventy-three farmers are using animal traction units consisting of two oxen and a plow to work the land. The project provides a loan guarantee for the purchase of the animals. The plows are made by local artisans trained by the project. Under Phase II an additional 27 farmers will be able to own animal traction units. The farmers are able to use the oxen as transportation by simply removing the plows and hitching up carts which are also made by the local artisans.
- 3) Appropriate rural technology training of local artisans in the production of animal traction units, farming tools, and transportation carts reduces the need of costly imports not only for the Tara Project but for the country as a whole. Under Phase I a work shop was constructed and equipped. Twelve villagers were trained and organized into the artisans cooperative. Loan guarantees for credit were provided under the project to purchase materials and supplies needed by the artisans to make the farming equipment. In addition to the orders placed by the Tara Project, the artisans cooperative filled orders placed by the Niger Government for use in other perimeters. Under Phase II, six more villagers will be trained in appropriate rural technology and organized into a cooperative. They will receive credit guaranteed by the project to purchase materials and supplies needed to construct the equipment.

4) Twenty (20) kms of farm-to-market road were constructed during Phase I to facilitate the marketing of crops in nearby towns and the urban centers. Under Phase II the road will be maintained and repaired where necessary. The rice cooperative truck which transported the harvest from Tara to the markets is broken down and is in need of repair. Under Phase II a new seven-ton truck will be purchased to assist the cooperatives with the marketing of increased production.

5) Poultry production under Phase I consisted of training 43 women in improved techniques of poultry production. They were organized into a cooperative and received training in the management/operation of poultry cooperatives. Under Phase II, 80 women will be trained in poultry production and organized into cooperatives. A poultry house is provided for every 10 women making a total of 12 production houses. Each woman receives 10 chickens and 1 cock plus feed on credit. The chickens produce table eggs and fertilized eggs which are sold throughout the community to be cross-bred with the local stock. When these layers reach 18 months they are sold as meat. The poultry station which was constructed under Phase I raises chickens for eating and egg production; provides veterinary services; and sells older chickens as meat. It also serves as the training site for the women's cooperatives. Under Phase II the station will begin hatching and raising baby chicks for egg production. A building for hatching will be constructed and equipped. Basic supplies and equipment, including vaccines, will be provided.

6) Fish production is also an activity aimed at assisting the villagers of Tara to improve their economic condition and standard of living. Under Phase

A multi-purpose building was constructed. It provides space for drying, smoking and conservation of fish as well as office and classroom space. The building is furnished with drying and smoking facilities, freezers, and furniture. Twenty villagers received training in fishing techniques and cooperative management. The fishermen are provided with nets, boats, small motors and equipment on credit which are arranged through the cooperative. A four-wheel drive pick-up truck provides transportation for both fishery and poultry activities. A four-wheel drive pick-up truck will be purchased for poultry, freeing up the present truck solely for fishing activities. Under Phase II, 60 new fishermen will be trained in fishing techniques and cooperative management. Additional fishing equipment and supplies will be provided through credit to the new cooperatives. Marketing studies will be undertaken to assist the fishermen in selling their fish at Gaya and Dosso.

7) Credit is a key component of the integrated approach to rural development. Under Phase I, credit to the cooperatives, through loan guarantees, supplied production inputs to the individual participants. Funds are advanced to the cooperatives through La Caisse Nationale de Credit Agricole (CNCA) and L'Union Nigerienne de Credit et de Cooperatives (UNCC). UNCC is responsible for assisting the cooperatives in the marketing of their products and the collection of the loans from the farmers. During Phase I, loans were backed by the project for the purchase of a rice de-huller for farmers; animal traction units, seeds, fertilizers, tools, fishing equipment and supplies for the fishermen, chickens and chicken feed.

The farmers have repaid their loans as follows: first harvest, 84%;

second harvest, 98%; third harvest, 93.5%; and fourth harvest, 57%. Data is incomplete for the fifth and sixth harvests. Under Phase II, newly organized rice, fish, poultry and artisans cooperatives will receive credit for production inputs. The cooperatives train the participants in the use and operation of credit systems before credit is extended.

8) In addition to cooperative training, villagers of Tara benefitted from adult literacy training offered by Alphabetization. Demands for more educational instruction increased after the successful introduction of farmer training in rice production. Under the farmer training program 20 farmers were selected to receive the extension course. They were expected to work with other groups of farmers to transmit the skills they had learned. The training included use of animal traction units in farming, planting, fertilizer and insecticide usage; and harvesting techniques. These 20 farmers were so stimulated by the extension course that they became the first enrollees along with five others in the Adult Literacy Program at Tara.

9) The Adult Literacy course expanded and reinforced knowledge taught under the extension program by teaching reading, writing and arithmetic relative to farming activities. The first cycle (beginners) lasted one year. These 25 advanced to the intermediate level and an additional 22 men enrolled in the beginners class. After one year of training, the intermediates moved to the advanced class and an additional 25 enrolled in the beginners class. Class size is controlled by space and teachers. The classes are held Monday - Friday 7-9 P.M. The student's motivation is reflected in the high attendance record (89%) as reported by the instructor. Upon completion of 3 cycles the participants receive a certificate.

The popularity of Adult Literacy spread throughout the community. The women expressed a desire to receive literacy training also. After completion of the poultry raising training program, 40 women will enroll in the beginners class. A female instructor has been assigned by GON to Tara to organize the Women Adult Literacy Program. The subject matter used to teach the women to read, write and count will be poultry related, thus reinforcing knowledge already learned by the women.

10) Cooperative self-management training consists of (a) training cooperative community representatives; (b) advanced extension training reinforcing technical knowledge provided under Phase I; and (c) advanced adult literacy-reading, writing, arithmetic and coop members self-management training. This training is different from cooperative organization/management training under Phase I in that it is more detailed and intensive. Participants in the self-management training must complete the elementary cooperative organization/management program before joining the advanced training.

A) Cooperative Community Representatives

Each of the eight communities participating in Tara will elect five representatives to the general assembly of the grand coop in order to protect their community interests. The grand coop consists of community members and specialty coops. The general assembly elects an administrative committee (President, Secretary, Treasurer and two Bookkeepers) which is responsible for the coordination and supervision of the coop. The forty members of the general assembly will receive a detailed, intensive training covering such topics as: principles of coops in Niger; structure of coops; role of general assembly; role of finance committee; credit; profits; expenses; and personnel.

In order to be effective, this one-month training course will be repeated each year of the project. The administrative committee plus three alternates will participate in an annual three-day workshop which will strengthen their administrative and financial skills. Topics for the workshop include: role of coop, financial records, organizing meetings, role of the administrative committee and its relationship with the project director.

B) Advanced Extension Training

Each of the specialty sections of the grand coop (rice, fish, poultry, rural artisans) will select outstanding members who have grasped the new techniques introduced under Phase I training to receive advanced training in the respective specialties. They will serve as trainers for the rest of the members of the coop. Rice coop will select six members per groupement mutual, making a total of 72 participants for the two-week course, which includes pricing, marketing, agriculture techniques, coop organization, recordkeeping, and credit. The five-member administrative committee of the rice coop will attend an annual one-week seminar designed to strengthen its administrative and financial skills.

The eighty poultry coop members will elect a five-member administrative committee. The eighty members will participate in an annual one-month concentrated course on principles of coops, organization of coops, income, expenses, marketing, credit, feed, and distribution of labor. The five-member administrative committee will attend a one-week annual seminar focusing on strengthening its administrative and financial skills.

The twelve rural artisan members will elect a five-member administrative committee. The twelve members will attend a three-week training emphasizing use of the workshop, production costs, credit, recordkeeping, coop principles, marketing, inventories, publicity, relationship to the larger coop and to the other specialty sections. The five-member administrative committee will attend an annual two week seminar designed to strengthen administrative and financial skills.

The sixty-member fish coop will elect a five-member administrative committee. The sixty members will participate in an annual one-month

training course on principles of coop, structure of coop, credit, record-keeping, loans, grants, repayment, marketing relationship with other coop specialties. The five-member administrative committee will attend a one-week annual seminar designed to improve its administrative and financial skills.

C) Advanced Adult Literacy

It is essential that adult literacy be provided to coop members to reinforce knowledge and skills taught under the self-management training. Eight months of advanced adult literacy courses in reading, writing and arithmetic using cooperative development and self-management as subject matter will be taught to 72 farmers, 80 poultry raisers, 60 fishermen, 11 rural artisans and 40 community representatives over the life of the project. Subject matter in advanced adult literacy classes is technically oriented, reinforcing extension concepts and practices. The classes will be taught in the evenings, each group having its own teacher.

11) Applied Agronomic Research

Under Phase I, field research was conducted at Tara under the supervision of INRAN. With the removal of the Director of Inran as the Director of the Tara project agronomic research ceased.

Under the new INRAN Director, a working relationship including research activities has been established. The present research activities include a series of rice trials on varieties brought in by the Chinese and from the West Africa Rice Development Association (WARDA).

Primary research emphasis for rice development is being given to applied research concerned with practical problems on the farm. Adaptive research will be coordinated with extension and training programs for early payoffs on rather elementary cultural practices. Also the present research includes evaluation of soils, fertilizer, cultural practices and weed control. Trials cover basic agronomic research pertaining to rice culture. This involves soil classification, seedbed preparation, trials to determine optimum seeding rates and dates, and fertilizer application (including rates) and irrigation water.

Varietal improvement research is seeking to introduce and test varieties from areas with similar climates in other tropical countries.

In the future, farm production research will include evaluation of diseases, insects, rodents and other pests. Methods will be developed for the maintenance and production of pure seed for distribution to farmers. Work will also be done with floating rice, and the cultivation of other crops.

IV. PROJECT ANALYSIS

A. Economic Analysis

In September 1981 Africare sent a team of engineers to Niger to study the irrigation perimeter that had been constructed in 1978 under the Tara Integrated Rural Development Project. The pumps that provided water to the rice fields were not supplying adequate water during certain months and the area under cultivation during the dry season was constrained to forty hectares. The team recommended that several studies be undertaken that would provide a basis for choosing among several options designed to re-establish production on the entire perimeter during both cropping seasons (see appendix 2).

Subsequent to the visit of the Africare team, the World Bank sent out a team that is presently working with ONAHA. The World Bank team is to analyze the problems of the perimeters along the Niger River and to make estimates of the work required to establish full production on the perimeters, as well as the cost of that work. The Tara perimeter is included in the study. The initial site visits have been made, preliminary reports should be finished in May, and final estimates for the rehabilitation of Tara should be available before the end of 1982, in time for work to begin in the dry season of 1983. Africare has been asked by ONAHA to extend its involvement in Tara to the rehabilitation of the perimeter as recommended by the World Bank team.

Africare has carried out the accompanying economic analysis of the Tara Project. The analysis shows the following:

- (1) The rate of return to the entire project is 19.36%. If the horizon in which costs and benefits are considered is restricted to 14 years, the rate of return of the project is 16.08%. These figures have

been calculated using the aggregated incremental net benefits of the various project activities.

- (2) The economic rate of return to the rice-related investments planned under the project is 19.58%. Sensitivity analysis has shown that this rate of return is stable under various assumptions.
- (3) The rice cooperative at Tara can be financially independent by the end of the project. The cooperative owns and operates a rice huller that allows the cooperative and its members to capture the value added by hulling the paddy and selling the rice and hulls. These sales generate a surplus that will allow the cooperative to meet all its regular costs and to put aside funds to meet any unexpected expenses. The cooperative will also be able to finance the purchase of production inputs at the beginning of each season, obviating the need of the farmers to borrow from CNCA.
- (4) Under the project, the individual farmers of Tara can expect an average annual increase in income of 104% over their income without the project. Average net benefits per farm family for rice production will be 243,679 CFA in Year 4, and is expected to rise to 308,954 CFA in Year 12.
- (5) The poultry cooperative is expected to produce 118,260 eggs per year on the Central Station and 144,540 eggs per year in the cooperative members' poultry houses. The economic rate of return to the project is 7.63%.
- (6) Fish production, upon completion of the project, is estimated at 47,520 kilograms annually by the 80 members of the cooperative. The rate of return has been estimated to be 23.66%.

1. Rice Production Component

a) Production Under the Project

In bringing the Tara irrigation scheme under full production, the total annual production will be 364 tons greater than without the project in Year 2 and 616 tons greater in Year 9, increases of 71% and 122% respectively. Table 1 illustrates the increase in production under the project.

Table 1. Rice Yield and Total Production With and Without Project

	YEAR									
	1	2	3	4	5-6	7-8	9	10-14	15-24	
Yield with project (tons per hectare)	4.2	4.4	4.5	4.8	5.0	5.3	5.6	5.6	6.0	
Yield without project (tons per hectare)	4.2	4.3	4.3	4.4	4.4	4.4	4.2	-0-	-0-	?
Production with project (tons)	336	880	860	880	1000	1060	1120	1120	1200	
Production without project (tons)	504	516	516	528	528	528	504	-0-	-0-	?
Incremental production (tons)	(168)	364	384	432	472	532	612	1120	1200	
Percentage increase	-33%	71%	74%	82%	90%	101%	122%	--	--	

The major increase in production is due to the double cropping of 100 hectares subsequent to the rehabilitation of the perimeter. Without the project the most that can be cropped is 80 hectares in the rainy season, and 40 hectares in the dry season. As the 250 farmers have already been farming on the perimeter, full production will begin directly upon completion of the work in Year 1. The first year of double-cropping is thus Year 2. As the farmers improve their skills in rice cultivation and irrigation methods the yields are expected to improve (see Table 1). Without the project, it is expected that, in spite of increased experience in irrigated rice production, the infrastructure itself will not lend itself to

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obtaining maximum yields. In fact, without the major improvements proposed under the project, it is estimated that the maximum life of the perimeter could be expected to be nine years.

When the Tara perimeter first began producing rice, the cooperative was obligated to buy the paddy from its members at 70 CFA per kilogram and sell the paddy to Riz du Niger at 72 CFA per kilogram. Due to the distance from Tara to Niamey, the margin allowed the cooperative did not cover the costs of transport. Upon request of the Prefet of Dosso by the Tara Project Director, the cooperative was granted permission to hull the rice itself.

Processing the Paddy

The Tara cooperative is unique among AHAs in that it owns and operates a rice huller. The cooperative took out a 1,540,000 CFA loan from the CNCA for four years at 10.5%. The members of the cooperative are charged 7.5 CFA per kilogram of paddy hulled. Upon hulling there is about 56% white rice and 44% hulls and rice flour. The white rice is sold at 180 CFA per kilogram. The hulls and rice flour are sold at 20 CFA per kilogram to the Dosso Productivity Project and the villagers, and are used for cattle feed. The value added to the rice by hulling is 28,400 CFA per ton (89,600 received from the rice plus 8,800 received for the hulls minus 70,000 that would have been received if sold as paddy). Thus, the value of the rice when hulled is 141% of the value of unhulled rice.

Marketing of Production

To pay the costs of operation, repair and management of the irrigated perimeter, the cooperatives are authorized to collect 2800 kilograms of paddy per hectare from the cooperative members. The farmer is credited with 70 CFA per kilogram for the paddy. His share of the season's expenses is deducted and he is paid the difference. The farmer is then free to sell the rest of his production as he likes. Most paddy is hulled and sold privately. As the amount of paddy collected by the cooperative is a fixed

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amount per hectare, any increase in yields accrues entirely to the farmer. Much of the rice is sold at the cooperative itself. Those farmers with ox carts transport up to a ton of rice per trip to the Gaya market. The cooperative truck markets the remainder in Gaya, Dosso, and Niamey.

The cooperative hulls the paddy it receives from the members and sells the rice and hulls on the market at 180 CFA per kilogram and 20 CFA per kilogram respectively. The difference between the amount received for the hulls and rice and the amount paid out to the cooperative members for paddy is used to cover its expenses. Any funds remaining after expenses each season is put into a banking account to finance future operations, repairs, maintenance and management expenses. The accompanying chart (page 14) illustrates the flow of commodities and cash. Table 2 shows the amount of paddy remaining to the farmer and the amount of rice and hulls sold.

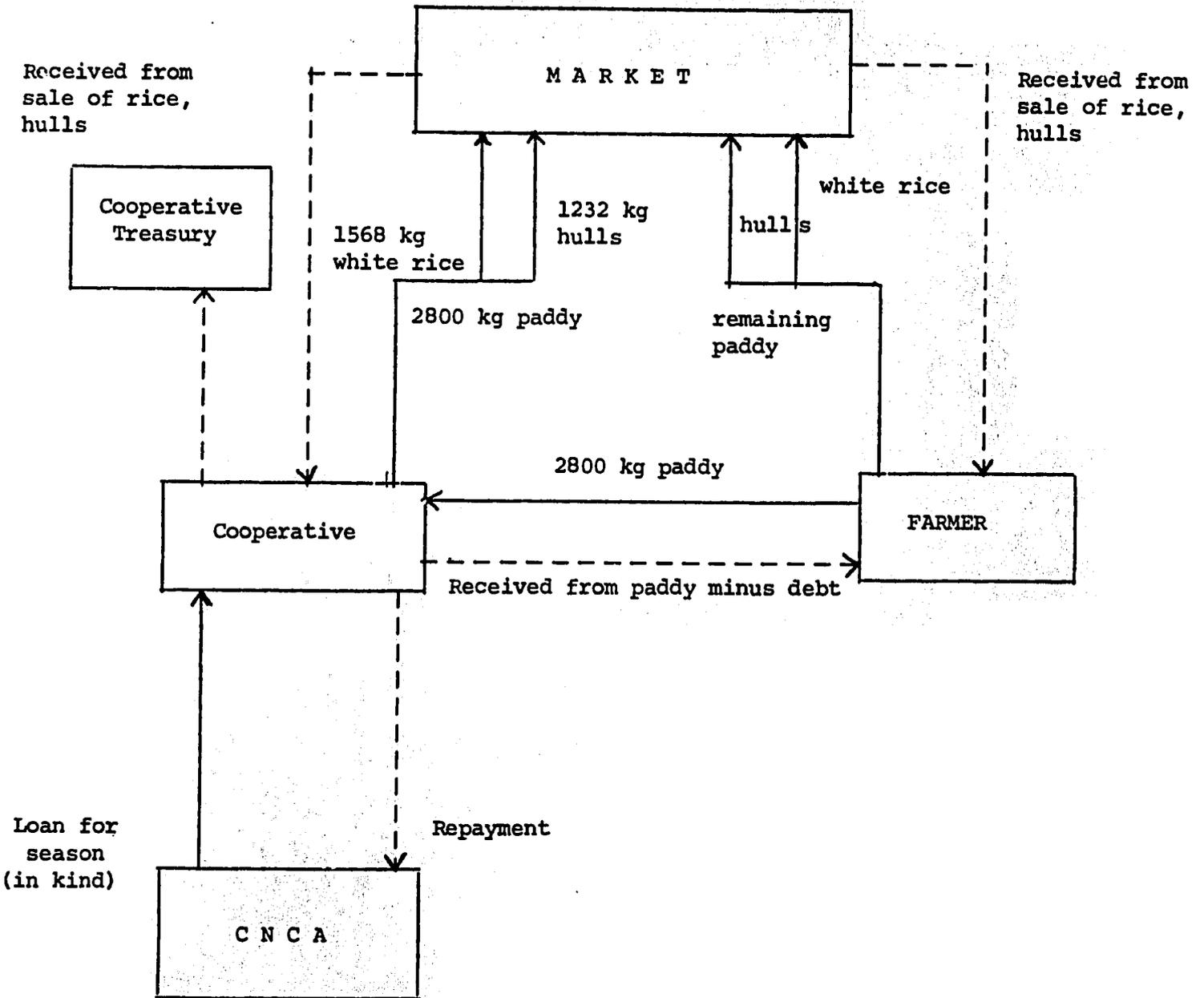
Animal Traction Units - Income Generation

Ownership of animal traction units provides three major benefits to the farmers. Income is generated from selling the oxen, transport and plowing.

A pair of oxen are purchased at the age of three years for 120,000 CFA. At the end of the third year, the oxen are fattened on rice hulls, sorghum and pasture and are sold for 200,000 to 250,000 CFA each. The farmer then buys a new pair of three-year-olds to use in animal traction. The net gain on this transaction is about 250,000 CFA every three years.

With the construction of the road and the availability of animal-drawn carts, there has sprung up a thriving transport sector. Tara farmers transport goods primarily to the three closest markets: Tanda, Gaya, and Malanville. The maximum recommended load is 700 kilograms, but loads of one ton are not uncommon. For transporting shelled peanuts, the charge is 200 CFA per 100-kilogram sack; for unshelled peanuts, the charge is 100 CFA per 50 kilogram sack. Other items commonly transported are rice

RICE MARKETING SYSTEM



Cash flow ----->

Commodity flow ----->

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Table 2a. Production on 0.4 Hectares Double-Cropped (Except Year 1)
Amounts of Paddy, Rice Hulls Sold With Project

Year	1	2	3	4	5	6	7	8	9	10	11	12
Total Production (kilograms)	1344	3520	3600	3840	4000	4000	4240	4240	4480	4480	4480	4480
Of Which Sold As: Paddy (kg)	896	2240	2240	2240	2240	2240	2240	2240	2240	2240	2240	2240
Rice (kg)	251	717	762	896	986	986	1120	1120	1254	1254	1254	1254
Hulls (kg)	197	563	598	704	774	774	880	880	986	986	986	986

Table 2b. Production on 0.32 Hectares Rainy Season and 0.10 Hectares Dry Season and Amounts of Paddy, Rice and Hulls Sold Without Project

Total Production (kilograms)	2016	2064	2064	2112	2112	2112	2112	2112	2016	-0-	-0-	-0-
Of Which Sold As: Paddy (kg)	1344	1344	1344	1344	1344	1344	1344	1344	1344	-0-	-0-	-0-
Rice (kg)	376	403	403	430	430	430	430	430	376	-0-	-0-	-0-
Hulls (kg)	296	317	317	338	338	338	338	338	296	-0-	-0-	-0-
Incremental Production	-672	1456	1536	1728	1888	1888	2128	2128	2464	4480	4480	4480

assuming
no loss
during
-23-
pro. of hulls

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from the Tara scheme and millet. The average income for these trips, which take place primarily after the harvests, is 2,000 CFA. If each cart averaged 30 trips per year, the total annual income per cart would be 60,000 CFA. The total income generated by the use of the 100 carts for transport would be 6,000,000 CFA.

