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A PROPOSAL FOR
A
COOPERATIVE GRAIN STORAGE PROJECT
RWANDA

PREPARED AND PRESENTED

By The

The Cooperative League of the U.S.A.

In Conjunction with

The Government of Rwanda

July 12, 1977

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LIST OF ABBREVIATIONS

UNCDF	United Nations Capital Development Fund
USAID (AID)	United States Agency for International Development
GOR	Government of the Republic of Rwanda
CLUSA	Cooperative League of the U.S.A.
RF	Rwandan Franc
CRS	Catholic Relief Service
Kg	Kilogram
PF	Purchasing Fund
GRENAWA	Food Marketing Storage Project
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Program

NOTE: 90 Rwandan Francs = \$1.00

SUMMARY:

1.1 This project has been planned and designed by the Cooperative League of the USA in consultation with the Government of Rwanda. Successful implementation of a grain storage project will require multi-agency collaboration and support from: The United Nations Capital Development Fund, the US Agency for International Development, the Government of Rwanda, The Peace Corps, CLUSA and Rwandan Cooperatives in the following forms:

UNCDF:

A Capital Development Grant of approximately \$232,000 to support construction costs for seven storage centers (silos) and the establishment of a purchasing fund for each center.

AID:

An Operational Program Grant to support 24 man-months of technical assistance, training and project support at an approximate cost of \$327,000.00

GOR:

Office space within the Ministry of Social Affairs and Cooperative Movement, a counter-part to the project manager and personnel from the Ministry receiving training and working with this project.

Peace Corps:

Two volunteers with a strong knowledge in construction techniques to supervise construction of the storage centers.

CLUSA:

Project management, overall supervision of the project, backstopping, general administration evaluation.

Cooperatives:

Participate in decisions concerning storage centers and contribution of labor and materials for construction.

1.2 The project, covering a 24 month period, consists of three inter-related components which are:

1. Cooperative selection and construction,
2. Storage center operations,
3. Training

1.3 Seven cooperatives will be selected under careful analysis to take on the added responsibilities of providing grain storage facilities and offering added marketing services to cooperative members as well as other farmers in the project areas.

1.4 Seven storage centers of approximately 80 tons each will be constructed. The project includes the establishment of a purchasing fund for each cooperative to support purchases of beans and grains and to cover initial operating expenses. Necessary training components to prepare and assist local cooperatives for the added financial, management and technical responsibilities are included.

1.5 The purposes of the project are:

1. Reduction in storage losses for farm families,
2. Increased income for farm families, and
3. Strong rural institutions in the form of farmer owned cooperatives providing new services to meet the need of the rural population.

1.6 It is anticipated that the fulfillment of these purposes will lead to an increased supply of beans and grain in the project areas as well as improved services available to the farm families utilizing cooperatives.

1.7 This project will benefit an estimated 17,500 small farmers and their families. It will also complement and strengthen other development programs of the government in areas of agriculture and cooperative development.

1.8 The project will utilize the experience and technology proven by a similar program being conducted by Catholic Relief Services. There will be no overlap between these two efforts, since CRS activities center on local missions and/or communes. This project is designed to introduce the concept of grain storage to the cooperative sector.

A PROBLEM: LOCAL GRAIN STORAGE

2.1 Rwanda is faced with a critical situation in keeping food production in step with population increases. This is and will continue to be the major problem confronting Rwanda. At the same time that national development requires increased agricultural production, greater farmer income is necessary to build a capital base for continuing development.

2.2 The Government of Rwanda is supporting and expanding programs of agricultural experimentation, demonstration and extension aimed at greater production while conserving the fertility of the soil. However, increased production will be a slow and cautious process. Experience has shown that the introduction and acceptance of new and improved methods of cultivation are slow and difficult in this largely subsistent economy.

2.3 While increased production is one side of the coin, another immediate way of increasing food supplies (as well as monetary income) for the farm family is to cut food storage losses. The Ministry of Agriculture estimates that loss of post harvest beans and grain continually borders on 25%. These losses are the result of insect infestation, rodents and excessive humidity. In a study done in 1969, losses due to inadequate storage were tabulated at 760,000,000 RF, or 9% of the Gross National Product! Rwanda cannot afford such loss.

Analysis of the Problem

Present Storage Methods

2.4 Traditionally the farmer stored grain in large, basket-shaped structures made from woven reeds. This structure was coated by mud plaster, with the entire unit covered with a thatch roof.

2.5 More recently, due to increasing frequency of theft brought on by population pressure, the farm family has begun to store grain in small baskets placed in the interior of the home. These baskets are made hard and durable through a coating of mud and cow dung.

2.6 What cannot be stored on the farm due to lack of space or the immediate need for money is sold to local merchants. Their storage is usually done by keeping beans and grain sacked in a room having no special provisions for storage.

Humidity

2.7 A look at AnnexA indicates the high humidity with which the Rwandan farmer must cope. It is evident that grain exposed to such average humidity will reach moisture levels conducive to the growth of many molds.

2.8 It is generally accepted that a continual moisture reading of 12.5% for beans and sorghum is low enough to prevent mold formation or growth. When one takes into account the minimum