*But
even if
the carts
are transported
these points*

The individual rice plots of the Tara Project are plowed entirely by animal traction. Those 150 farmers without plows pay 20,000 CFA per hectare for the service. The charge for this service for both seasons amounts to 2,400,000 CFA. On the average, then, each of the farmers with an animal traction unit receives 24,000 CFA per year for plowing.

In addition to the rice fields, the plows are used to plow dryland farms. Land preparation with animal traction aerates the soil and makes nutrients more readily available to the plants, thus increasing yields by 150% to 250%. Reports conflict as to whether plowing has encouraged the cultivation of more area or whether it has provided time for other activities by reducing the labor input in millet production.

Farmer Income

After the repair and reconstruction of Tara, 100 hectares will be double-cropped. Under the project, each member of the cooperative will be assigned a plot of average size of 0.4 hectares to be cultivated in both the rainy and dry seasons. The only exception will be the first year dry season, during which construction will be underway and cultivation suspended.

At present, the farmers are able to cultivate, on the average, only 0.32 hectares in the rainy season and 0.16 hectares in the dry season. Many farmers have not participated in the dry season production cycle due to the small amount of land available for cultivation.

There are now 73 animal traction units owned by members of the cooperative. Under the project, an additional 27 will be purchased. The owners of the animal traction units plow the fields of those who do not have oxen for 20,000 per hectare. In addition, they earn income from using their oxen with carts to transport goods and from fattening their oxen after three years service and selling them for beef.

The farmer's rice revenues come from three sources. He is obligated to sell to the cooperative 2,800 kilograms of paddy per hectare cultivated; for this share of the crop he receives 70 CFA per kilogram. The rest he can hull using the cooperative's huller. For this service he pays 7.5 CFA per kilogram paddy. The product is 56% white rice, which sells for 180 CFA per kilogram and 44% hulls and rice flour, which sells for 20 CFA per kilogram. Table 2 illustrates the annual production by a farmer double-cropping 0.4 hectares and the amounts of paddy, rice and hulls sold in the first 12 years of the project as well as the incremental production over the without project situation. The increased efficiency anticipated with the improved irrigation system is reflected in the reduction of the per hectare charge to the farmer for the cost of inputs, management, maintenance and equipment. The per hectare charge falls from 139,450 CFA per hectare without the project to 75,608 CFA per hectare with the project--a drop of 46%.

Apart from the seasonal fees paid to the cooperative, the farmer must pay 7.5 CFA per kilogram of paddy hulled to the cooperative. If the farmer has no plow he pays 16,000 CFA per year for his land to be plowed. If he owns a plow, he must replace the equipment after ten years and his oxen every three years. The farmers of Tara employ no hired labor. All work is done by family members.

b) Economic Benefits of the Rice Component

Table 6 presents the revenues and costs involved in the reconstruction and subsequent exploitation of the Tara Irrigation Perimeter over a 24-year period. With the project, 80 hectares will be cultivated during the first

rainy season. Construction will take place during the following dry season. From Year 2 on, 100 hectares will be cultivated during each season.

Table 7 presents the revenues and costs anticipated if the project is not implemented, in which case the expected life of the Tara perimeter is nine years. The maximum area expected to be cultivated is 80 hectares in the rainy season and 40 hectares in the dry season. In addition to less efficient water supply and utilization due to the poor state of equipment and infrastructure, pump and perimeter costs are increased by the need to set up a pump by the river each dry season.

Yield and production figures and annual costs appear in greater detail in Tables 1 and 8. In the economic analysis, economic prices have been assumed for seed, fungicide, insecticide, fertilizer, and the 27 animal traction units to be purchased in Year 1 of the project.

what are they?

The economic rate of return of the project is 19.58%. A sensitivity analysis was run for each of two sets of assumptions. The first assumes a 20% cost overrun in the reconstruction of the Tara perimeter. The resulting economic rate of return is 18.26%. The second sensitivity analysis assumes a 25% increase in the costs of vehicle operation and maintenance and production inputs. The economic rate of return is then reduced to 17.89%. The results of these analyses illustrate that the returns to the investments in the Tara Irrigation Perimeter are high and stable.

Financial Viability of the Rice Cooperative

The cooperative depends upon the contributions of its members for its revenues. The cooperative collects 2800 kilograms paddy per hectare cultivated. It credits the farmers with 196,000 CFA per hectare, 70 CFA per kilogram, for the paddy collected. The cooperative deducts the fees the farmer owes to cover the costs of production inputs, maintenance and operation of the pump station and irrigation infrastructure, and management, as well as fees for the eventual replacement of equipment and for major repairs to

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the station and perimeter. The difference between the fees owed to the cooperative and the value of the paddy sold to the cooperative is paid back to the farmer in cash.

The cooperative then hulls the paddy and sells the rice and hulls at 180 CFA per kilogram and 20 CFA per kilogram, respectively. The margin between the price paid to the farmer for the paddy and the revenues from the sale of rice and hulls forms the working capital of the cooperative. With this fund, the cooperative pays the costs of infrastructure operation and maintenance, including repairs and maintenance of cooperative buildings, operation and maintenance of the cooperative's generator and rice hullers (a second huller will be bought in Year 2 by the cooperative), purchase of office supplies and maintenance of the Gaya-Tara road. It also covers operations, maintenance and repair costs of the cooperative truck and pickup.

The surplus remaining in the cooperative's treasury after annual expenses will reach 44,462,400 CFA by Year 3, the last year of the project, 184,000,000 by year 10, and 269,354,400 CFA by Year 15. This will allow the cooperative to buy the inputs and supplies for each season, without recourse to credit, by the end of the project. It will also allow the cooperative to meet unforeseen expenses.

Since the surplus accruing to the cooperative after expenses will be critical to the cooperative's ability to provide credit and other services to its members, it is essential to examine the security of this surplus. To this end, the surplus was recalculated assuming an across-the-board increase of 33.3% in the cooperative's expenses. With the increase in costs, the surplus after Year 3 is 24,261,992 CFA. In Year 10 it is 106,841,318 CFA, and by Year 15 there will be 144,532,722 CFA in the cooperative treasury. Though this is a decrease of 45% in Year 3, 42% in Year 10, and 46% in Year 15, the absolute amounts should still allow the cooperative to continue providing credit and other services to its members.

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Financial Attractiveness of the Project to the Farmer

If the net benefits under the without-project assumptions are subtracted from the net benefits under the project, the series obtained is the incremental net benefits resulting from the implementation of the project. This is the additional amount the family would receive by participating in the project over and above what it would receive without the project. Thus, the incremental net benefit is the direct financial incentive for the farmer to participate, as it reflects his own investments and returns. Table 3 shows the incremental net benefits of the Tara Project to a rice farmer. In the first year the incremental net benefit is negative due to the suppression of dry season cultivation during construction. However, it quickly turns positive and increases up to 308,954 CFA by Year 12 of the project.

A measure that consolidates this series of potential increases in income is the net benefit increase, which is the present worth of the incremental net benefit with the project divided by the present worth of the net benefit without the project, expressed in percentage terms. This is the weighted average incremental increase in income the farmer will receive for participating in the project. For the Tara Project the net benefit increase, using a 10% discount rate, is 104% for the first 12-year period. At the farmer level, then, this project is very attractive.

Table 3. Incremental Net Benefits of Tara Project

*in CFAF
in '000?*

Year	1	2	3	4	5	6	7	8	9	10	11	12
Net Benefits With Project	73434	211034	219234	243674	260074	260074	284514	284514	308954	308954	308954	308954
Net Benefits Without Project	86104	91024	91024	95944	95944	95944	95944	95944	86104	-0-	-0-	-0-
Incremental Net Benefits	(12670)	120010	128210	147730	164130	164130	188570	188570	222850	308954	308954	308954

Though the net benefit increase is high under the project assumptions, the farmer benefits greatly from subsidies on seed, fertilizer, fungicides, and insecticides. Table 4 gives the present subsidized prices and economic prices of these inputs.

Table 4. Financial and Economic Prices
of Agricultural Inputs

Inputs (Unit)	Subsidized Price Per Unit (CFA)	Economic Price Per Unit (CFA)	Units per Hectare
Seed (kilogram)	80	105	80 - 90
Urea (kilogram)	35	56	200
15-15-15 (kg)	30	77	150
Insecticides (liters)	600	1200	0.2
Fungicides (Packs)	25	50	3.5

The distortions in agricultural production due to subsidies have been extensively investigated in recent years and strong arguments have been made for their elimination. For this reason, the incremental net benefit was recalculated using the economic prices of the agricultural inputs. The results, shown in Table 5, illustrate the sensitivity of the farmer's benefits to lifting government subsidies.

Upon lifting subsidies, incremental net returns are slightly diminished, but are still high. In fact, the net benefit increase rises to 114% under the new assumptions. This is due to the fact that the percentage decrease in net benefits without the project is greater than the percentage decrease in net benefit with the project. To the farmer, then, this project would remain financially attractive even if subsidies were lifted on basic agricultural inputs.

Table 5. Incremental Net Benefits Assuming Economic
Prices of Agricultural Inputs (cfa)

Year	1	2	3	4	5	6	7	8	9	10	11	12
Net Benefit With Project	69127	200268	208468	232908	249308	249308	273748	273748	298188	298188	298188	298188
Net Benefit Without Project	79525	84445	84445	89365	89365	89365	89365	89365	79525	-0-	-0-	-0-
Incremental Net Benefit	(10398)	115823	124023	143543	159943	159943	184383	184383	218663	298188	298188	298188

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*Without Project
(From Table 7)

Table 6. Tara With-Project Economic Analysis
120 Hectares Double-Cropped, Years 2-24
80 Hectares Rainy Season, Year 1

YEAR	1	2	3	4	5	6	7	8	9	10	11	12
<u>REVENUES</u>												
<u>Farmers</u>												
Revenue from 2800 kg/ha paddy	15680000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000
Revenue from rice	11289600	32256000	34272000	40320000	44352000	44352000	50400000	50400000	56448000	56448000	56448000	56448000
Revenue from hulls	985600	2816000	2992000	3520000	3872000	3872000	4400000	4400000	4928000	4928000	4928000	4928000
Revenue from selling oxen	29200000	-0-	-0-	40000000	-0-	-0-	40000000	-0-	-0-	40000000	-0-	-0-
Revenue from transport	4380000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000
<u>Cooperative</u>												
Net Revenue After Hulling 2800 kg/ha	8870400	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000
TOTAL REVENUE PROJECT	70405600	102448000	104640000	15216000	115600000	115600000	162176000	122176000	128792000	168792000	128792000	128792000
<u>COSTS</u>												
Capital	16876000	1800000	-0-	14800000	750000	18000000	17550000	-0-	-0-	16600000	-0-	2650000
Production Inputs	2525200	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000
Pump/Perimeter	2500000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000
Management	1800000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000
Veh. Op/Mainten.	4380000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000
Infrastructure Operation/Mainten.	1830000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000
Project Investment	218312080	66613900	52349640	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL COSTS	248207280	89961960	73897600	36348000	22298000	39548000	39098000	21548000	21548000	38148000	21548000	48048000
Net Benefits With Project	(177801680)	12486040	30742360	114868000	93302000	76052000	123078000	100628000	107244000	130644000	107244000	80744000
*Net Benefits	59156200	40762200	36576200	61876200	40686200	24786200	58266200	39916200	38706200	-0-	-0-	-0-
INCREM. NET BENEFIT (236957880)	(28276160)	(5833840)	52991800	52615800	51265800	64811800	60711800	68537800	130644000	107244000	80744000	

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13	14	15	16	17	18	19	20	21	22	23	24
39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000	39200000
56448000	56448000	64512000	64512000	64512000	64512000	64512000	64512000	64512000	64512000	64512000	64512000
4928000	4928000	5632000	5632000	5632000	5632000	5632000	5632000	5632000	5632000	5632000	5632000
40000000	-0-	-0-	40000000	-0-	-0-	40000000	-0-	-0-	40000000	-0-	-0-
6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000	6000000
22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000	22176000
168792000	128792000	137520000	177520000	137520000	137520000	177520000	137520000	137520000	177520000	137520000	137520000
-0-	-0-	1800000	32800000	3750000	1800000	12000000	750000	-0-	37750000	1800000	-0-
6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000	6313000
4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000	4375000
3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000	3300000
5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000	5680000
1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000	1880000
-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
33548000	21548000	23348000	54348000	25298000	23348000	33548000	22298000	21548000	59298000	23348000	21548000
135244000	107244000	114172000	123172000	112222000	114172000	143972000	115222000	115972000	118222000	114172000	115972000
-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
135244000	107244000	114172000	123172000	112222000	114172000	143972000	115222000	115972000	118222000	114172000	115972000

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Table 7. Tara Without-Project Economic Analysis
80 Hectares Rainy Season, 40 Hectares Dry Season

YEAR	(CFA)								
	1	2	3	4	5	6	7	8	9
<u>REVENUE (CFA)</u>									
<u>Farmers</u>									
Revenue from paddy	23520000	23520000	23520000	23520000	23520000	23520000	23520000	23520000	23520000
Revenue from rice	10920000	18180000	18180000	19440000	19440000	19440000	19440000	19440000	16920000
Revenue from hulls	1480000	1580000	1580000	1680000	1680000	1680000	1680000	1680000	1480000
Revenue from selling oxen	29200000	-0-	-0-	29200000	-0-	-0-	29200000	-0-	-0-
Revenue from transport	4380000	4380000	4380000	4380000	4380000	4380000	4380000	4380000	4380000
<u>Cooperative</u>									
Net Revenue After Hulling 2800 kg/ha	13305600	13305600	13305600	13305600	13305600	13305600	13305600	13305600	13305600
TOTAL REVENUE	88805600	60965600	60965600	91525600	62325600	62325600	91525600	62315600	59605600
<u>COSTS</u>									
Capital	8760000	-0-	3500000	8760000	750000	16640000	10560000	1500000	-0-
Production Inputs	3899400	3899400	3899400	3899400	3899400	3899400	3899400	3899400	3899400
Pump/Perimeter	9600000	9600000	9600000	9600000	9600000	9600000	9600000	9600000	9600000
Management	2040000	2040000	2040000	2040000	2040000	2040000	2040000	2040000	2040000
Vehicle Operation and Maintenance	3800000	3800000	3800000	3800000	3800000	3800000	3800000	3800000	3800000
Infrastructure Operation/Maintenance	1550000	1550000	1550000	1550000	1550000	1550000	1550000	1550000	1550000
TOTAL COSTS	29649400	20889400	24389400	29649000	21639400	37539400	33259400	22394400	20899400
NET BENEFITS	59156200	400762200	36576200	61876200	40686200	24786200	58266200	39916200	38706200

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Table 8. Financial Analysis, Tara Rice Cooperative
With Project (cfa)

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TOTAL REVENUES	18302000	43397500	43547500	43997500	44297500	44297500	44747500	44747500	45197500	45197500	45197500	45197500	45197500	45197500	45797500
Revenue from hulling 2800 kg/ha	10300400	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000	25876000
Revenue from hulling member paddy	840000	2400000	2550000	3000000	3300000	3300000	3750000	3750000	4200000	4200000	4200000	4200000	4200000	4200000	4800000
Fees paid by 250 members (II a,b,c,f)	7161600	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500	15121500
TOTAL EXPENDITURES	13621000	24481500	22681500	25481500	23431500	22681500	28231500	22681500	22681500	27281500	22681500	49181500	22681500	22681500	24481500
I. Capital Outlays															
1. 10-ton truck	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	12000000	-0-	-0-	-0-
2. 1-ton pickup	-0-	-0-	-0-	2800000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
3. Rice hullers (2)	-0-	1800000	-0-	-0-	-0-	-0-	1800000	-0-	-0-	2800000	-0-	-0-	-0-	-0-	-0-
4. Pumps (5)	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	1800000	-0-	-0-	-0-	-0-	-0-
5. Motors (5)	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	10000000	-0-	-0-	1800000
6. Generator	-0-	-0-	-0-	-0-	750000	-0-	3750000	-0-	-0-	-0-	-0-	3750000	-0-	-0-	-0-
II. Annual Costs-Total	13621600	22681500										750000	-0-	-0-	-0-
a) Production Inputs	1448600	3621500													
1. Seed	512000	1280000													
2. Fungicide	7000	17500													
3. Insecticide	9600	24000													
4. Urea	560000	1400000													
5. 15-15-15	360000	900000													
b) Pump/Perimeter	2500000	4375000													
1. Fuel/lubricants for pumps/motors	2000000	4000000													
2. Pump station/perimeter repair/main.	500000	375000													
c) Management	1800000	3300000													
1. Salaries	1000000	2500000													
2. ONAHA Transport and fees	800000	800000													
d) Vehicles	4380000	5680000													
1. Truck Operation and maintenance	1500000	2800000													
2. Pickup Operation and maintenance	1400000	1400000													
3. Truck repairs	1200000	1200000													
4. Pickup repairs	280000	280000													
e) Infrac. Oper/Maint	1830000	1880000													
1. Build. maint/rep.	600000	400000													
2. Gener. Oper/Maint	500000	500000													
3. Off/Coop. Supp.	280000	280000													
4. Huller Oper/Maint	250000	500000													
5. Road Repair/Maint	200000	200000													
f) Amort./Provis Fund	1413000	3825000													
1. Amort. Truck	-0-	1000000													
2. Amort. Motors	375000	750000													
3. Amort. Pumps	500000	1000000													
4. Amort. Generator	38000	75000													
5. Fund for major sta/perin. rep.	500000	1000000													
Net Cash Position (Cumulative)	4680400	23596400	44462400	62978400	83844400	105460400	121976400	144042400	166558400	184474400	206990400	203006400	225522400	248038400	269354400

Years 3-15

Same as Year 2

Table 9. Farm Level Analysis, Tara With Project (cfa)
 Year 1, 0.32 ha. Rainy Season
 Years 2-12, 0.4 ha. Double-Cropped

YEAR	1	2	3	4	5	6	7	8	9	10	11	12
REVENUES												
Revenue From Paddy	62720	156800	156800	156800	156800	156800	156800	156800	156800	156800	156800	156800
Revenue From Rice	45180	129060	137160	161280	177480	177480	201600	201600	225720	225720	225720	225720
Revenue From Hulls	3940	11260	11960	14080	15480	15480	17600	17600	19720	19720	19720	19720
TOTAL REVENUE RICE	111840	297120	305920	332160	349760	349760	376000	376000	402240	402240	402240	420240
Revenue From Plowing	15518	24000	24000	24000	24000	24000	24000	24000	24000	24000	24000	24000
Revenue from Selling Oxen	400000	-0-	-0-	400000	-0-	-0-	400000	-0-	-0-	400000	-0-	-0-
Revenue From Transport	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
TOTAL REVENUE RICE AND OXEN	587358	381120	389920	816160	433760	433760	860000	460000	486240	886240	486240	486240
FEES PAID TO COOP												
a) Production Inputs	5794	14486										
b) Pump/Perimeter	10000	17500										
c) Management	7200	13200										
d) Amort/Provi. Fnd	5652	15300										
Plowing Fee	6400	16000										
Animal Traction Costs												
Replace. Equipment	-0-	-0-	-0-	-0-	-0-	180000	-0-	-0-	-0-	-0-	-0-	-0-
Replacement Oxen	120000	-0-	-0-	120000	-0-	-0-	120000	-0-	-0-	120000	-0-	-0-
Hulling Fees	3360	9600	10200	12000	13200	13200	15000	15000	16800	16800	16800	16800
Total Costs to Farmer Without Oxen	38406	86086	86686	88486	89686	89686	91486	91486	93286	93286	93286	93286
Total Costs to Farmer With Oxen	146354	70086	70686	192486	73686	253686	195486	75486	77286	197286	77286	77286
FARM FAMILY NET BENEFIT:												
Without Oxen	73434	211034	219234	243674	260074	260074	284514	284514	308954	308954	308954	308954
With Oxen	441004	311034	319234	623674	360074	180074	664514	384514	408954	688954	408954	408954

Years 3-12 same as year 2

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Table 10. Farm Level Analysis - Tara Without Project
 .32 Ha. Rainy Season, .16 Ha. Dry Season Per Farmer (cfa)

Year	1	2	3	4	5	6	7	8	9
REVENUE									
Revenue From Paddy	94080	94080	94080	94080	94080	94080	94080	94080	94080
Revenue From Rice	67680	72540	72540	77400	77400	77400	77400	77400	67680
Revenue From Hulls	5920	6340	6340	6760	6760	6760	6760	6760	5920
TOTAL REVENUE RICE	167680	172960	172960	178240	178240	178240	178240	178240	167680
Revenue From Plowing	23277	23277	23277	23277	23277	23277	23277	23277	23277
Revenue From Selling Oxen	400000	-0-	-0-	400000	-0-	-0-	400000	-0-	-0-
Revenue From Transport	60000	60000	60000	60000	60000	60000	60000	60000	60000
TOTAL REVENUE RICE AND OXEN	650957	256237	256237	661517	261517	261517	661517	261517	250957
FEES PAID TO COOP.									
a) Production Inputs	9076	9076	9076	9076	9076	9076	9076	9076	9076
b) Pump/Perimeter	38400	38400	38400	38400	38400	38400	38400	38400	38400
c) Management	8160	8160	8160	8160	8160	8160	8160	8160	8160
d) Amortization/ Provisional Fund	11300	11300	11300	11300	11300	11300	11300	11300	11300
Plowing Fee	9600	9600	9600	9600	9600	9600	9600	9600	9600
Animal Traction Costs									
Replacement Equipment	-0-	-0-	-0-	-0-	-0-	180000	-0-	-0-	-0-
Replacement Oxen	120000	-0-	-0-	120000	-0-	-0-	120000	-0-	-0-
Hulling Fees	5040	5400	5400	5760	5760	5760	5760	5760	5040
TOTAL COSTS TO FARMER WITHOUT OXEN	81576	81936	81936	82296	82296	82296	82296	82296	81576
TOTAL COSTS TO FARMER WITH OXEN	191976	72336	72336	192696	72696	252696	192696	72696	72976
FARM FAMILY NET BENEFIT:									
Without Oxen	86104	91024	91024	95944	95944	95944	95944	95944	86104
With Oxen	458981	183901	183901	468821	188821	8821	468821	188821	177981

2. Poultry Production Component

a) Present Status of Poultry Production in Tara

The poultry project comprises two interdependent but distinct parts: the Central Station, in which table eggs are produced for sale and which can provide training, veterinary and other technical services for the cooperative members; and the members' poultry houses, which will produce and sell both fertilized eggs to improve the local breed and table eggs.

Central Station

- (1) The Central Station was completed in March of 1981. Two houses were stocked with a total of 596 leghorn hens in July. On the Station site there is a building for the guard and a 6000-liter water tank. The water tank is serviced by a submerged pump in a large diameter well. Several standpipes have been set up to serve the villagers near the Station. A generator provides electricity for the Station. The Station site is enclosed by wire fencing and 1500 trees have been planted around the perimeter of the Station to act as a windbreak and to provide shade. Personnel on the Station include a guard, one workman, a poultry production and health specialist, and a poultry technician, the latter two assigned by the Livestock Service of the Department of Agriculture.
- (2) Forty women underwent a six-month training course that ended on February 28, 1982. The women were given a practical course in animal health and poultry production. These women are the first members of the cooperative. Two groups of 40 women each are to be trained under the project.
- (3) The Station is meant to be self-sustaining through the sale of eggs and meat. The hens are presently bought from Service d'Elevage at the age of 5-6 months for 1250 CFA each and begin producing at the age of 6 months. After one year of egg production, the hens are culled from the flock and sold for meat for about 1400 CFA each. The hens consume an average of 100 grams per hen per day. Consumption can rise as high as 130 grams per hen during the hot season, and as low as 80 grams per hen per day during the cold season. Feed costs 100,000 CFA per ton.

Production at the Station from July 1981 through March 1982 was 71,732 eggs. The eggs were marketed by the cooperative using the one-ton:pick-up that is presently being shared with the fishery cooperative. After breakage, a total of 69,711 eggs were marketed as follows: 19,979 in Tara, 27,428 in Gaya, and 22,304 in Dosso. The cooperative received 25 CFA per egg for total revenues of 1,742,775 CFA.

Cooperative Production and Extension Activities

The cooperative members, having been trained in poultry production, will divide into four Groupements Mutuels de Production (GM) of ten members each. Each GM will have a 30 m² chicken house containing 400 hens and 40 cocks. The cooperative members contributed 6000 mud bricks as a self-help contribution to the construction of the four houses. The cost of the four houses, including fencing, is 1,930,750 CFA. Once the houses are completed, the cooperative will be given credit in kind to be repaid within one year. This credit includes 400 hens and forty cocks valued at 1250 CFA each, for a total value of 550,000 CFA, and four tons of feed, at 100,000 CFA per ton, for a total value of 400,000 CFA. Thus the average credit per GM is 237,500 CFA. The women will be responsible for making the feed and watering troughs and for vaccinating the chickens as required.

b) Poultry Production Under the Project

Central Station

The Central Station will continue to produce unfertilized eggs for sale in Dosso, Gaya and Tara. It is estimated that 118,260 eggs will be produced per year. This figure is based upon a 60% laying rate and allows a 20% mortality rate evenly distributed over the year of production. This is a conservative estimate as the mortality rate for the first six months was 3.6% for one house and 8.2% for the other house. Eggs will be sold in Tara and Gaya at 30 CFA per egg and in Dosso at 35 CFA per egg.

The Central Station will continue to train women in poultry production and to provide necessary support services to the cooperative members.

In relation to the activities of the cooperatives, the poultry expert at the Station must determine the rate of fertility of the eggs before the sales begin. In addition, the expert will oversee the chick-raising required to maintain the hen population in the members' poultry houses and on the Central Station. Chick-raising will begin in the second year of the project.

Cooperative Production and Extension Activities

Training is foreseen for two groups of 40 women each during the project. The cooperative will produce fertilized eggs that will be sold at the Station. Those who buy the eggs will place them under their own hens. The birds that hatch will then breed with the rest of the flock, resulting in an improved, cross-bred flock.

This strategy is meant to overcome some of the deficiencies of "operation coq," a scheme in which the large-scale distribution of purebred roosters was intended to improve the local breed of chickens. Though in effect since 1974 in Niger, this project has not been successful due to the expenses of raising and distributing the roosters and to the difficulties that the animals had in adjusting to the various environments.

Initially, each cooperative member will receive credit in the form of ten hens, one rooster, and feed. By the end of eight years, the cooperative--in cooperation with the Central Station--will provide themselves with enough chicks to maintain the population of their poultry houses.

The price of the fertilized eggs will be determined in the COTEDEP meeting with the Sous-Prefet of Gaya, but is expected to be 40 cfa per egg.

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c) Benefits to Poultry Production

The revenues accruing to the investments in the poultry production aspect of the project are listed in Tables 13 and 14. The initial costs of construction and providing the Station and cooperative members with equipment and supplies cause a highly negative net benefit in the first year that is only slowly compensated for due to the gradual participation of the women in the cooperative. The inputs of the project at this stage of cooperative development are considered essential to its continued existence. Without the project, production on the Station would stop and members would not receive the supplies necessary to carry on production activities. The provision of the chick-hatching and raising facilities is especially crucial to the financial viability of the cooperative. Without these facilities, the cooperative would have to keep buying chicks in Niamey. The equipment and supplies of the poultry unit serve functions other than production, though their value in training and demonstration has not been included in the analysis.

In examining the financial viability of the cooperative, it is assumed that the members each put in the equivalent of one full day of work per week in production activities, and that the shadow price of their labor is 300 CFA per day. The surplus that thus accumulates to the cooperative is 6,468,035 CFA at the end of the project year 3, after covering their costs. By the end of year 12, the cooperative will have 9,298,325 CFA (see Table 12).

The economic rate of return was calculated by discounting the incremental net benefits, shown in Table 11, and was determined to be 7.63%.

Table 11. Poultry Production Economic Analysis
(cfa)

YEAR	1	2	3	4	5	6	7	8	9	10	11	12
Total Revenue, Members	3214750	6757095	6757095	6757095	6757095	6757095	6757095	6757095	6757095	6757095	6757095	7261095
Total Revenue, Station	4414930	1975435	4414930	4414930	4414930	4414930	4414930	4414930	4414930	4414930	4414930	5170931
TOTAL REVENUES	7629680	8732530	11172025	11172025	11172025	11172025	11172025	11172025	11172025	11172025	11172025	12432026
Feed Costs, Members	1314000	3178000	3728000	3728000	3728000	3728000	3728000	3728000	3728000	3728000	3728000	3728000
Feed Costs, Station	1971000	1865300	2796000	2796000	2796000	2796000	2796000	2796000	2796000	2796000	2796000	2796000
Bldg Const, Members	2000000	2000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Bldg Const, Station	1000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Start-up Birds	1300000	1100000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Purchase Fert. Eggs	-0-	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
Medicine, Supp, Mem.	93600	237200	287200	287200	287200	287200	287200	287200	287200	287200	287200	287200
Med, Supplies, Station	140400	149100	215400	215400	215400	215400	215400	215400	215400	215400	215400	215400
Hatch. Equip. & Supp.	450000	-0-	-0-	-0-	-0-	300000	-0-	-0-	-0-	-0-	-0-	-0-
Residence	5000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Marketing Stalls	1000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Salaries	190000	190000	190000	190000	190000	190000	190000	190000	190000	190000	190000	190000
Fuel, Oil for Vehicle/Generator	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Mainten. Bldgs/Equip	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000
Vehicles	2800000	-0-	-0-	-0-	-0-	-0-	2800000	-0-	-0-	-0-	-0-	-0-
Veh. Maint/Repair	-0-	280000	280000	280000	280000	280000	-0-	280000	280000	280000	280000	280000
Training	504000	504000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL COSTS	19063000	10902680	8886600	8886600	8886600	9186600	11406600	8886600	8886600	8886600	8886600	8836600
IRR = 7.63%												
Cash Flow, Incremental Net Benefit	(11433320)	(2170150)	2285425	2285425	2285425	1985425	(234575)	2285425	2285425	2285425	2285425	3595426

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Table 12. Poultry Cooperative Financial Analysis*

(cfa)

YEAR	1	2	3	4	5	6	7	8	9	10	11	12
<u>OPERATING COSTS</u>												
Vehicle Maintenance	-0-	280000	280000	280000	280000	280000	280000	280000	280000	280000	280000	280000
Feed	-0-	3043300	6524000	6524000	6524000	6524000	6524000	6524000	6524000	6524000	6524000	6524000
Start-up Birds, Station	1300000	1100000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Medical Supplies	234000	386300	502600	502600	502600	502600	502600	502600	502600	502600	502600	452600
Replacement Equipment	-0-	-0-	-0-	-0-	-0-	300000	-0-	-0-	-0-	-0-	-0-	-0-
Fertilized Eggs	-0-	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
Salaries	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
Fuel, Oil	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Maint. Bldgs/Equipmt	-0-	-0-	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000
Vehicle Payments	-0-	-0-	-0-	-0-	-0-	-0-	800000	637784	637784	637784	637784	-0-
TOTAL COSTS	2594000	5959600	8456600	8756600	8756600	9056600	9276600	9394384	9394384	9394384	9394384	8706600
TOTAL REVENUE	7629680	8732930	11172025	11172025	11172025	11172025	11172025	11172025	11172025	11172025	11172025	12432026
CASH FLOW	5035680	2772930	2715425	2415425	2415425	2116025	1895425	1777641	1777641	1777641	1777641	3725426
Accumulated Surplus**	4411680	5624610	6468035	7011460	7554885	7798910	7822335	7727976	7633617	7539258	7444899	9298325

*Leaves out project expenses of: (a) Salaries: 130000 CFA/year and cost of first vehicle; (b) Construction: Kiosk, Residence, member's chicken houses and chick-raising houses; and (c) feed and medicine.

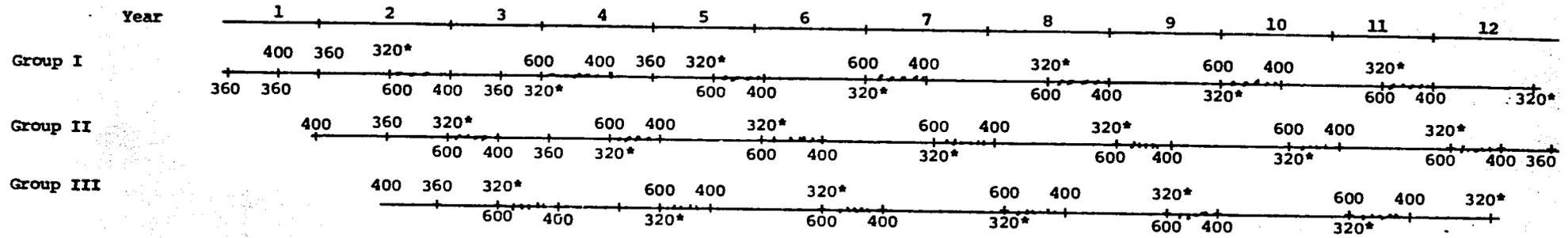
**After subtracting value of members' labor (1 day per week per member at 300 CFA per day).

l/h

Table 13. Central Station Production

	600	480* 600	500 480*	600	480*	600	480*	600	480*	600	480*	600	480*	600	540
Hens producing eggs			600		480*	600	480*	600	480*	600	480*	600	480*	600	480*
Chick-raising		900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600	900 600
Year	1	2	3-11	4	5	6	7	8	9	10	11	12			
Ave # Laying Flock	540	285	540												540
# Eggs Laid (Ave Flock 365 x .6)	118260	62415	118260												118260
# Non-layers	-0-	750	750												750
# Birds Bought Start-up @ 1250 cfa	600	-0-	-0-												-0-
# Birds Sold (Culled at 1-1/2 year)	480	-0-	480												1020
# Chicks Hatched To Raise	-0-	1800	1800												1800
Fertilized Eggs Used to Hatch (Bought)	-0-	2000	2000												2000
Eggs Sold For Eating	118260	62415	118260												118260
Feed for Layers (kg)	19710	10403	19710												19710
Feed, Non-layers (kg)	-0-	8250	8250												8250
<u>REVENUE</u>															
Sale 67% Eating Eggs @ 30 CFA/egg	2377020	1254540	2377020												2377020
Sale 33% Eating Eggs @ 35 CFA/egg	1365911	720895	1365911												1365911
Sale Birds @ 1400 CFA	672000	-0-	672000												1428000
<u>COSTS</u>															
Feed, Non-Layers	-0-	825000	825000												825000
Feed for Layers	1971000	1040300	1971000												1971000
Start-up Birds	750000	-0-	-0-												-0-
Fertilized Eggs	-0-	90000	90000												90000
Medicine, Oth. Supps.	140400	149100	215400												215400

* No. of birds culled and sold



Year	1	2	3-11	12
Ave # laying flock	360	720	720	
#Eggs laid (Ave flock 365 x .55)	72270	144540	144540	720
Ave # Non-layers raised	-0-	500	1000	144540
#Birds brought for Start-up	440	880	-0-	500
#Birds sold	320	640	640	-0-
#Chicks hatched to raise	-0-	1200	2400	1000
#Eggs used to hatch	-0-	1335	2670	
Eggs sold for hatching	36135	96360	96360	1200
Eggs sold for eating	36135	48180	48180	1335
Feed for layers (kg)	13140	26280	26280	96360
Feed, non-layers (kg)	-0-	5500	11000	48180
REVENUE				
Fertilized eggs @ 45	1626075	4336200	4336200	
67% Table eggs @ 30	726300	968430	968430	
33% Table eggs @ 35	417375	556465	556465	
Selling Birds @1400	448000	896000	896000	
COSTS				
Feed, Non-layers	-0-	550000	1100000	
Feed for layers	1314000	2628000	2628000	550000
Start-up Birds @1250	550000	1100000	-0-	2628000
Cooperative bldgs.	2000000	2000000	-0-	-0-

*(no. of birds culled and sold)
 1/3 day old pullets are culled before reaching laying house - 2 layers require 3 sexed pullets or 6 straight run chicks
 Layers consume 100 grams per day.
 Pullets consume 11 kilograms up to maturity.
 assumes 10% loss before hatching
 assumes 20% mortality over year of production

Table 14. Cooperative Members Production

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3. Fish Production Component

a) Present Status of Fish Production in Tara

Fishing is most productive during the period of low water from April through August. Between September and February, the catch is greatly diminished due to the dispersion of the fish population among the flooded areas along the river (see Figure 1). However, as this is the spawning season, the lull in fishing activity allows the fish population to re-establish itself. During much of this period, the fishermen are preoccupied with cultivating their own fields. Thus, the fishing serves as a source of cash income complementing their dry land subsistence farming.

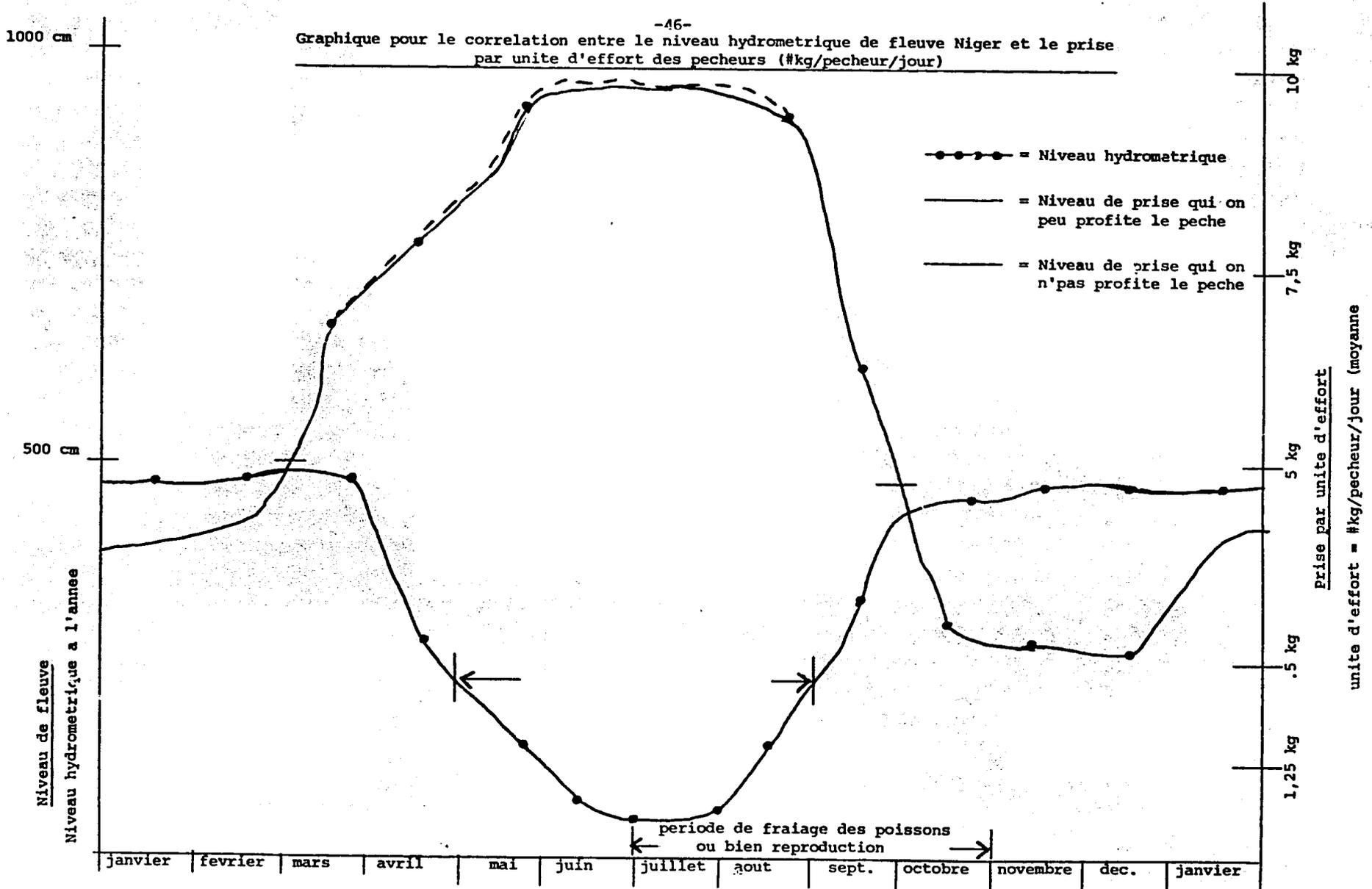
Under the Tara Project, twenty fishermen were trained, supplied with fishing equipment, and organized into a cooperative. Cooperative buildings were constructed, including an office, freezer room, and smoking/drying facilities. A generator runs two freezers and an ice machine.

The fishermen bring in their catch in the morning. The fish are divided into first and second quality and then weighed. The individual's catch is registered and the fish are frozen. When enough fish have been collected, they are removed from the freezers and placed with blocks of ice into an insulated container on the back of the cooperative pick-up. The fish are then taken to Gaya and Dosso.

The catch is generally 10% to 20% first quality and 80% to 90% second quality. First quality fish are sold for 500 CFA per kilogram and second quality fish are sold for 350 CFA. The prices for fish have been set in Departmental meetings (COTEDEP) of the local technicians and the Sous-Prefet. It has been the impression of those involved in the project that fish can demand a higher price in the local markets, especially Dosso. Accordingly, efforts are being made to allow the fish to be sold at a price more in line with the demand for fish.

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Graphique pour le corrélation entre le niveau hydrométrique de fleuve Niger et le prise par unite d'effort des pecheurs (#kg/pecheur/jour)



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Fishing began in July 1981. In seven months the members of the cooperative sold fish for a value of 1,780,391 CFA, which enabled them to make their payments to CNCA and to begin covering operating and maintenance costs. The cooperative is already paying its operating costs for the refrigeration unit and for transporting the fish to market.

b) Fish Production Under the Project

Production and marketing procedures will remain substantially the same. In order to make more efficient use of the present infrastructure, two more groups of 40 fishermen will be trained in each of the first two years of the project. To provide adequate storage capacity, two freezers will be purchased in Year 2 of the project, along with replacements for the present scales and generator. Marketing outlets will be built in Gaya and Dosso for use by the fishery and poultry cooperatives.

c) Benefits to Fish Production

The analysis presented in Table 15 assumes fifty fishermen fishing in Year 1 and eighty fishermen fishing in Years 2-10. The average per day catch is 5.5 kilograms. Each fisherman fishes an average of 108 days per year. It is assumed that 90% of the fish is second quality and is sold at 350 CFA per kilogram and that 10% is first quality fish sold at 500 CFA per kilogram.

Costs include replacement of capital equipment; repair and maintenance of buildings; generator and vehicle; one-half the cost of construction of market stalls in Gaya and Dosso (shared with the poultry cooperative); fuel and oil for the vehicle and the generator; and the chauffeur's salary.

It is assumed that without the project the twenty fishermen presently in the cooperative would use the equipment through the fourth year, after which most of it would be unusable. During the first four years those who would have participated in the project will be considered to be using traditional methods

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of fishing. They will be joined by the original twenty in the fifth year. It is assumed that the catch will average 1.5 kilograms per fisherman per day. The fish would be sold on the local market or consumed by the fishermen's families and has been valued at 100 CFA per kilogram. (see table 16)

The economic rate of return to the fish production project is 23.66%. To test the stability of this return, sensitivity analyses were carried out assuming increases in the two major cost components: cooperative equipment and fuel and oil. A 20% increase in the costs of cooperative equipment resulted in a drop of the rate of return to 16.34%. A 20% increase in fuel and oil led to a rate of return of 16.48%. Neither of these results would compromise the profitability of the project.

Table 18 is an analysis of the financial viability of the cooperative for the individual members. Once the cooperative has paid all expenses, the balance is that due to the members. The balance is divided by the number of cooperative members to give annual cooperative member income, which ranges from 12,764 CFA to 84,079 CFA. Assuming 108 fishing days per year, the return per day of labor ranges from 118 CFA to 779 CFA per day. The average return over ten years is 425 CFA per day. This income is, as mentioned above, supplemented by the dry land farming activities of the fishermen during the rainy season, a period of relatively poor fishing.

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YEAR	Table 15. Tara Fish Production With-Project Economic Analysis (cfa)									
	1	2	3	4	5	6	7	8	9	10
Number of Fishermen	50	80	80	80	80	80	80	80	80	80
Kilograms fish caught (5.5/day x 10E days/man)	29700	47520	47520	47520	47520	47520	47520	47520	47520	47520
TOTAL REVENUE	10840500	17344800	17344800	17344800	17344800	17344800	17344800	17344800	17344800	17344800
<u>COSTS</u>										
Equipment, individual coop. mems., initial purchase	6000000	6000000	6000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Annual upkeep/replacement	1000000	2500000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000
Training	1400000	1400000	-0-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
<u>Cooperative Equipment</u>										
Canoe with outboard (3 yrs)	-0-	-0-	400000	-0-	-0-	400000	-0-	-0-	400000	-0-
Car (4 years)	-0-	-0-	-0-	2800000	-0-	-0-	-0-	2800000	-0-	-0-
Generator (5 years)	-0-	4000000	-0-	-0-	-0-	-0-	4000000	-0-	-0-	-0-
Ice Machine (4 yrs)	-0-	-0-	-0-	3000000	-0-	-0-	-0-	3000000	-0-	-0-
Freezers (4 years)	-0-	496000	-0-	496000	-0-	496000	-0-	496000	-0-	-0-
Scales	-0-	140000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
<u>Repair/Maintenance of Infrastructure, Vehicle</u>	600000	600000	600000	600000	600000	600000	600000	600000	600000	600000
<u>Construction</u>										
Market Stall	1000000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
<u>Vehicle/Generator Operation</u>										
Fuel and oil	2603186	5206364	5206364	5206364	5206364	5206364	5206364	5206364	5206364	5206364
<u>Salaries</u>										
Chauffer	520000	520000	520000	520000	520000	520000	520000	520000	520000	520000
TOTAL COSTS	13123182	20862364	10726364	16622364	10326364	11222364	14326364	16622364	10726364	10326364
Net Benefit	(2282682)	(3517564)	6618436	722436	7018436	6122436	3018436	722436	6618436	7018436

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Table 16 Tara Fish Production Without-Project Economic Analysis (cfa)

YEAR	1	2	3	4	5	5	7	8	9	10
<u>REVENUE - TOTAL</u>	4867200	5398200	5398200	5398200	1416000	1416000	1416000	1416000	1416000	1416000
20 Fishermen, 5.5 kg 4 kg, 3 kg, 3 kg, Yr.1-4	4336200	4336200	4336200	4336200	-0-	-0-	-0-	-0-	-0-	-0-
30 Fishermen traditional @ 1.5 kg/day Yr 1 @100 CFA/kg	531000	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
60 Fishermen traditional @ 1.5 kg/day Yr 2,3,4	-0-	1062000	1062000	1062000	-0-	-0-	-0-	-0-	-0-	-0-
80 Fishermen traditional @ 1.5 kg/day Yr 5-10	-0-	-0-	-0-	-0-	1416000	1416000	1416000	1416000	1416000	1416000
<u>COSTS - TOTAL</u>	3323182	3323182	3323182	3323182	-0-	-0-	-0-	-0-	-0-	-0-
Gas, Oil, Diesel	2603182	2603182	2603182	2603182	-0-	-0-	-0-	-0-	-0-	-0-
Chauffer	520000	520000	520000	520000	-0-	-0-	-0-	-0-	-0-	-0-
Supplies	200000	200000	200000	200000	-0-	-0-	-0-	-0-	-0-	-0-
<u>NET BENEFIT</u>	1544018	2075018	2075018	2075018	1416000	1416000	1416000	1416000	1416000	1416000

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Table 17. Benefits to Fish Production in Tara

YEAR	1	2	3	4	5	6	7	8	9	10
Net Benefit with project	(2282682)	(3517564)	6618436	722436	7018436	6122436	3018436	722436	6618436	7018436
Net Benefit Without Project	1544018	2075618	2075018	2075018	1416000	1416000	1416000	1416000	1416000	1416000
Incremental Net Benefit	(3826700)	(5592586)	4543418	(1352582)	5602436	4706436	1602436	(693564)	5202436	5602436

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Table 18. Financial Analysis - Fisheries Cooperative

Year	1	2	3	4	5	6	7	8	9	10
<u>REVENUE</u>	10840500	17344800	17344800	17344800	17344800	17344800	17344800	17344800	17344800	17344800
<u>TOTAL COSTS</u>	6636533	12653007	14315331	16323674	14409722	12654541	13930109	13930109	13930109	13930109
Net Revenue	4203967	4691733	3029469	1021126	2935078	4690259	3414691	3414691	3414691	3414691
Per Cooperative Member	84079	58647	37868	12764	36688	58628	42684	42684	42684	42684
Per Day Return (108 days per year)	779	543	351	118	340	543	395	395	395	395
<u>COSTS</u>										
<u>Equipment</u>										
Canoe	-0-	-0-	162264	162264	162264	162264	162264	162264	162264	162264
Car	-0-	-0-	-0-	892897	892897	892897	892897	892897	892897	892897
Generator	-0-	-0-	-0-	-0-	-0-	-0-	1275568	1275568	1275568	1275568
Ice Machine	-0-	-0-	-0-	956676	956676	956676	956676	956676	956676	956676
Freezers	-0-	-0-	-0-	158170	158170	316340	316340	316340	316340	158170
<u>Fuel and Oil</u>	2603182	5206364	5206364	5206364	5206364	5206364	5206364	5206364	5206364	5206364
<u>Repairs/Maintenance</u>	600000	600000	600000	600000	600000	600000	600000	600000	600000	600000
<u>Salaries</u>	520000	520000	520000	520000	520000	520000	520000	520000	520000	520000
<u>Cooperative Member Equipment</u>	1913351	3826703	3826703	3826703	1913351	-0-	-0-	-0-	-0-	-0-
<u>Repair/Replacement of Cooperative Member Equipment</u>	1000000	2500000	4000000	4000000	4000000	4000000	4000000	4000000	4000000	4000000

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B. Technical Analysis

1. The Problem

In spite of the achievements of the Tara Project, there remain several constraints to the development of self-sustaining cooperatives that are preventing the individuals of Tara from realizing the potential earnings in poultry, rice and fish production.

The basic constraints are: a) the poor state of present infrastructure, itself due in part to the lack of data required for adequate design and planning, and b) the skills necessary for individual and cooperative development are weak.

a) Due to a combination of faulty design and poor implementation of the contracts, the irrigation scheme, as it has been constructed, is not producing on 140 hectares of land as called for in the original plans. The pump station does not have adequate access to river water during 1 - 3 months of the dry season. This has constrained production during the dry season to 40 hectares. In addition, rainy season production is limited to 80 hectares due to the presence of high and low areas within the perimeter.

In combination with oversights in design and construction, inadequate maintenance has greatly accelerated wear on the pump installation. Additional damage has occurred in the process of moving 2 pumps down to the river to gain access to water in the dry season.

The Station must be redesigned and equipment adequately provided for to assure that a full 100 hectares are cropped in both the rainy and dry season. The permanent solution to the problem is under study by ONAHA in consultation with a World Bank engineering team.

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b) Lack of experience in large-scale production and commercialization in the Tara area reduces the efficiency of the newly organized cooperatives. The rice cooperative is the oldest cooperative at Tara and consists of 256 members. It is well organized and has been functioning since 1979. Poultry, fish and artisans cooperatives are small and relatively recently organized, consisting of 40, 20, and 12 members respectively. These numbers are too small for the cooperatives to become self-sustaining. Over the next three years, these numbers are expected to increase to 120 for poultry; 80 for fish; and 18 for artisans. Cooperative members must be technically trained in the production of their commodities. Training is coordinated with the government extension service by Union Nigerienne de Credit et de Cooperation, UNCC. Members must also be trained in the operation and management of the cooperative. Training in functional literacy enables the members to participate fully in the activities of the cooperative. Because the majority of the cooperative members have little experience in large-scale marketing techniques, assistance in bulk storage, transportation and marketing must be provided. This training and assistance will allow the members to manage their own cooperatives without further government or private assistance.

2. Niger Government Efforts in Cooperative Development

One of the factors which will determine the success of agricultural development in Niger is the establishment of farmer organizations at the village level. The agency responsible for farmer organization is the Union Nigerienne de Credit et Cooperation (UNCC). The UNCC is a semi-public agency with an autonomous administration responsible to the Ministry of Rural Development. It has an Administrative Council composed of 20 members and a

director appointed by the Council of Ministers. Its functions as determined by law in 1967 are as follows:

1. Promote the establishment of cooperatives and training their representatives;
2. Aid the cooperatives in marketing their production and supplying inputs;
3. Furnish technical assistance to the cooperatives; and
4. Manage hydro-agricultural and other government projects.

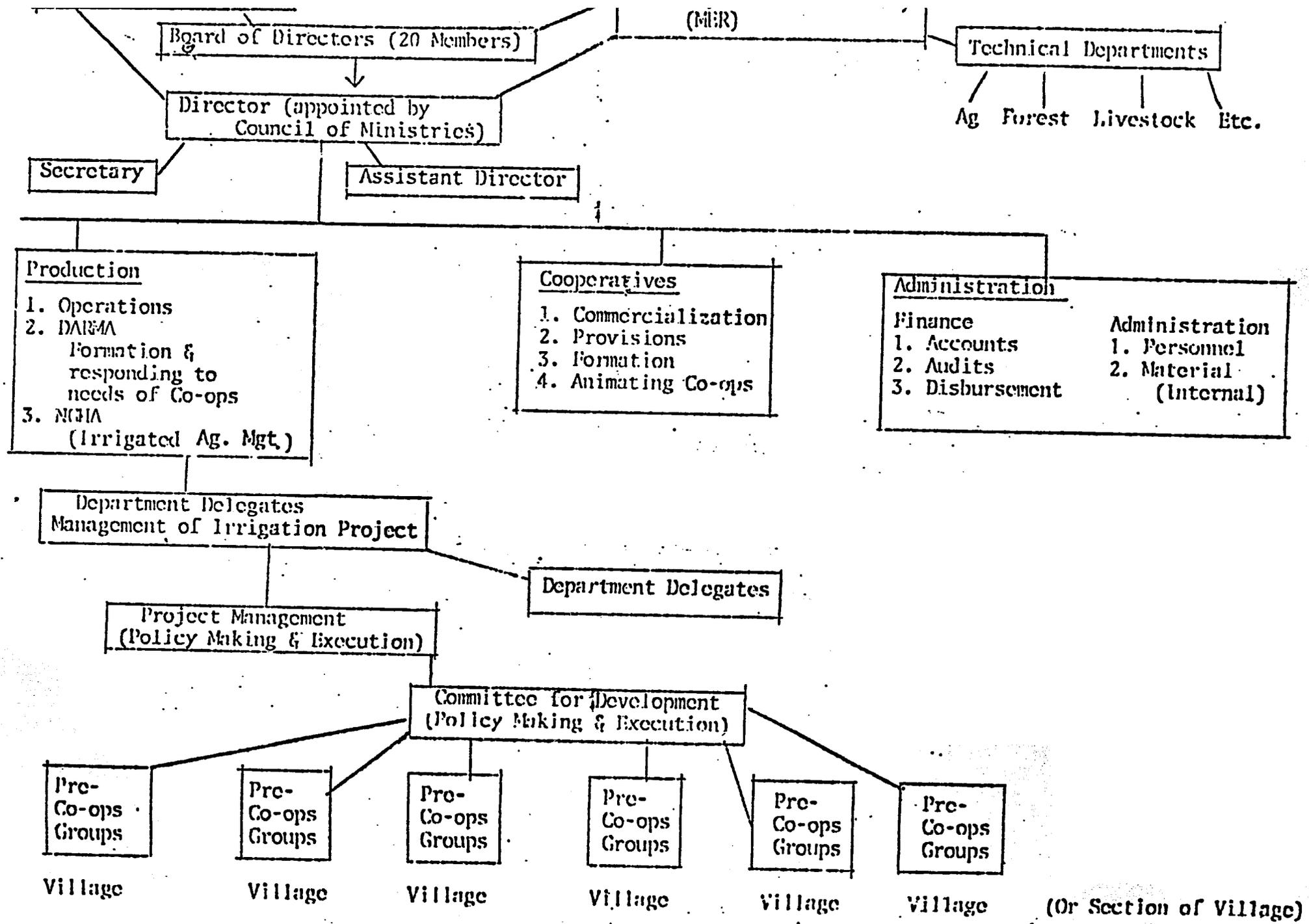
The UNCC has three divisions. These are: administration, cooperatives, and production. The production division has major responsibility for production activities in projects such as Tara. The organizational structure relating to Tara can be seen on the attached organizational chart.

The role that UNCC plays in this project is an extremely important one. It is responsible for the communications between the Government and the farmer. Its function begins by establishing dialogue between the farmer and the Government in which the project is explained to the farmers and the farmers in turn voice their opinions and concerns regarding their participation.

UNCC continues the process of identifying the farmer's needs and provides support, training, and management until the farmers are capable of managing the project on their own. UNCC was organized uniquely for the purpose of aiding farmers to take advantage of technological change and has proven highly effective in similar projects.

UNCC is responsible for training the farmers to cultivate and manage their fields, forming cooperatives of the farmers and training them in the function and operation of cooperatives, training the farmers in the marketing

of their crops, and providing credit and the collection of debts for agricultural equipment and supplies.



3. Credit

Credit is a key component of the integrated approach to rural development. Under Phase I, credit to the cooperatives, through loan guarantees, supplied production inputs to the individual participants. Funds are advanced to the cooperatives through La Caisse Nationale de Credit Agricole (CNCA) and L'Union Nigerienne de Credit et de Cooperation (UNCC). UNCC is responsible for assisting the cooperatives in the marketing of their products and the collection of the loans from the farmers. During Phase I, loans were backed by the project for the purchase of a rice dehuller for farmers; animal traction units, seeds, fertilizers, tools; fishing equipment and supplies for the fishermen; chickens and chicken feed.

The farmers have repaid their loans as follows: first harvest, 84%; second harvest, 98%; third harvest, 93.5%; and fourth harvest, 57%. Data is incomplete for the fifth and sixth harvests. Under Phase II, newly organized fish, poultry and artisans cooperatives will receive credit for production inputs. The cooperatives train the participants in the use and operation of credit systems before credit is extended.

4. Rice Cooperative

The base of the UNCC organization is formed of mutuals (G.M.P.). Several mutuals make up a cooperative. At the mutual level, farmers elect a President, Secretary and 5 delegates. The officers, together with a UNCC agent, establish an office. The 7 people elected from each mutual together form an assembly at the Coop level. They then elect a President, Secretary and Treasurer who is assisted by the UNCC Director of the irrigation project. Production decisions and credit needs are identified with help from UNCC agents. The combined needs of the several mutuals are reviewed and agreed upon by the Cooperative Assembly.

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Credit requests are then passed on to the national level where they are approved and transmitted to the National Agricultural Development Bank. Responsibility for repayment rests with the Cooperative.

Agricultural extension and management of water are also functions performed by the mutuals. Subgroups of the mutual are determined, usually by the geographical location in the irrigation area and by water distribution systems. One farmer of these subgroups is chosen to receive special training in the new production. He is responsible for informing the other farmers of the new methods.

In addition, the farmers in a group will elect one man to be responsible for equitable distribution of water in his area. Problems and disputes are therefore the concern of the farmer's group, reducing management problems for the UNCC.

Although this system does not eliminate the need for management and extension personnel, it does reduce the numbers required. Thus, the concentration of government officials at the production level is less and grassroots decision-making is enhanced.

The rice cooperative has a multi-purpose center which was constructed and furnished under Phase I. It consists of office space for project personnel, classrooms, storage facilities, library, and health rooms. Planning for the expected increase in rice yields requires that additional transportation and dehulling facilities be provided under Phase II. Maintenance and repair to the existing co-op center also will be supported under Phase II.

bk

5. Poultry Cooperative

The poultry project, which was recently initiated, will be an important means of increase in income for the women. Poultry production under Phase I consisted of training 43 women in improved techniques of poultry production. They were organized into a cooperative and received training in the management and operation of poultry cooperatives. The women were divided into mutuals of 10 members each. Each mutual made 150 sun-dried mud bricks which were used in the construction of the mutual's poultry house. Each woman received ten chickens and one cock for production of table eggs and for production of fertilized eggs. The fertilized eggs are to be sold to the villagers for hatching and cross-breeding with local stock. The chickens and feed were provided through credit from CNCA. The four houses were constructed by a mason. Under Phase II, 80 women will be trained in poultry production and organized into cooperatives. Eight poultry houses will be constructed and fenced. Shade trees will be planted. Basic supplies and equipment, including vaccines, will be provided.

The poultry station is the headquarters for the poultry cooperative. It consists of an office and two houses for egg production. The houses are fenced in and shade trees have been planted. The station is staffed with a poultry production specialist, a veterinary nurse, an aide, and a guard. The station produces eggs for sale; trains women in poultry raising techniques; and provides veterinary and other technical services to the cooperative members. Under Phase II the station will have the capability of producing baby chicks. A brooder house will be constructed and equipped with incubators and other appropriate equipment. Presently the station buys 5 - 6 month old chicks from the poultry service in Niamey. When the chickens reach 18 months of age, they are sold as meat and new chicks are purchased.

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6. Fisheries Cooperative

In March 1981, twenty fishermen were organized and trained in fish production and cooperative organization/management. (This training was scheduled to take place in 1979 in the original implementation plan, but was postponed until feasibility studies were completed in 1980.) In July 1981, the end of the training, each fisherman received on credit, guaranteed by the project, basic fishing equipment, a boat and a small motor. Total catch for August registered under the cooperative equalled 1,672,200 kg. This was marketed in Tara, Gaya and Dosso. A fisheries cooperative building was constructed and furnished. Drying and smoking facilities were installed. Two freezers, an ice making machine and weighing scales were purchased.

The feasibility studies show there are 4,335 fishermen living along the river in Gaya District. Under Phase II, sixty new fishermen will be trained in fishing techniques and cooperative organization and management. Fishing equipment and supplies will be provided through credit. The Cooperative will receive additional equipment as necessitated by the increased production. Marketing studies will be conducted to determine preferences, prices and frequency of demands in Tara, Gaya and Dosso. Marketing Stalls in the Gaya and Dosso will be shared with the poultry cooperative.

7. Artisan Cooperative

The artisan cooperative was organized to respond to the needs generated by the national policy on intensive irrigated agriculture, and for animal traction equipment. Twelve villagers were trained as blacksmiths and

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trained in cooperative organization/management. The project guaranteed credit for the purchase of materials and supplies needed to make gardening tools, animal traction units, and transportation carts. The gardening tools used by the Tara rice farmers were purchased from the artisan cooperative. Seventy-three animal traction units used by the rice farmers were also purchased from the artisans. In addition to filling orders for the Tara project, the artisans cooperative fills orders placed by the GON for other irrigated agriculture schemes.

Under Phase II six additional artisans will be trained as blacksmiths and trained in cooperative organization/management. Credit will be guaranteed by the project for the purchase of materials and supplies.

C. Social Analysis

The social changes occurring in the Tara community are evidenced "in a great diversity of things and activities such as: increased food production, increased income, general appearance in homes and in the village, new buildings, new equipment and farm implements, greater disposable income and purchase of consumer goods, improvements in transportation and communications, improved services and labor-saving devices, general health conditions, a flurry of educational activities, attitudes and aspirations of the people, a general climate of hope throughout the village." This quote is from the Tara Evaluation Report July, 1981, by Baumgardner, et al.

"Before the Project the people of Tara seldom had enough to eat--not even an onion. Now they have plenty to eat --rice, millet, vegetables, goats and beef. This supply of abundant food is a direct result of the Project."

- Mr. Son Allah Bagna, Treasurer
Rice Farmers Cooperative

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The Tara Project means many things to many people. To some it means abundant food; to others it means enough money for the first time ever to purchase a radio or mobylette. To some it means a drink of clean water every day of the year; to others it means the elimination of the drudgery of manual tillage practices in the fields. To the women it means improved health care for their children. It means writing one's own name for the first time, doing arithmetic, improving the home, producing eggs, participating in local government. To all the villagers the Tara Project means hope and rising expectations.

Food shortages have ceased in Tara. Repeatedly, the evaluators heard from villagers that prior seasonal food scarcities had ended since the first rice harvest in 1979. Although it is difficult to quantify this statement, this fact is unquestionably the most important benefit of the agronomic component of the Tara Project.

Nutritious crops such as peanuts and okra remain a part of the local diet. Rice has been added but has not replaced these items in the local diet. Nutritional level of the community is further insured with the women's poultry production activities and the fishing co-op activities. The villagers learn of the National Economic Development Plans on the radio and feel a keen sense of participation in the development of Niger. The Tara project has demonstrated that there is a viable solution for a food-deficit country.

Project Tara is an example of local people taking the initiative to participate in their own development. Often, projects are viewed as positive only when they achieve technical or economic results, paying less attention to their social and psychological impact. Although most of the substantial social benefits cannot be measured in hard economic terms, there are many results of the Tara Project that are unambiguously constructive. It has

brought an appreciable increase in the productive capacity of farmers at Tara that buys valuable time in the race between food needs and population increase. Such effects simultaneously make continued rural development activities feasible without contributing to inflation. It has substantially increased incomes of Tara village families. It has infused a pervasive upsurge of confidence in the ability of farmers to improve their standard of living. It has resulted in much greater attention being given to agricultural development by the national government (the President of Niger has visited the project three times).

The project was a major factor in the reverse urban-to-rural migratory stream, wherein eighty farmers have returned to Tara Village reclaiming farm land. Farmers now realize that farming can be profitable and that it can repay capital invested in it at a very satisfactory rate. It has vastly improved the quality of life as evidenced by increased numbers of radios, bicycles, mobylettes, ox-carts, clothes, and house improvements. It has, of course, resulted in more land being cultivated, along with heightened awareness of the value of irrigated agriculture. Farmers now realize that the pathway to modernize food production capabilities begins with the application of modern science and hydro-technology to the problems of farming. Finally, the benefits brought about by the Tara Project are demonstrated through the interlocking cooperation of Niger government agencies (national, departmental, local), international funding agencies, and private donors. Through local initiative the Tara Village residents are introducing a new realism into general planning for development.

Quite apart from the food production components of the Project, another basic need, housing, had more or less been ignored in the original project design. The evaluation team found that inadequate housing was having a depressing effect on disposable farm income. A considerable portion of income received from the rice project must be used to repair housing following the torrential rains that are part of the climatic cycle. Just how large an amount was illustrated in the team's discussions with local farmers. One farmer estimated that last year, after debts were paid, his disposable income was about 123,200 CFA. Housing repair for the year had cost about 50,000 CFA, or 41% of the farmer's disposable income.

Some of these effects constitute objective gains already achieved -- the increased productive capacity of farmers at Tara, appreciable increases in farmer's income, new cooperatives formed, new patterns of organizational cooperation -- while others change the social, economic and political climate in ways that should facilitate additional gains in the future.

"I have followed closely and with keen interest the activities of the Tara Project. The effects of the Project on the villagers of Tara have been dramatic. Although there have been problems with some aspects of the Project, the benefits far outweigh the deficiencies. We must learn from our past experiences and make sure that the gains achieved at Tara in Phase 1 will not be lost. I will support the continuation of the Project (Phase 2) in every way available to me."

-Silimane Ganaua, Secretary General
Ministry of Rural Development

The evaluation team was impressed with the impact which Tara Project has had in the community of Tara as well as surrounding areas. Recognizing the time constraints of the study, the team feels that the following

conclusions can be defended and documented:

-- The Tara Integrated Rural Development Project has brought numerous measurable improvements in the lives of the people of Tara. These include improvements in quantity and quality of food, water, consumer goods (radios, mobylettes and bicycles, clothing), educational opportunities, health care, and economic well-being.

-- The Tara Project has provided the opportunity for the development and exercise of leadership among both the men and women of the village. This has been accomplished within the context of the GON's development plans and enjoyed strong, enthusiastic government support on both local and national levels.

-- Credit to farmers through the Rice Farmers Cooperative has been a successful endeavor and has had a remarkable educational and economic impact on those families participating in the credit opportunities.

D. Institutionalization of the Tara Project

One general concern of development projects is the extent in which activities are institutionalized within the local structure. At Tara this institutionalization has effectively taken place already. From the beginning the Tara project has been designed, in keeping with Africare policy, to involve a minimum of expatriate assistance. For the last few years there has been no resident expatriate staff at Tara. The project director, training positions and technical assistance in maintaining the pumping station have been provided by the GON. GON officials view the project as their own, directed by the Office National D'Aménagement Hydro-Agricole (ONAHA) administration, an institutional part of its development efforts. GON officials' reputation for honesty and prior experience in management of other irrigation projects add to the favorable climate. GON commitment has been shown in both the above-mentioned manpower, and also in financial contributions as well. This has been especially evident in the costly, time-consuming maintenance of the pumps.

The Tara Project requires the active participation of several Government services in the execution of the project. The coordination and communication is provided by the regional planning committee of Dosso Department (COTEDEP) thereby insuring the timely interventions of the different services. The regional planning committee determines market prices for the eggs, meat, and fish. Also it determines magnitude of project activities such as number of trainees, size of building construction and the amount of fees charged to the villagers.

Office National d'Aménagement Hydro-Agricole (ONAHA)

ONAHA is responsible for engineering design, including surveys and blueprints and physical construction either by contract with private (or government) construction firms or in-house. The construction of the pumping stations is to be contracted and the construction of all internal canals and dikes is to be done by ONAHA. (See Annex 3 - ONAHA Organization)

Public Works (Travaux Publics)

Public Works is responsible for preliminary surveys of the Gaya-Tara road and supervision of construction of work on the road.

Water and Forests Department (Including Game and Fish)

This Department is responsible for implementation of the fisheries component, except cooperative organization.

Livestock Service

This Service is responsible for the design and implementation of the poultry project except cooperative organization. It will also assist in the purchase and training of work oxen and is responsible for their health and care.

Animation

Animation is responsible for organizing villagers, introducing new concepts, conducting preliminary surveys and laying groundwork for other government services.

Adult Literacy

Adult Literacy is responsible for the organization of functional literacy programs, preparation of materials and conducting literacy courses.

Union Nigerienne de Credit et de Cooperation (UNCC)

UNCC is responsible for cooperative organization and development.

Institut Nationale de Recherches Agronomiques du Niger (INRAN)

INRAN is responsible for development of the field research station and producing cultural practices and systems for the area.

Agriculture

Agriculture is responsible for training farmers in new cropping techniques, and the overall coordination of all activities.

Africare

Africare performs a role of coordination and technical assistance in design, implementation and evaluation of project activities. Subgrants are made to the government services by the Project Director based on approved proposals and implementation plans and budget forecasts.

E. Coordination with Other Agencies and Other Donors

The Tara Project has always enjoyed a measure of support from other Agencies and Donors. Phase I was financially supported by:

Lilly Endowment
USAID
UMCOR
Kansas West Conference (Methodist)

World Vision
Ramapo College
Africare/New York Chapter
Government of Niger

U.S. Peace Corps has a Peace Corps Volunteer assigned to the fisheries sub-project.

The Project Director is an Agricultural Officer from the Department of Agriculture. The project is under the supervision of ONAHA. Technical support also comes from Public Works, Water and Forestry, Livestock, Animation, Adult Literacy, UNCC and INRAN.

This type of assistance and cooperation will be continued into Phase II.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact
Identification
and
Evaluation 2/

Impact Areas and Sub-areas 1/

A. LAND USE

- 1. Changing the character of the land through:
 - a. Increasing the population _____ N
 - b. Extracting natural resources _____ N
 - c. Land clearing _____ N
 - d. Changing soil character _____ N
 - 2. Altering natural defenses _____ N
 - 3. Foreclosing important uses _____ N
 - 4. Jeopardizing man or his works _____ N
 - 5. Other factors _____
- _____
- _____

B. WATER QUALITY

- 1. Physical state of water _____ N
 - 2. Chemical and biological states _____ N
 - 3. Ecological balance _____ N
 - 4. Other factors _____
- _____
- _____

1/ See Explanatory Notes for this form.

2/ Use the following symbols:

- N - No environmental impact
- L - Little environmental impact
- M - Moderate environmental impact
- H - High environmental impact
- U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

- 1. Air additives _____ N
- 2. Air pollution _____ N
- 3. Noise pollution _____ N
- 4. Other factors _____

D. NATURAL RESOURCES

- 1. Diversion, altered use of water _____ L
- 2. Irreversible, inefficient commitments _____ N
- 3. Other factors _____

E. CULTURAL

- 1. Altering physical symbols _____ N
- 2. Dilution of cultural traditions _____ N
- 3. Other factors _____

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns _____ L
- 2. Changes in population _____ N
- 3. Changes in cultural patterns _____ N
- 4. Other factors _____

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

- 1. Changing a natural environment _____ L
- 2. Eliminating an ecosystem element _____ N
- 3. Other factors

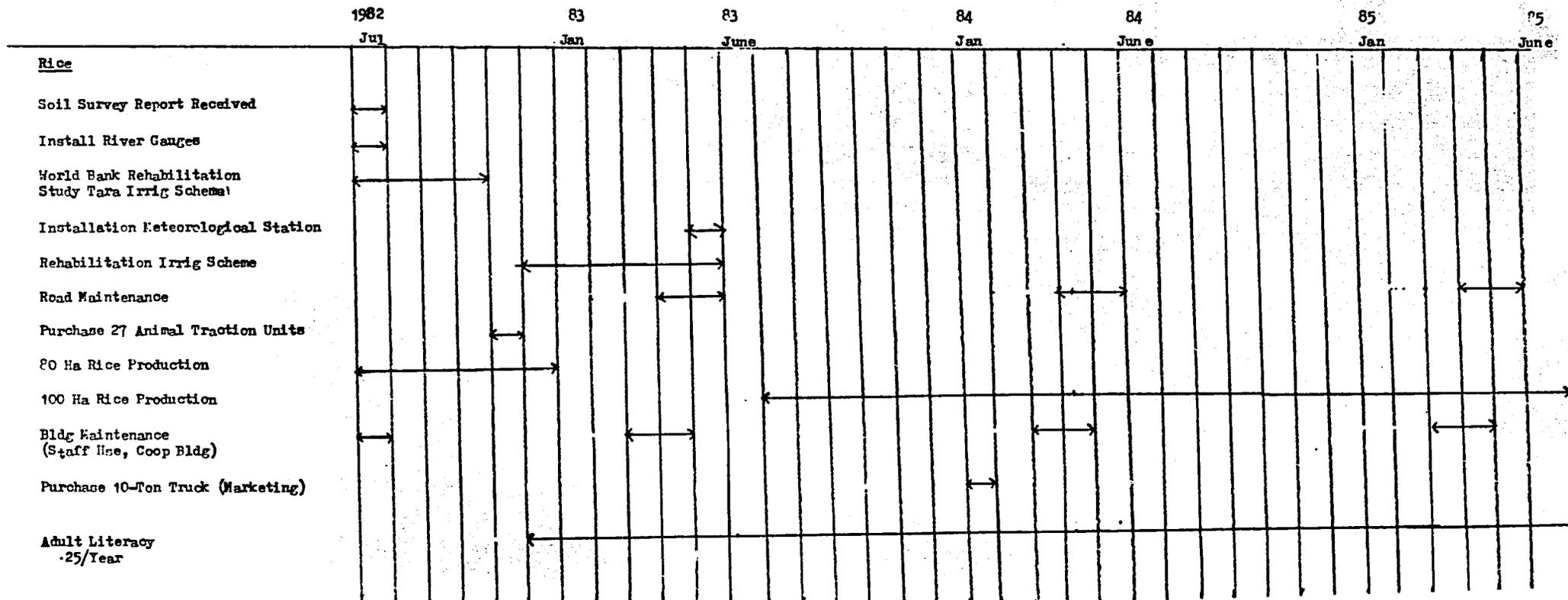
H. GENERAL

- 1. International impacts _____ N
- 2. Controversial impacts _____ N
- 3. Larger program impacts _____ L
- 4. Other factors

I. OTHER POSSIBLE IMPACTS (not listed above)

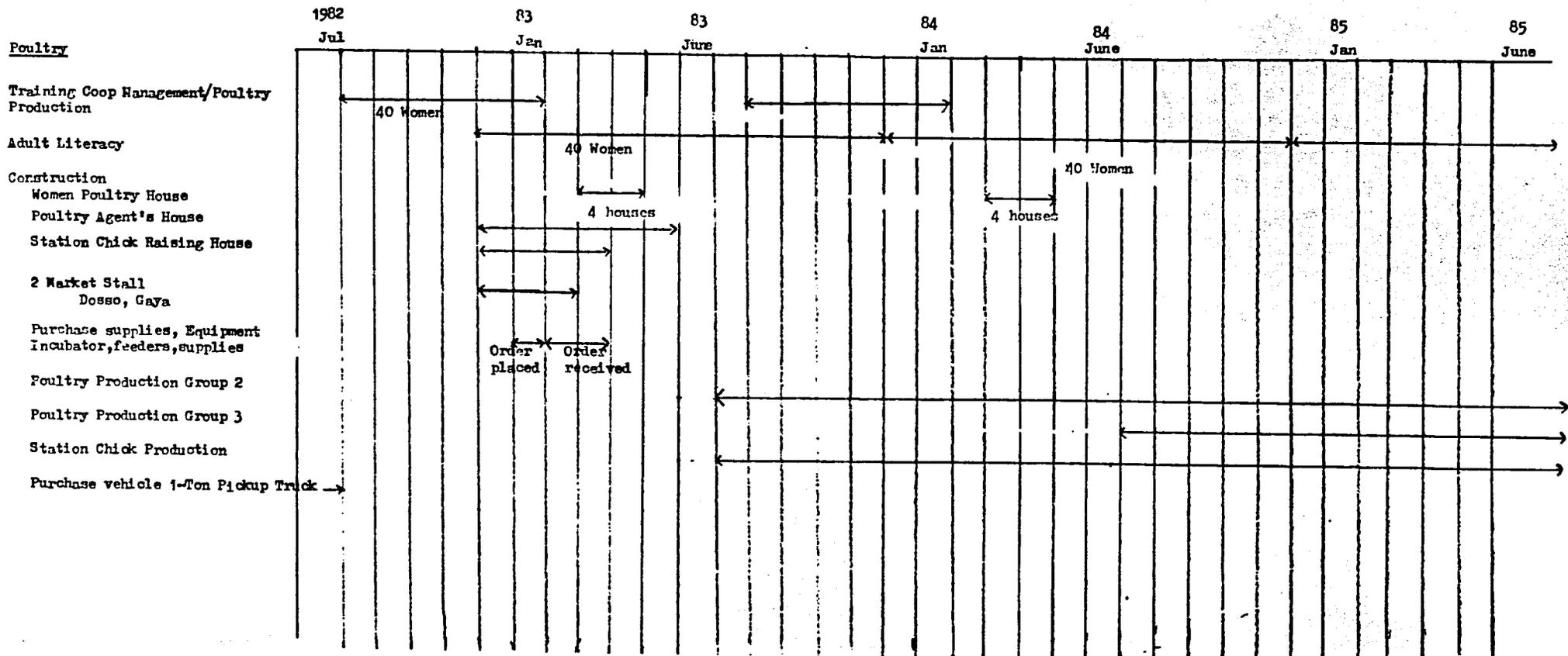
See attached Discussion of Impacts.

A. IMPLEMENTATION SCHEDULE



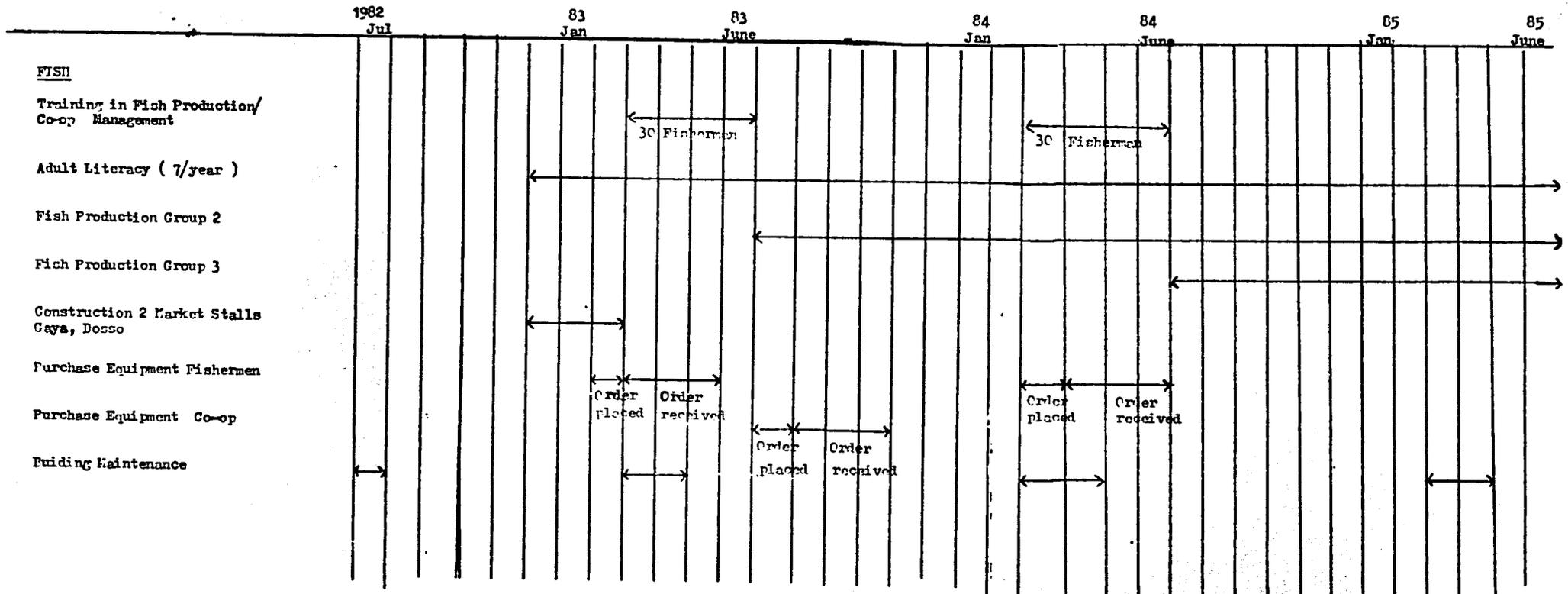
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IMPLEMENTATION SCHEDULE 2



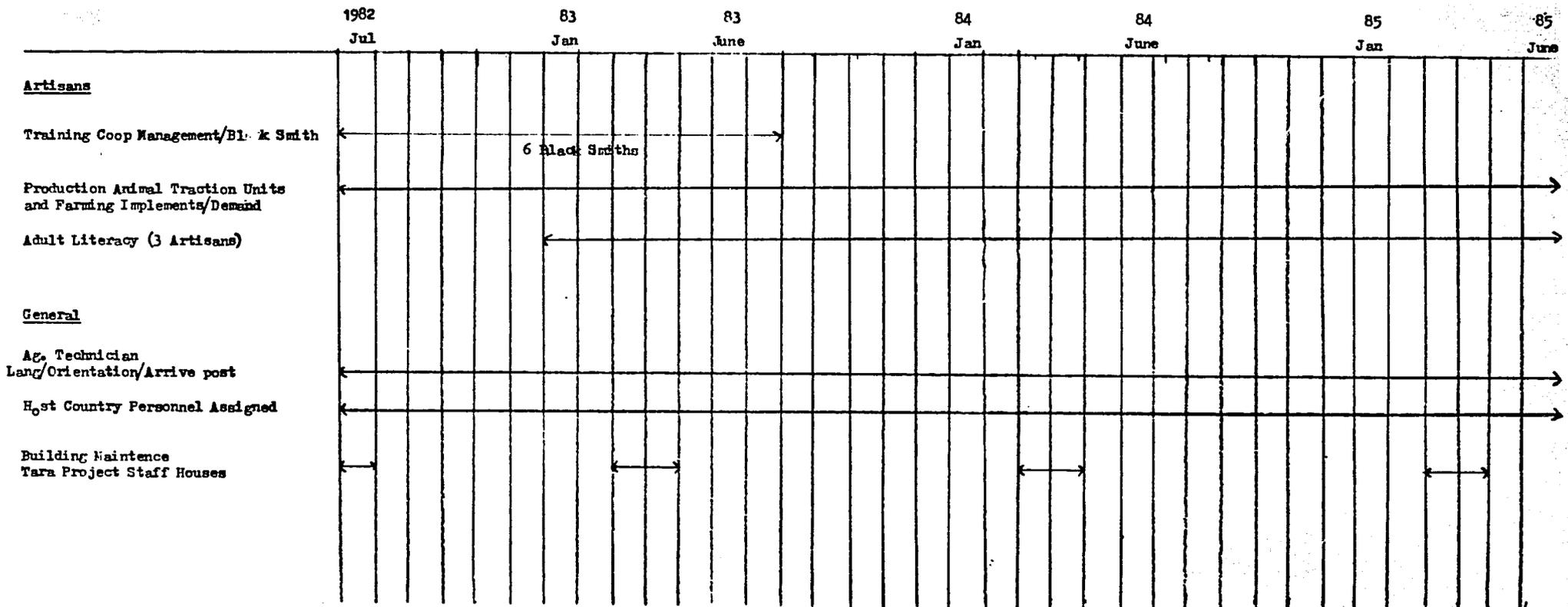
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IMPLEMENTATION SCHEDULE 3



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IMPLEMENTATION SCHEDULE 4.



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D. Tara Hydro-Agricultural Project Phase II

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

1.
Life of Project:
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

Revised October 1982

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Goal</u> Improve the economic conditions and the standard of living of the rural population.</p>	<p>Measures of Goal Achievement: 1) Increase rural per capita incomes.</p>	<p>1) World Bank and Government of Niger Economic Development Reports.</p>	<p>Assumptions for achieving goal targets: That the GON continues to recognize food production as one of its top priorities.</p>
	<p>2) Increase availability of food.</p>	<p>2) OPVN production records.</p>	<p>Assumptions for achieving purpose:</p>
			<p>Assumptions for achieving outputs:</p>
			<p>Assumptions for providing inputs:</p>

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ID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 2.
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Project Purpose:</u> Increase food production in Tara a) Rice production up by 70%</p>	<p><u>End of project status.</u> 900 Tons rice produced by end year 3</p>	<p>Reports, Tara Project Director</p>	<p><u>Assumptions for achieving goal targets:</u> That a solution will be found to supply sufficient water for 100 hectares.</p>
<p>b) Establish poultry production capability</p>	<p>250,000 eggs produced by end year 3 1,000 chickens produced by end year 3</p>	<p>Reports, Poultry Officer</p>	<p><u>Assumptions for achieving purpose:</u> That demands for eggs and meat will remain high in the area. That technical skills will be available to insure successful production.</p>
<p>c) Develop fishing industry</p>	<p>47,580 Kg fish produced end year 3</p>	<p>Reports, Fisheries Officer</p>	<p><u>Assumptions for achieving outputs:</u> Fish population will remain stable in spite of any river construction. Catch will increase because of increase in Coop membership.</p>
<p>Establish self-sufficient rice, poultry, fish and artisan co-ops.</p>	<p>Co-ops supplying members with inputs Co-ops marketing members outputs Co-ops financially sound</p>	<p>Reports, Tara Project Director</p>	<p><u>Assumptions for providing inputs:</u> Co-op management training will be effective in preparing members to manage co-ops.</p>

AD

ID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 3.
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Outputs:</u> Women trained in poultry production</p>	<p>Magnitude of Outputs: 40 trained by end year 1 40 trained by end year 2</p>	<p>Tara Project Monthly Reports COTEDEP Quarterly Reports</p>	<p>Assumptions for achieving goal targets: That success of the first poultry co-op will be incentive for others to join.</p>
<p>Fishermen trained in Co-op management/fish production.</p>	<p>30 trained by end year 1 30 trained by end year 2</p>	<p>Reports, Fisheries Officer</p>	<p>Assumptions for achieving purpose: That success of the first fish Co-op will be incentive for others to join.</p>
<p>Blacksmiths trained in appropriate rural technology</p>	<p>6 Artisans trained by end year 1</p>	<p>Reports, Tara Project Director</p>	<p>Assumptions for achieving outputs: That success of the first artisan Co-op will be incentive for others to join.</p>
<p>Villagers trained in functional literacy</p>	<p>25 men enrolled by end year 1 50 men enrolled by end year 2 75 men enrolled by end year 3 40 women enrolled by end year 1 80 women enrolled by end year 2 80 women enrolled by end year 3</p>	<p>Reports, Adult Literacy Officer</p>	<p>Assumptions for providing inputs: That villagers will continue to be motivated to attend evening classes.</p>

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ID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 4.
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFICABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Outputs:</u> Rehabilitated irrigation Scheme</p>	<p>Magnitude of outputs 100 ha double-cropped with Rice by end year 2</p>	<p>Reports, Tara Project Director</p>	<p>Assumptions for achieving goal targets: That technical knowledge exist to resolve in-sufficient water problem on the perimeter.</p>
<p>Poultry Co-op Buildings completed Marketing Outlets Poultry and Fish Co-ops</p>	<p>4 women poultry houses by end year 1 1 Poultry agents house by end year 1 1 Poultry Station Chick Raising house by end year 1 1 Market Stall Dosso by end year 1 1 Market Stall Gaya by end year 1</p>	<p>Reports, Poultry Officer</p>	<p>Assumptions for achieving purpose: That Construction skills are available.</p>
<p>Cooperative Self-management training instituted</p>	<p>40 community coop members enrolled year 1 72 farmers enrolled " " 40 poultry raisers enrolled enrolled year 1 6 artisans enrolled year 1 20 fishermen enrolled year 1 80 poultry raisers enrolled year 2,3 12 artisans enrolled year 2,3 60 fishermen enrolled year 2,3</p>	<p>1,2,3 UNCC Reports 1,2,3</p>	<p>Assumptions for achieving outputs: Coop profitability remains high enough to sustain villagers motivation to participate.</p>
			<p>Assumptions for providing inputs:</p>

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ID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 5.
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFICABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>Inputs:</u> <u>Technical Assistance</u> U.S. Hire Agronomist Community Development Spec. AFRICARE Management Host Country Hire	Implementation Target (Type and Quality) 191,763 36 mm 138,865 36 mm 52,514 7.5 mm 117,864	AFRICARE, Tara Financial Report Financial Reports, Tara Project Director	Assumptions for achieving goal targets:
<u>Equipment and Supplies</u> Rice Co-op Research	9,000 18,000		Assumptions for achieving purpose:
<u>Construction</u> Rice Co-op Fish Co-op Road	14,500 3,500 3,000	Financial Reports, Tara Project Director	Assumptions for achieving outputs:
Co-op Management/Technical Training Misc.	70,978 5,595	Financial Reports, Tara Project Director	Assumptions for providing inputs:

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ID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

6.
Life of Project:
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFICABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>Inputs:</u> <u>Other Donors</u> GOVERNMENT OF NIGER Project Director U.N.C.C. Agent Agriculture Agent Fisheries Officer	(36 mm) (36 mm) (36 mm) (36 mm)		Assumptions for achieving goal targets:
Poultry Officer Adult Literacy 2 Instructors PEACE CORPS Fish Biologist	(36 mm) (72 mm) (36 mm)		Assumptions for achieving purpose:
UMCOR/KANSAS West Equipment/Supplies	100,000		Assumptions for achieving outputs:
			Assumptions for providing inputs:

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V. FINANCIAL PLAN

A. Reporting Schedule

Africare will submit the financial status reports on a quarterly basis using the Agency for International Development form 269-101. Africare plans to submit vouchers for funds no less frequently than quarterly using AID form 1034-116.

B. Request for Waiver

Africare would like to purchase a seven-ton truck and a pick-up truck for use in the implementation of the Tara Project. In order to procure these two vehicles, a source/origin waiver from geographic code 000 (U.S. only) to geographic code 935 (free world), is needed.

There is no United States manufacturer of four-wheel drive vehicles represented by an agent specializing in spare parts and maintenance. Consequently, maintenance and repair of U.S. made vehicles would be virtually impossible for a small organization like Africare.

C. Finance Controls

Funds expended for the Tara Project are disbursed through an account at the National Development Bank in Niamey, Niger (BDRN). This account is controlled by the Director of The Tara Project, who was appointed by the President of Niger to supervise the project, and the Sous-prefet of Gaya.

Budgets for the project are prepared on a forecast basis, usually of a three-month period. Funds to cover these budgets are transferred to Niger by Africare. Francs are then transferred to the BDRN Tara account by Africare's Representative in Niamey, who obtains receipts for funds delivered.

Africare verifies vouchers for expenses through its Niger Office. Payment is made by check drawn against the BDRN account by the Director of the Tara Project. The Director reports these expenditures to the Ministries of Development and Finance and to Africare.

Funds advanced to other government agencies by the Project Director are controlled within the respective departments and progress and financial reports, including receipts expenditures, are issued to the Project Director.

Africare receives a copy of all receipts for which payment has been made by funds deposited in the BDRN account. Africare receives all financial bank statements relating to receipts and expenditures. Africare then maintains complete accounts for the project in its national office in Washington. These accounts are audited annually by Africare's auditors, Delloite Haskins and Sells. In addition, all donors have full auditing rights of these accounts both in Washington and in Niger.

Further transfer of funds against budget requests are made only when full documentation has been made which satisfies Africare that funds have been properly expended.

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Expenses for Africare personnel, consultants and travel are handled through Africare's U.S. bank.

D. Evaluation and Reporting

In depth evaluations will be carried out at the end of Year One and towards the end of Year Three. The first special evaluation will assess progress made toward achievements of the project purpose, including determination of what modifications, if any, are required of project outputs. USAID financial requirements will be examined to determine if they remain valid. Any recommended upward or downward adjustments will be noted. The log frame, which contains a schedule of planned accomplishments, will be used for measuring achievements.

The second evaluation will assess whether the project will meet its targeted end-of-project conditions by project end, and whether there is any need for follow-up-assistance. Both evaluations should be performed by a team composed of USAID, GON and Africare representatives. All participants should have expertise in food production and rural development.

The Africare Representative will submit monthly reports to Africare/Washington. The Africare Representative will report on a quarterly basis to USAID/Niger and the GON.

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Tara Hydro-Agricultural Project, Phase II

Summary Budget

July 1, 1982 - June 30, 1985

	(U.S. Dollars)			
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
I. Personnel and Fringe	101,202	102,761	109,507	313,470
II. Travel and Allowances	54,818	32,835	54,150	141,803
III. Equipment and Supplies	36,500	18,500	18,000	73,000
IV. Construction	9,000	6,000	6,000	21,000
V. Training and Other Costs	41,689	32,964	1,920	76,573
VI. Indirect	<u>47,278</u>	<u>38,778</u>	<u>38,084</u>	<u>124,140</u>
GRAND TOTAL	290,487	231,838	227,661	749,986

Revised October 21, 1982

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TARA HYDRO-AGRICULTURAL PROJECT, PHASE II

THREE-YEAR BUDGET

JULY 1982 - JUNE 1985

<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
I. PERSONNEL AND FRINGE BENEFITS							
5-01	<u>Salaries U.S. Hire Staff</u>						
	Agronomist			30,000	32,100	34,345	96,445
	Community Development Specialist	30,000 x 7%	32,100 x 7%	20,000	20,000	21,000	61,000
	Africare Representative, 1da/wk	4,300 x 7%	5,136 x 7%	4,800	5,136	5,496	15,432
	Africare /Washington Manager, 1 da/wk			4,800	5,136	5,496	15,432
	Sub-Total U.S. Hire			59,600	62,372	66,337	188,309
5-02	<u>Salaries Host Country Hire Staff</u>						
	Bookkeeper 400 x 12 - 4,800	4,800 x 7%	5,136 x 7%	4,800	5,136	5,496	15,432
	Secretary 250 x 12 - 3,000	3,000 x 7%	3,210 x 7%	3,000	3,210	3,435	9,645
	Maintenance/ Electrician 300 x 12 - 3,600	3,600 x 7%	3,852 x 7%	3,600	3,852	4,122	11,574
	Driver 200 x 12 - 2,400	2,400 x 7%	2,568 x 7%	2,400	2,568	2,748	7,716
	Driver 180 x 12 - 2,160	2,160 x 7%	2,311 x 7%	2,160	2,311	2,473	6,944
	5 Laborers 120 x 12 - 7,200	7,200 x 7%	7,705 x 7%	7,200	7,705	8,245	23,150
	Watchman 120 x 12 - 1,440	1,440 x 7%	1,541 x 7%	1,440	1,541	1,649	4,630
	Sub Total Host Country Hire Staff			24,600	26,323	28,168	79,091
5-06	<u>Consultant Fees</u>						
	\$150/day x 10 days			1,500	--	--	1,500

<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
5-08	<u>Recruitment Costs, Including Ads and Interviews</u> 2 ads @ 250 each 2 candidates & 2 spouses, RT Transp. 275 ea. Per Diem, 4 people @ 75/da x 2 da			500 1,100 600	- - -	- - -	500 1,100 600
	Sub-Total Recruitment			2,200	-	-	2,200
5-10	<u>Fringe Benefits U.S. Hire</u> 59,600 x 12%	62,372 x 12%	66,337 x 12%	7,152	7,485	7,960	22,597
-11	<u>Fringe Benefits Local Hire</u> 24,600 x 25%	26,323 x 25%	28,168 x 25%	6,150	6,581	7,042	19,773
	Sub-Total Fringe			13,302	14,066	15,002	42,370
	Sub-Total Personnel and Fringe			101,202	102,761	109,507	313,470
II. TRAVEL AND ALLOWANCES							
5-20	<u>Domestic Transportation</u> Orientation/Language Training 3 people x 150 (1-way ticket)			450	-	-	450
5-21	<u>Domestic Subsistence/Per Diem</u> 2 people x 75/da x 30 1 person x 10/da x 30			4,500 300	- -	- -	4,500 300
5-30	<u>Pre-departure/Settling-In Costs</u> Medical Exams, 3 x 100 Immunizations, 3 x 50 Visas, Passports, 3 x 50 Settling-In Allowance			300 150 150 500	- - - -	- - - -	300 150 150 500
5-31	<u>International Transportation</u> (excluding relocation) Consultant, 1 RT x 1500 Project Manager/ W, 2 RT x 1500			1,500 3,000	- 1,500	- 1,600	1,500 6,100

<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
5-32	<u>International Subsistence & Per Diem</u> Consultant 97 x 10 days Project Manager 97 x 7 x 2 wks	105x7da x 2 wks	110 x 7da x 2 wk	970 1,358	- 735	- 1,540	970 3,633
5-33	<u>Travel Freight & Storage for Relocation</u> Technicians, 3 dependents, 1-way, 750 ea. 1500x 3 RT Freight		1-way 800 x 3 3250 lbs x 4/1b	2,300 10,000	4,500 -	2,400 20,000	9,200 30,000
5-34	<u>Employee House Rental</u> Technicians, 208 /mo. x 12 x 2 Bookkeeper, Secretary	208/mo x 12 x 2 \$71 + 54 = \$125/month	208/mo x 12 x 2	5,000 1,500	5,000 1,500	5,000 1,500	15,000 4,500
5-35	<u>Basic Furnishings for Overseas Staff</u>			5,000	3,000	-	8,000
5-36	<u>Employee Housing Repairs/Maintenance</u>			4,000	2,000	6,000	12,000
5-37	<u>Incountry Transportation</u> (including gas) Technicians			7,000	7,400	7,850	22,250
5-38	<u>Incountry Subsistence/ Per Diem</u> Technicians 3da/mo x 12 x 70/da	3 da/mo x 12 x 75/da x 2	3da/mo x 12 x 80 x 2	5,040	5,400	5,760	16,200
5-39	<u>Employee Dependent Allowance</u>			1,800	1,800	2,500	6,100
	<u>Sub-Total Travel & Allowances</u>			<u>54,818</u>	<u>32,835</u>	<u>54,150</u>	<u>141,803</u>
III. <u>EQUIPMENT AND SUPPLIES</u>							
5-40	<u>Office Equipment and Furniture</u> Tara Project Office			2,500	1,500	1,000	5,000

<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
5-41	<u>Equipment Tools/Spare Parts III</u> <u>Agriculture Research Equipment</u>			3,000	2,000	2,000	7,000
5-45	<u>Vehicles for Host Country Use</u>						
	Mobylette (for Bookkeeper)			1,000	-	-	1,000
5-46	<u>Vehicles for Africare Staff Use</u>			15,000	-	-	15,000
5-47	<u>Repairs/Service Host Country Equipment and Vehicles</u> Tara project truck, generator			6,000	6,000	6,000	18,000
5-48	<u>Repairs/Servicing Africare Vehicle</u>			<u>4,000</u>	<u>4,000</u>	<u>4,000</u>	<u>12,000</u>
	Sub-Total Equipment			<u>31,500</u>	<u>13,500</u>	<u>13,000</u>	<u>58,000</u>
	Supplies						
5-50	<u>Office Supplies</u> Tara Project Office			2,000	1,000	1,000	4,000
5-51	<u>Project Supplies I</u> <u>Agriculture Research Supplies</u>			<u>3,000</u>	<u>4,000</u>	<u>4,000</u>	<u>11,000</u>
	Sub-Total Supplies			<u>5,000</u>	<u>5,000</u>	<u>5,000</u>	<u>15,000</u>
IV.	<u>CONSTRUCTION</u>						
5-71	Road Construction (Maintenance)			1,000	1,000	1,000	3,000

<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Project Total</u>
5-78	<u>Non Residential Bldg. Repairs/Maintenance</u> Pice, Fish Co-ops Bldgs.			3,000	2,000	2,000	7,000
5-79	<u>Residential Bldg. Repairs/Maintenance</u> Tara Project Staff Houses			<u>5,000</u>	<u>3,000</u>	<u>3,000</u>	<u>11,000</u>
	Sub-Total Construction			<u>9,000</u>	<u>6,000</u>	<u>6,000</u>	<u>21,000</u>
V. <u>OTHER DIRECT COSTS</u>							
<u>Training</u>							
5-60	<u>Africare Staff Training</u> including language 120 hrs x 20/hr			1,200	-	-	1,200
5-61	<u>Training and Fees</u>						
	Training of Cooperative Community Reps.			289	289	-	578
	Advanced Extension Training--Rice Coop			167	167	-	334
	Advanced Extension Training--Artisan Coop			179	179	-	358
	Advanced Extension Training--Fisheries Coop			250	250	-	500
	Advanced Adult Literacy and Coop						
	Self-Management Training			4,274	4,274	-	8,548
	Beginning Adult Literacy Training			2,200	2,200	-	4,400
	<u>Teaching & Training Materials</u>						
	Fish Co-op/mgt.			5,000	5,000	-	10,000
	Artisan			7,600	-	-	7,600
	Adult Literacy (men)			2,400	2,400	-	4,800
	Adult Literacy (women)			2,400	2,400	-	4,800

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<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
5-62	<u>Travel and Allowances</u>						
	Training of Cooperative Community Reps			1,305	1,305	-	2,610
	Advanced Extension Training: Rice Coop			762	762	-	1,524
	Advanced Extension Training: Artisan Coop			366	366	-	732
	Advanced Extension Training: Fisheries Coop			1,587	1,587	-	3,174
	Advanced Adult Literacy and Cooperative Self-Management Training			3,975	3,975	-	7,950
	Beginning Adult Literacy Training			1,560	1,560	-	3,120
5-69	<u>Training Materials</u>						
	Training of Cooperative Community Reps			159	159	-	318
	Advanced Extension Training: Rice Coop			87	87	-	174
	Advanced Extension Training: Artisan Coop			54	54	-	108
	Advanced Extension Training: Fisheries Coop			184	184	-	368
	Advanced Adult Literacy and Cooperative Self-Management Training			2,851	2,851	-	5,702
	Beginning Adult Literacy Training			1,040	1,040	-	2,080
	Sub-Total Training			<u>39,889</u>	<u>31,089</u>	<u>-</u>	<u>70,978</u>
<u>Other Direct</u>							
5-85	Insurance (3 vehicles) 600/yr x 3	625/yr x 3	640/yr x 3	1,800	1,875	1,920	5,595
	Sub-Total Training & Other Direct Cost			<u>41,689</u>	<u>39,964</u>	<u>1,920</u>	<u>76,573</u>
	Total Direct Costs						

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<u>Line Item</u>	<u>Description Year One</u>	<u>Adjustment Description Year Two</u>	<u>Adjustment Description Year Three</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
5-98	<u>Indirect Cost on Personnel, Travel Training, Other Direct</u>						
	21.45% x 197,709	168,560 x 21.45%	165,577 x 21.45%	42,409	36,156	35,516	114,081
5-99	<u>Indirect Cost on Equip., Supplies, Construction</u>						
	10.7% x 45,500	24,500 x 10.7%	24,000 x 10.7%	4,869	2,622	2,568	10,059
	Sub-Total			<u>47,278</u>	<u>38,778</u>	<u>38,084</u>	<u>124,140</u>
	GRAND TOTAL			290,487	231,836	227,661	749,986

" I would like to see the aspirations of the people and the accomplishments of the Tara Project repeated in every village in Dosso Department."

--Ibrahim Hassane, Prefet
Dosso Department

Based on a wide range of observations of the many facets of the Tara Project and on discussions with farmers, village women, project personnel, and officials (local, subdepartment, department, national), the Evaluation Team has formulated these recommendations.

General Recommendations

It is recommended that a Phase 2 Development Plan for Tara be pursued and that Africare play an active and key role in the design and implementation of the Plan. Although improvement of the irrigated rice component of the Project may deserve highest priority, the rising expectations of all the people of Tara suggest that attention to and support of other community and family related activities during Phase 2 could make the integrated development of Tara more complete. Special emphasis should be placed on the development of management and decision-making skills of the leaders among the men and women of Tara.

In considering specific recommendations, the Evaluation Team realized the uncertainty of the kind and amount of technical and financial support which might be available to the Tara Project in the future. Therefore, the Team has made recommendations under three different levels or scenarios of assistance:

Scenario 1 - High level of technical and financial assistance

Scenario 2 - Modest level of assistance

Scenario 3 - Very little assistance

Scenario 1

The set of assumptions used as a basis for these recommendations include the following:

- A Phase 2 of the Tara Project will be implemented and will provide continued financial and technical support for the next two to three years at a level similar to that provided the project during the 1977-1981 period.
- Africare and other non-GON agencies will provide technical/financial support to supplement that provided by GON.

Several special recommendations relate to specific components of the Tara Integrated Development Project. The degree of success of Phase 2 will be greatly dependent upon the extent to which these recommendations are carried out.

1. Irrigated rice project

- a. It is recommended that a detailed soil survey be made for the entire area in the irrigated rice scheme. It is essential that this survey be prepared by a qualified soil surveyor. The high cost of irrigation water and fertilizer makes it essential to have adequate soil information for rational and efficient management of the land resources. The soil survey should include a detailed description of the internal drainage characteristics, the textural and structural properties of the soil profile (1 meter in depth), and an assessment of the potential productivity for rice for each parcel.
- b. It is recommended that the entire area inside the dike be carefully surveyed and that an in-depth, engineering study be made to determine the cost of moving sufficient soil material to lower the surface of the high parcels and raise the surface level of the low (wet) parcels. Every effort should be made to bring into production all land which is suitable for cultivation within the diked area. This task may entail the redesign and reconstruction of the irrigation water distribution system and possibly the development of a drainage canal and pump for removal of excess water.
- c. It is recommended that a careful engineering study be made of the water requirements for all potentially irrigable land in the rice scheme and that the pumping station and accessory facilities be redesigned, reconstructed and re-equipped to assure that sufficient water

will be available for all parcels during both the rice campaigns (high and low water levels in the river) each year. A careful study to determine the cost of implementing this recommendation is needed.

- d. It is recommended that a basic requirement for Phase 2 be the design and implementation of a system of record-keeping of statistical data related to soil management and irrigated rice production. Such records should be kept for each parcel under cultivation. The following kinds of data should be obtained during each campaign:

- date of seed-bed preparation (plowing)
- method of seed-bed preparation
- date and method of planting
- variety of rice planted
- population density
- dates and amounts of water applied
- dates and amounts of fertilizer applied
- methods and kinds of fertilizer applied
- dates of weeding
- observations of crop conditions during growing season (diseases, insects)
- dates of harvest
- yield

The methods being recommended for rice production in Tara were not developed in that area. They were "imported". The kinds of records being recommended could be analyzed after two or three years and be used to determine the best management practices to improve rice production in the Tara area.

- e. It is recommended that serious consideration be given to the assignment of a fulltime rice production specialist to the Tara irrigated rice scheme. This person would have a basic understanding of statistics and be assigned to manage field operations, keep accurate records, make agronomic observations throughout the growing season, and provide technical advisory service to the rice farmers.
- f. It is recommended that consideration be given to the installation of a basic meteorological station at the site of the irrigated rice scheme. The following data should be collected:

- maximum-minimum daily temperatures
- precipitation (recording rain gauge)
- incoming radiation (albedo)

These data, kept on a regular basis, will become increasingly useful as production increases and agriculture develops in the region. Further, it would be useful to have streamgauges to collect data on rate and volume of flow of the Niger River.

- g. It is recommended that a few (2-4) parcels of irrigated land be used for research in irrigation practices, soil management and rice production. Such research should be under the direction of ONAHA OR INRAN.

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- h. It is recommended that consideration be given to the use of a common rice seedling nursery to be operated under the direction of the Rice Farmers Cooperative. Although the Evaluation Team did not have an opportunity to explore this idea with the Tara Project Director and the farmers, it is felt that such a common nursery might provide more timely and consistent quality of rice seedlings.
- i. It is recommended that Phase 2 include appropriate arrangements to assure regular technical repair and maintenance of the pumping station and irrigation water distribution system.
- j. It is recommended that consideration be given to the utilization of extra space in the rice storage building for grains and oil seeds (millet, sorghum, corn, peanuts) produced on the upland non-irrigated fields around Tara. These improved storage facilities could greatly decrease the loss of stored grains caused by rodents and insects.

2. Poultry Project

- a. It is recommended that the recently implemented poultry project be continued and supported. Careful attention must be given to assure a continuous supply of clean water for the flocks. Sanitation and medication must be adequate to control disease.
- b. It is recommended that training and technical advisory services be continued for the members of the Women's Poultry Cooperative.
- c. It is recommended that a program of literacy training be implemented for the members of this co-op.
- d. It is recommended that a study be made to determine the best methods of quality control and marketing of eggs and meat produced by the poultry co-op.
- e. It is recommended that consideration be given to the mixing of poultry rations in Tara with locally grown grain and imported protein supplement as an option to reduce the cost of production. This might supplement or replace the currently imported complete ration.
- f. It is recommended that careful analysis be made of the poultry project after two years. If the project proves to be sound, technically, socially and financially, consideration should be given to the construction of one or two more poultry houses to increase the volume to the level proposed in the Phase 1 plan.

3. Fisheries Project

- a. It is recommended that technical support be continued in Phase 2 for the Fisheries Project. Although the Project is just beginning, there is ample evidence observed by the Evaluation Team that this activity is important for the development of Tara. The facts given

to the Team suggest excellent potential for exploitation for commercial purposes of the many species of edible fish in the Niger River. Further, officials of the Government of Niger strongly support the Fisheries Project.

- b. It is recommended that fish farming in ponds and cages be implemented through appropriate training of villagers and development of ponds and facilities.

4. Domestic Water Supply

It is recommended that Phase 2 include the construction of a covered well equipped with one or more hand pumps to provide a year-round supply of clean water for domestic use for all the inhabitants of Tara. A more centrally located, covered well with a pump will relieve the women of Tara of the drudgery of drawing water and carrying it great distances. Further, the provision of clean water should reduce the incidence of infections and disease in the village.

5. Health Delivery System and Sanitation

- a. It is recommended that discussions be continued with the Ministry of Health in an effort to provide more adequate medical care for the families of Tara. Villagers and government officials alike expressed concern that basic medication and treatment be made readily available to those in need of it. Greatly increased time in and contact with water and work with animals and mechanical devices increase the probability of physical injury and of contracting water-related diseases.
- b. It is recommended that an educational program on family health, nutrition and sanitation be implemented.

6. Housing

It is recommended that the design, availability and costs of low-cost permanent family houses be investigated for possible use in Tara. If any such housing is economically feasible and adaptable to the environmental conditions of Southern Niger, it is recommended that several houses be constructed in Tara as a pilot study. If they prove to be satisfactory, a system of credit, technical assistance and training should be provided so that villagers could purchase building materials and participate in the construction of new houses for Tara.

7. Farm-to-Market Road

It is recommended that appropriate stone and/or concrete structures be constructed to provide permanent protection to the surface of the farm-to-market road in those areas which are currently susceptible to severe erosion during the rainy season.

8. Adult Education

Although training has been mentioned as components of other recommendations, the Evaluation Team recommends that emphasis be given to a broad spectrum of adult educational programs, including, literacy, rice production, farm management, cooperative management, grain marketing, poultry production, and fish production and marketing, animal production and marketing, nutrition, family health care and sanitation.

The assumptions in this case are that no external (non-GON) support will be available, but that GON will continue to support the Tara Project with limited financial and technical support.

1. It is recommended that the irrigated rice scheme be continued and that GON provide as much assistance as possible to improve the reliability and delivery of river water for the production of two crops of rice per year. It is also important that Genie Rural make every effort to bring more of the diked land under irrigation by land leveling.
2. It is recommended that GON provide essential technical assistance to support the poultry and fish projects.
3. It is recommended that particular emphasis be given to the training of village leaders, men and women, in management and decision-making. It is extremely important that the people of Tara take the initiative in developing and utilizing the resources of the area and in making those decisions which will help to make their future more secure.

Scenario 3

In this situation it is assumed that little or no financial and technical assistance will be available to the Tara Project in the future. In discussions with leaders and rice farmers in Tara, the Evaluation Team asked if the Project could survive without assistance. The major concern expressed by the farmers was their inability without external aid to maintain, operate and improve the pumping station and the land under irrigation. They expressed fear that without technical assistance, the irrigation program would not continue.

1. It is recommended that the Rice Farmers Cooperative explore the possibility of employing and funding a part-time irrigation engineer/manager. If no other assistance is available, such initiative by the cooperative may be the only way to continue the irrigated rice program.

Appendix II: Engineering Team's Recommendations

II - Summary of Recommendations

The members of the team spent 12 effective days in Niger. Such a duration coupled with a lack of topographic, hydrographic and economic data has meant that the team had to confine itself to reviewing the project, identifying fields of study, developing feasible options for solutions to the constraints identified and recommending for further specialized study those most likely to offer a permanent solution at an "economic" cost.

The team therefore recommends the following:

- A. The immediate and urgent financing of basic data collection including:
 1. Topographic survey of project;
 2. Topographic survey of river cross section at the pumping station;
 3. Installation and operation of river stage gages along the line of the river cross section; (The above three items should be accurately tied together.)
 4. Test on hydraulic conductivity of soil to at least 15 meter depth in the TARA AMONT (irrigation pump station area.)
- B. Depending on the data obtained from A2, A3, and A4, a choice be made between the following options for low river pumping:
 1. Drilling a borehole at the irrigation pump station and the installation of a submersible pump to replace one of the present pumps for the limited low water period (approximately 2 months per year.)
 2. Providing a tractor mounted pumping unit which can be driven out along the river bed to convenient access at the receding waterline. This would include the provision of a pump with an

output line of unknown length because there exists no river section data. The pump should have sufficient head to overcome the pipe length and still be able to lift the water to the stilling basin. Considerations should be given to providing concrete base pads for standing pump operation on a river bed of unknown quality.

- C. An agricultural solution be adopted with respect to land above irrigation command and land below drainage command including:
1. For high land, it is recommended that suitable cereals of the sorghum/millet species be grown with yams (*Dioscorea*) and Taro (*Colocasia*)
 2. For the low land, "floating" rice should be utilized with the intention of extending its use to all the inundated land within the project area (i.e., exterior to the main dike) and thereby substantially increasing the exploitable area.
- D. The team does not believe that a drainage problem exists which is not covered by the existing station if restored to proper functioning order, coupled with the implementation of C2 above. If, however, it is preferred to remove all inundation, then the following should be considered:
1. Excavation of a drainage canal with a maximum invert level of 156 meters, approximately 1 km long, excluding laterals, of a suitable grade and approximately 1 meter deep. It would be aligned to insure proper drainage of the inundated parcels.
 2. Modification of the inlet sump at the drainage pump station to allow pumping from this new lower level.

- E. Following collection of data as outlined in A1, A2, and A3, sympathetic consideration should be given to construction of a gravity flow structure at the irrigation pump station. Any reasonable probability that such flow would be possible for at least one month per planting season would, in our view, justify this course.
- F. Though not constituting a total solution, the use of 105 day rice (such as Pacachai perumol from SRI LANKA) would appreciably reduce the pumping intake problem and consequently cut the use of gasoil (diesel fuel) and motor/pump wear. Planted in January, it would mean harvesting by mid April of which period, the two latter weeks at least, would need no water. This type of rice is grown in Ceylon and elsewhere and utilizes a short rainy season while developing yields at least 75% of the longer season varieties.
- G. This final recommendation does not address the existing problems, but those that will develop in the near future. As is noted in Annex M, the conditions of certain elements of the pump station is cause for great concern. Because of inadequate maintenance and oversights in the design and construction, greatly accelerated wear has occurred at the pump installations. The following would significantly increase the longevity of the installation.
1. Repair/replace the floor slab supporting the pumps at the intake pump station.
 2. Remove tires and permanently mount the pumps.
 3. Reattach and realign intake and discharge pipes.
 4. Perform full service/maintenance on pumps and motors repairing and replacing all broken or missing parts with special emphasis on fuel tanks.

5. Install hour meters on motors and institute a regular maintenance program.

III - Economic Review of Solutions Proposed

Before discussion of the main solutions, it is necessary to review the preliminary actions which must precede any substantial outlay of funds.

These actions are:

- A-1. The establishment of river stage gages at TARA AMONT. Gages in the plural because of the river's lateral movement without authoritative data for the actual weekly and monthly levels of the river relative to the intake, irrigation, and drainage levels, all economic benefit figures are guess work. It is not sufficient to extrapolate from stage figures at Malinville because the river sections are probably substantially different.
- A-2. An accurate topographic survey of the project as now existing with levels tied to the stage gage (or vice versa)
- A-3. An accurate topographic cross section of the river at TARA AMONT, in order that the pumping needs (low water levels) can be assessed properly and permanent solutions achieved.
- A-4. Assessment of the hydraulic conductivity at TARA AMONT.

The team was unable to obtain local costs for performing the above actions during the visit and therefore restricted to prices for performing a similar activity in the Washington, D.C. area.

CONSIDERATION OF POTENTIAL SOLUTIONS TO THE PUMPING INTAKE PROBLEM

The general basis of this problem has been discussed in previous annexes. In effect we have the situation that the vertical lowering and the horizontal movement of the waterline away from the pumping station produces problems of intake. Measurements made on site confirm the general original basal data and suggest that the river does not drop below the practicable suction level or only for a relatively unimportant duration.

Six principle types of solution have been recognized:

1. Floating Pump
2. Static Pump permanently immersed
3. Mobile Pump following the waterline
4. Gravity replenishment of the intake basin
5. Percolation/Pumping
6. Complete Replacement of the intake pump station
7. Rationalization of the planting cycle to avoid or minimize water demand during the low water period.

Consideration of Options

1. Floating Pump. This envisages some form of small barge around 2m X 5m x 1m deep on which the pump and motor is installed. This is moved in the stream and may be moved to and from the bank according to the river line. There will be problems with the output pipe line and the whole set up is vulnerable to floating debris. There are problems in regard to starting and stopping, refuelling and maintenance.

It would probably be preferable to construct a floating jetty for servicing purposes and to carry the output pipe.

The major advantages of this solution are:

- a) Relative ease of movement of pump
- b) Direct and continuous access to water

- c) Rapid implementation with relatively small expenditure apart from the pump to shore pipe.

2. tatic Pump with permanent immersion.

This would consist of the installation of an 8 to 10 inch pipe out to the center channel of the river, suitable filters and a closed end. In this would be installed an electric submersible pump connected to a generator. This provides direct pumping with no suction lift problems. We have no information on which to comment about the pipe installation, its stability, and its vulnerability to burial at the suction section.

3. Mobile Pump following the waterline.

Two options exist:

- a) To install railway lines (or the equivalent, and fit the pump unit with matching wheels)
- b) To lay a concrete ramp and roadway by the western side of the pump house of a width which will comfortably take a small tractor (equipped with a wire rope winch)

The pump unit is winched up or down the ramp section and then pushed/pulled out or back towards the water and then a pipe coupled up and a suitable intake with filter dropped into the river.

The problems are the stability of the roadway under rapid flow conditions and the need to move the equipment back daily when under rising flood conditions.

The solution is relatively simple involving only the installation of a concrete roadway, the provision of enough pump to stilling basin piping and the use of a tractor with winch during a short period (2 months) of the year.

4. Gravity replenishment of the intake basin.

In theory, including the designed characteristics of the installation and as approximately confirmed by our measurements on site, the problem is probably horizontal rather than a vertical one.

The pump centerline elevation is 161.1 m (referred to the irrigation invert as a bench mark). The pump (s) will support a suction of not less than 5 m (probably 6) on an elevation of 155.1 - 156.1. According to the theoretical hydrograph, the normal minimum river elevation is 156.1 m. Thus, even at worst suction potential, there should not be a water deficit in the intake basin except in the worst years (1 in 5 or more).

The problem clearly is to provide a reliable channel from the river at all stages to the intake basin.

While this could be an open (concrete) channel or one closed by top slabs, there would seem to be merit in using instead a pipe terminated in a very substantial large area filter box. Hopefully, this would reduce silting within the channel to a minimum. This channel (pipe) would have to be sited and levelled with some care, and proper consideration given to stabilizing its position on/in the river bed.

In considering this option it must be emphasized that the original design (Annex K) seems to have been soundly based given that Malanville data had to be used. A clear error was made in assuming that conformation of basin design levels to minimum river levels was all that was necessary to ensure a reliable supply. This assumption based on an 'ideal' river section (Diagram Cl, a.), has proved to be unjustified and productive of problems but in no way invalidates the designed heights.

There is one area of doubt as expressed in the document Annex J. It is their contention that for 8 years out of 10 the lowest water level will be below that of the installed intake basin (suction point) They quote a lowest river minimum of 154.86 m or more than 1 m below the figure given in the project design document and hydrograph.

Thus, there is a possibility that a channel at the level of the suction point would still be dry at some point in the river minimal cycle. It is the opinion of this team that the duration of such deficit would not be sufficient and could be synchronized with the maturation (non irrigated) period of the first annual rice crop. It does however remain as a potential drawback which may not be considered as an acceptable solution.

It is possible further to lower the designed installation level of this channel to, say, 154.5 m thus ensuring an uninterrupted supply of water in all cases but that of a dry river.

This new level however is likely to be below the effective suction level of the existing equipment. This is an absolute constraint because:

- a) The installed level must be above maximum flood level or the units must be mobile.
- b) The absolute maximum suction is 7 m negative head and the practical value is 5-6 m dependent on pump wear and actual h.p. developable.

The original design therefore, had to reconcile a number of incompatible constraints within an economic framework and has, in fact, been relatively successful. It now remains to decide whether the resolution of the remaining shortfall in performance can be achieved for an acceptable cost.

5. Percolation/Pumping.

Another positive solution is based on the assumed fact that the effective water table level up to 100 or more metres from the river bank will be that of the river itself. Unfortunately there is no data on hydraulic conductivity but such data would not be difficult to obtain. A mobile drilling rig is presently sited some 6-8 km from Tara towards Gaya.

From personal experience, one of us knows that the daily supply of irrigation to 100 ha. in the Sahara desert is entirely practicable from an 8" cased borehole into permeable rock. In fact some 80 such units were operating at 24 hours per day, year round. 7

Therefore, and subject to initial pumping heads and conductivity measurements, it would be practicable to sink one or more boreholes adjacent to the pumping platform, to a depth of 15-20 m, fitted with perforated casing and to use submerged pumps either electrically driven or by a vertical shaft and a right angle gearhead to a diesel power unit.

This is not an inexpensive solution, but is potentially a total one. Such a solution would ensure a year round supply of water. The water resulting from this installation should be silt free thereby giving low pump impeller wear and might also be significantly purer and better for human consumption

(when not needed for irrigation) than most of the domestic water in use at Tara.

6. Complete replacement of the intake pump station.

This is the last positive solution to be considered and obviously the most expensive one. It would entail removing the existing intake pumps, intake sump, and all related concrete work. A new inlet channel would have to be built along with a completely redesigned pump station. The bottom of the inlet would be lowered to insure a supply of water at all times. The existing pumps would no longer be adequate because of their limited suction head and would have to be replaced by new submerged pumps and new power units.

As stated earlier, present information is not sufficient to reliably establish what the minimum invert of the sump should be and without a river cross section at the present intake pump station the problems of cutting an intake channel at a new lower elevation are also unknown.

The theoretical hydrograph that was used to establish the elevations for the original design (Annex B) would not support such a solution. Field experience does not confirm that the river goes below the intake but only that it recedes from the intake. (Possibly a horizontal instead of a vertical problem).

The last fact to be considered is that this condition may exist from 1 to 3 months and with proper crop scheduling the impact could be significantly reduced. (See Annex H)

7. Planting Rationalization

The theoretical river hydrograph, the approximate rainfall and a rational planting schedule are combined in Diagram D-1. It will be seen from this that it is possible to schedule a period of nil or minimal water demand to coincide with the lowest river levels. From this diagram, the river level should be back to 157.5 m (i.e., only 2½ m below normal high water) by the time that water is needed for land preparation. Again, the water level situation will be improving daily to an estimated height of 159.0 by the end of the land preparation and further to 160.0 by the third week of September would reduce the instantaneous demand by 50% and permit the fuller use of the high water level to meet the maximum demand. It is

also fortunate that the resulting harvest should fall in January so that the next land preparation in February will also utilize the second (annual) river maximum.

It would be worth examining the possibilities of planting a 4 month rice in September and a 5 month rice in March to conform most closely to the use of the river peaks for the land preparation demands of 60 cms of water.

Although this solution has the merit of costing nothing, it is somewhat sensitive to the annual variations in river flow and rainfall and to good control of planting schedules within the project.

This solution should be adopted because it will make the most effective use of the water resources. There is, however, need to improve further the pumping installation at not too high a price and, through the combination of improvements, to assure the success of cultivation through all but the largest climatological disasters.

Before closing this section it is desirable to refer to a piece of information, namely, "that pumping ceases after March 15th." As mentioned earlier, this date cannot be reconciled with the theoretical hydrograph nor the team's observations on the river height at October 3rd. At this date it was clear that the river could descend well below the 158.9 meters suggested by March 15th and still be available for pumping.

Further examination of this point suggest that:

- a) It was an isolated happening. The project has only been operating 3 years and nowhere near full capacity most of that time.
- b) The year concerned saw one of the lowest river levels in memory or so we are told. Indeed the climate history of the past ten years has been a most unhappy one. It is not clear, however, whether these ten years are a norm or a statistical minimal probability.

Given the comparative lack of basic meteorologic and hydrologic data, it would appear preferable to adopt a solution which is not dependent on predictions of probability.

This consideration is given much more credence by the existence on paper of the Kandassie Dam Project. With a projected irrigation take-off for 130,000 hectares the river characteristics are going to be seriously modified and all existing hydrographic levels will be obliterated.

Thus, the only long term solution is either:

- a) To pump directly from the river wherever it may be.
- b) To pump from a reliable water level associated with the river, that is to say a borehole or holes in direct hydraulic relationship.

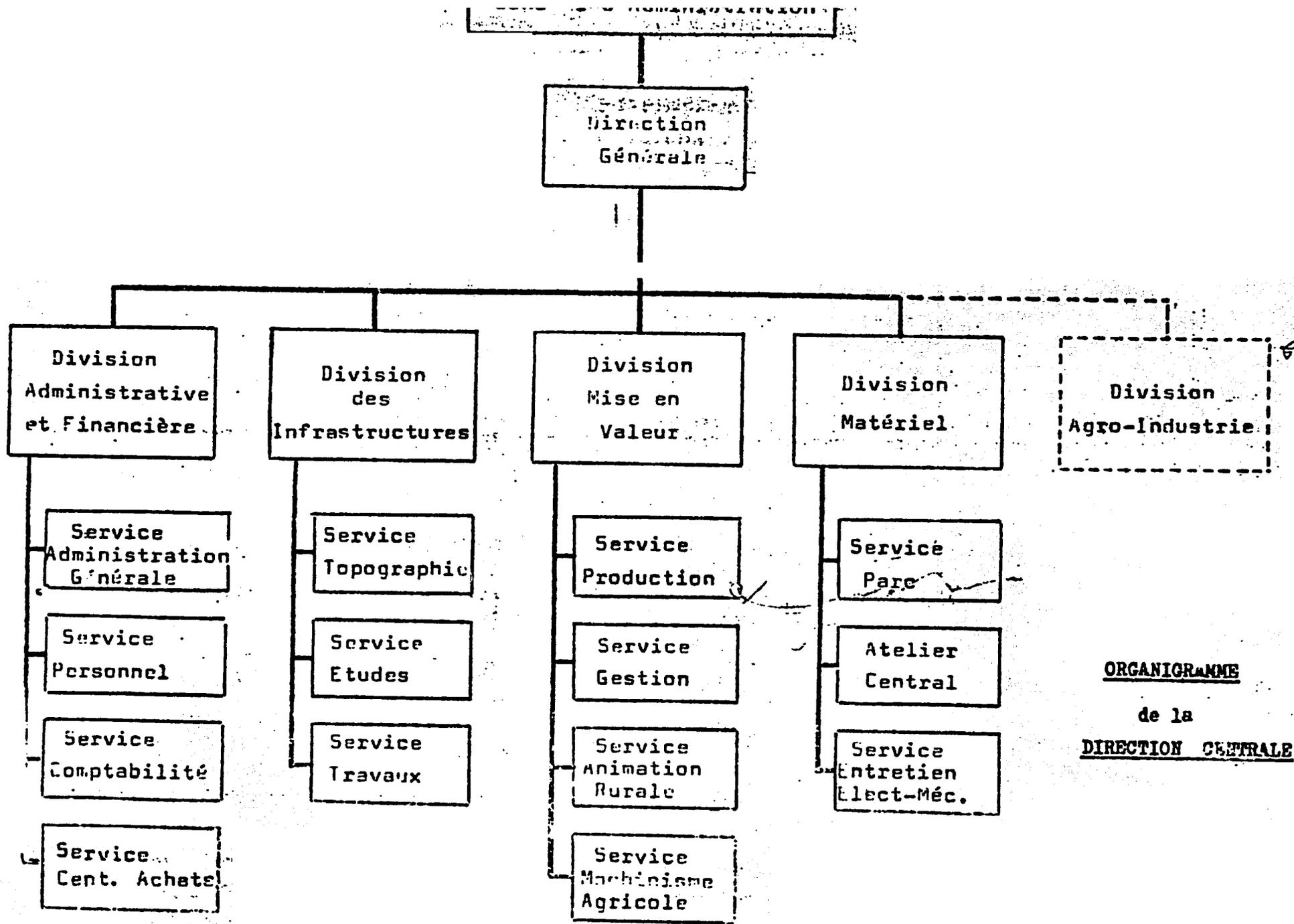
APPENDIX IV

ONAHA ORGANIZATION

ONAHA was created within the Ministry of Rural Development in 1978 and began functioning in 1979. ONAHA has its central offices in Niamey and has regional offices in Niamey, Tillaberry, Tahoua and Diffa. Each irrigation scheme is assigned to one of the regional offices.

The Central Office is Divided into four divisions:

1. Administration and Finance, responsible for personnel, accounting, purchasing and general management.
2. Infrastructure, which provides technical assistance necessary before and during the initial construction of the irrigation schemes and is responsible for any studies and further construction necessary to maintain the productivity of the scheme. It is divided into Topographical, Planning and Works Services.
3. Development, which coordinates supports and supervises the Regional Directors in their activities that have to do with starting up, maintaining and developing agricultural production on the individual schemes. This includes coordinating the various seasonal plans and input needs of the schemes, assuring the repayment of credit and the commercialization of the copy. The Division is divided into four services: Management, Production, Rural Animation and Training, and Agricultural Machinery.
4. Materials, which assures the proper use, maintenance and repair of ONAHA vehicles and agricultural equipment. The Division is divided into the Vehicles Park, Central Workshop, and Electro-Mechanical Maintenance Services.



ORGANIGRAMME
de la
DIRECTION CENTRALE

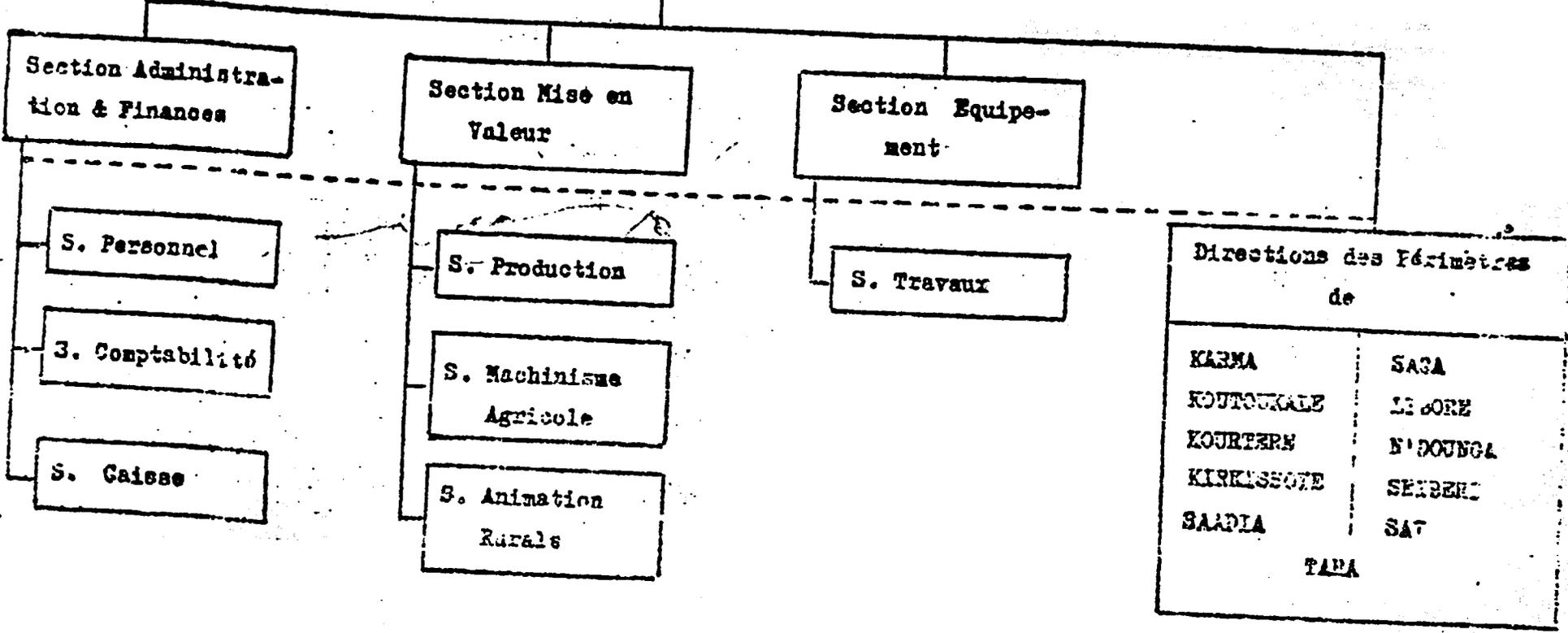
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Tara is in the Regional Office of Niamey, which is responsible for all perimeters in the Niamey Dept. except those in the Sous-Prefecture of Tillabery. The Regional Offices are divided into three major sections: Administration and Finance, Development, and Equipment. Their responsibilities are similar to those at the national level. In principle, each farmer working the land on a plot on an ONAHA perimeter is to sign a contract in which are stated the regulations of the perimeter (see attached) and in which the responsibilities of ONAHA are stated as follows:

- 1) to provide water necessary for agriculture
- 2) to provide the inputs necessary for production and to arrange for credit
- 3) to provide the personnel necessary to train the farmer in proper irrigation techniques and irrigated agricultural practices
- 4) to provide for the commercialization of the farmer's production.

DIRECTION GENERALE

DIRECTION REGIONALE DE
NIAMEY



ORGANIGRAMME de la DIRECTION REGIONALE
de
NIAMEY

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IL A ETE CONVENU ET ARRETE CE QUI SUIT :

Article I.— obligation de l'exploitant . .

L'exploitant s'engage à :

- Ne pas céder ou louer sa parcelle, ni même la prêter à titre gratuit.
- Exploiter la totalité de sa parcelle lui-même avec les membres de sa famille.
- Ne pas faire effectuer sur sa parcelle, pendant chaque campagne, un nombre de journées de travail salarié supérieur à la moitié du montant total de journées de travail fournies par lui-même et sa famille.
- Adhérer activement à toute association, à caractère professionnel mutualiste et/ou coopérative existante ou qui pourrait être créée au niveau de l'aménagement.
- Respecter les plans de campagne, notamment en ce qui concerne les espèces de variétés à cultiver, les assolements et rotations, les techniques culturales et leur calendrier. (Spécialement les dates de semis et de requipages) ;
- Respecter les mesures phytosanitaires ; dates de traitements, produits et moyens, et y prendre une part active.
- Respecter les doses, formules et dates d'épandage des engrais.
- Respecter le plan d'arrosage, notamment en ce qui concerne les heures et les tours d'eau, ainsi que celui de drainage
- Assurer la permanence et l'entretien des plantations perennes existantes ou à créer pour les besoins de l'aménagement (brise vent notamment).
- Accepter toutes les servitudes qui pourraient être créées pour les besoins de l'aménagement et notamment pour l'implantation d'ouvrage d'intérêts collectifs.
- Ne pas édifier d'immeubles sur sa parcelle.
- Respecter les consignes de récoltes et de conditionnement, et confier la commercialisation de ses produits, à l'organisme habilité.
- S'acquitter auprès de l'O.N.A.H.A., aux dates fixées, de la totalité de ses obligations financières, comprenant ; notamment les redevances d'aménagements.
- Participer sous forme de prestations de travail, à tous travaux de l'aménagement aux dates fixées par l'encadrement, en vue de l'entretien et de l'amélioration de l'aménagement.
- Se conformer strictement au règlement intérieur de l'aménagement.

Art. II — Obligations de l'O.N.A.H.A.

L'O.N.A.H.A. s'engage vis à vis de l'exploitant à :

- Fournir de l'eau nécessaire aux cultures, sauf cas de force majeure, notamment incident climatique ou impossibilité de réparation des moyens d'exhaure.
- Fournir les moyens de production (semences, engrais, matériel, produits, etc...) nécessaires à son exploitation, dont le montant sera imputé à la redevance.
- Assurer l'encadrement nécessaire à sa formation pour la conduite des irrigations et des cultures.
- Assurer la commercialisation de ses produits, en relation avec l'organisme habilité sous réserve que ceux-ci présentent les normes de qualités et de conditionnement requises.

Art. III. — Dégrevements

Lorsque les récoltes se révèlent affectées, du fait de circonstances échappant à la responsabilité de l'exploitant, celui-ci pourra solliciter auprès de l'O.N.A.H.A., via le canal des autorités de l'aménagement, une modération ou une remise de ses engagements financiers.

Cette demande devra en tous cas être introduite au stade laitieux de l'épiaison, ou à la date où celle-ci aurait dû avoir lieu normalement, en comparaison avec les parcelles voisines.

Art. 4.— Durée du présent contrat

Le présent contrat durera tant que dureront les qualités qui ont permis aux parties contractantes de passer ce contrat, à savoir pour l'exploitant son droit de jouissance sur la parcelle n° et pour l'O.N.A.H.A., sa qualité de gérant de l'aménagement de

A , le

L'exploitant

Le Directeur de l'Aménagement:

REPUBLICQUE DU NIGER

MINISTRE DU DEVELOPPEMENT RURAL

OFFICE NATIONAL DES AMENAGEMENTS
HYDRO-AGRIQUES

CONTRAT D'EXPLOITATION N°

Conformément aux textes en vigueur, sur la mise en valeur et la gestion des aménagements agricoles, réalisés par la puissance publique :

Vu la loi 60-28 du 25 mai 1960

Vu la loi 67-32 du 20 sept. 1967

Vu l'arrêté 003-MER du 24 oct. 1967

Vu le décret 68-41/MER/DCG du 21 mars 1968

Vu le décret 69-149/CGD du 19 oct. 1969

Vu le décret 69-150/PRN/CGD du 19 oct. 1969

Vu l'ordonnance 78-39 du 28 déc. 1978

Vu le décret 78-154/PCMS/MDR du 28 déc. 1978

Vu l'arrêté du Conseil des Ministres approuvant le présent contrat d'exploitation

ENTRE LES SOUS SIGNES

L'Office National des Aménagements Hydro-Agricoles, chargé de la mise en valeur et de la gestion de l'aménagement hydro-agricole de par convention de gérance n°, du représenté par le Directeur de l'aménagement et désigné dans le présent contrat par le sigle «O.N.A.H.A.»

d'une part

et Monsieur.....
demeurant à....., attributaire de la parcelle n°....., du même aménagement,
et désigné dans le présent contrat par le «vocable» exploitant

d'autre part →

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A. Introduction

In order to be an effective promoter of cooperation, Africare must have a basic awareness of the fundamental historical and practical guidelines which have been conceived to determine what, exactly, a cooperative society is.

The issue of cooperative principles is currently the center of controversy because some contemporary thinkers on the subject feel that the goals that have evolved from the fundamental belief of the Rochdale Pioneers (who started the first consumer cooperative in Britain in 1844) are too idealistic and do not fit the framework of modern government-sponsored cooperative projects in the developing areas of the world. Changes in the political, social, and economic environment have brought about an evolution of accepted practices which contradict, at times, the traditional viewpoint on cooperative principles.

B. Cooperative Principles

1. Cooperatives are Self-Help Organizations - The Tara Cooperatives exist basically so that members can overcome their own weaknesses by joining together with others, who are in the same economically disadvantaged position, to become strong through group action. Thus, the member is responsible for certain self-help actions which will work to increase the combined power of his organization. Members must be aware of their standing as co-owners of the cooperative enterprise and strive to build the society from within through active participation in the management process (either themselves, or through elected representatives) and through the full use of services that are provided by the organization.

2. Voluntary Association - Members must be allowed to join and withdraw at their own free will. They must voluntarily agree to conform to the rules of conduct that are prescribed for their organization.

3. Open Membership - Cooperative membership applications must not be judged on the basis of any artificial restriction such as race, religion, sex, political affiliation, or social status. Cooperative membership must be limited under certain circumstances, i.e. if the potential member's economic objective in joining the cooperative does not coincide with the objectives of the society, or if the cooperative cannot efficiently serve an unlimited number of new members.

4. Political Neutrality - Cooperatives should not attempt to interfere with, or change, the political feelings of their members. Cooperative meetings should not be allowed to become forums for the expression of differing political viewpoints. Whenever possible, cooperatives should seek to remain independent from political parties and the government, and concentrate on protecting the economic interest of their members.

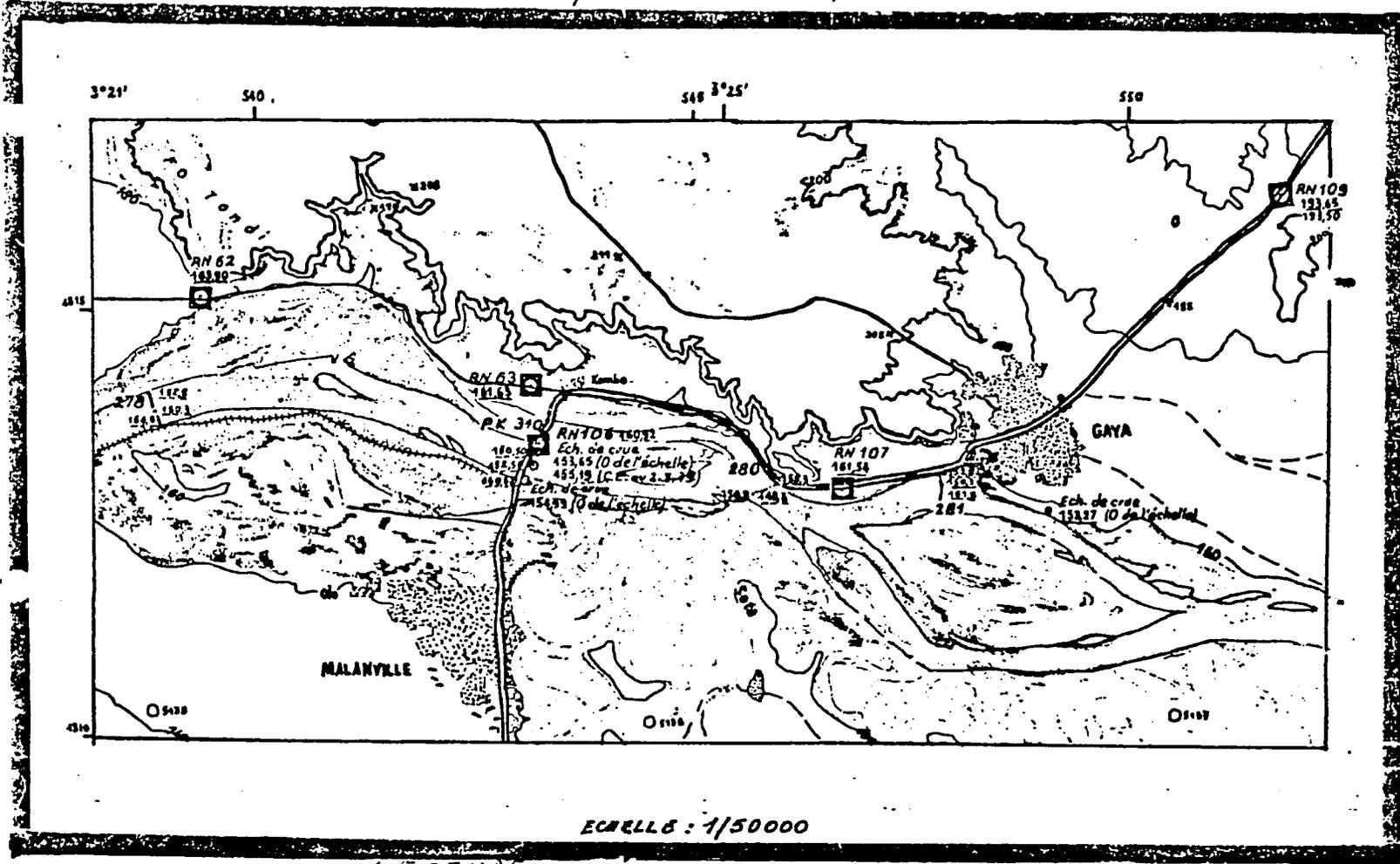
5. Cooperatives Must Promote Economic Efficiency in Their Dealings - In basic terms, cooperatives are business enterprises that are formed to promote the economic advancement of their constituent members. In commercial transactions with members and outside firms or agencies the cooperatives must strive to reduce overhead costs and risks to a minimum. The general principles of business administration and management are equally as relevant to cooperatives as they are to private firms.

6. Democratic Management and Control - The principle of democratic management and control has three aspects: cooperatives are self-governing organizations run by their members; they operate on the democratic principle of "one man-one vote," and the members must control the management of their own society (either directly or indirectly through democratically elected committees). Members must fulfill their responsibilities in this respect by keeping fully aware of all important matters which concern the society and by exercising their right to vote at election time.

7. Fair and Prudent Distribution of Economic Returns - Surplus funds must be divided on the basis of the amount of business that the individual has with the society. This is done in an effort to return to the members what they have been charged by the cooperative that is in excess of actual costs. However, some earnings may be retained in the cooperative for the division of capital reserves - either allocated or unallocated.

8. Promotion of Member and Employee Education - The fact that cooperatives are primarily self-help organizations implies that they must play a forceful role in the education of their members and staff. The cooperative member must receive instruction so that he can participate effectively in the functioning of his society. The cooperative must train its employees so that they are able to fill their management and administrative positions efficiently, imaginatively, and honestly.

9. Autonomy - The cooperative must be allowed to enjoy a relative degree of autonomy in its individual goal-setting and management. Africare/GON must allow the cooperative the scope to become an autonomous self-help organization. Cooperatives can naturally be subjected to a regulated amount of state planning, just like any other business organization.



ECHELLE : 1/50000

LEGENDE

- | | | |
|--|---|---|
| <p>☐ BORNE (RN) ou REPÈRE (RM) de M.G. A.D.</p> <p>○ POINT DE NIVELLEMENT LÉVÉ SUR LE TERRAIN</p> <p>x POINT DE NIVELLEMENT PHOTOGRAMMÉTRIQUE</p> <p>○ MARQUE DE PHOTOGRAPHIE</p> <p><u>165,90</u> : COTE MÈRE</p> <p><u>153,50</u> : COTE SOL</p> <p><u>150,50</u> : COTE DE FOND</p> | <p>----- ITINÉRAIRE DE PROFIL EN LONG</p> <p>~ COURBE MAÎTRESSE</p> <p>— COURSE NORMALE (Eq. 5m)</p> <p>- - - AUTRES PISTES</p> <p>== ROUTE REVÊTUE</p> <p>— PISTE PARTICULIÈREMENT ALÉATOIRE</p> | <p>☺ Villages</p> <p> Bâche longue</p> <p>++++ Bâche étroite</p> |
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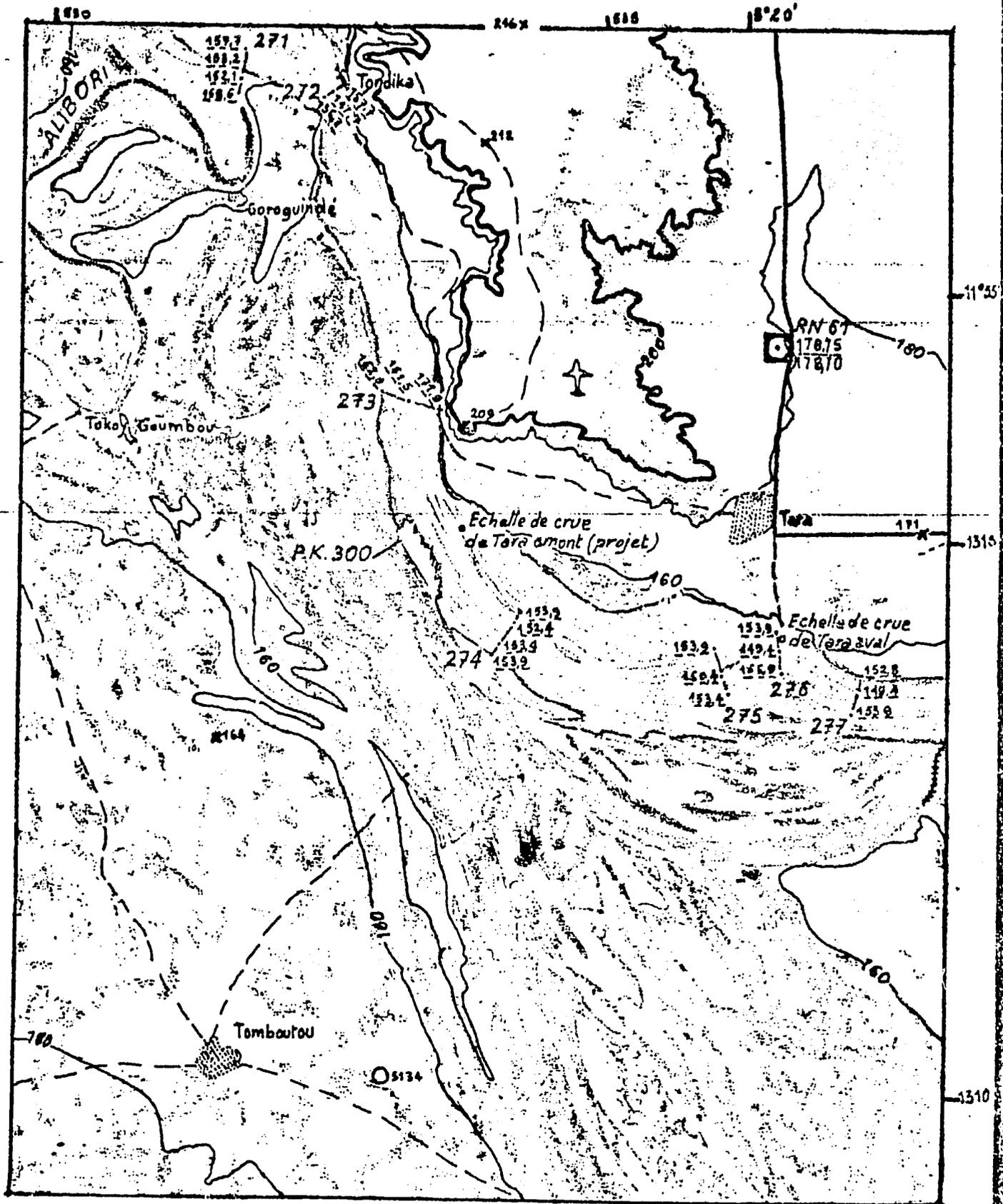
VU et VÉRIFIÉ, Niamey le 18-05-1980

par LE C.D.C. : *[Signature]*

*) Approuvé par Le D.R.E. : *[Signature]*

*) Dessiné par *[Signature]*

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AUTORITE DU BASSIN DU NIGER
DIRECTION DES RESSOURCES EN EAU
PROFILS DU FLEUVE NIGER
(Tronçon TARA - TONDIKA)
 D'après levés aériens I.G.N. 1975

VIRIPIB	APPROUVÉ	DATE	ECHELLE
C.S.C.	D.R.6	20/5/1975	1/50 000
<i>[Signature]</i>	<i>[Signature]</i>	1975	

- ☉ Borne (B.N.)
 - x Point de nivellement photogrammetrique.
 - Nadir de photographie.
 - 153,9 cote de fond.
 - Itineraire de profil en long.
 - ~ Courbe maîtresse.
 - Courbe normale (Eq. 5m).
 - - - Autres pistes.
- villages
 Dignes étroites

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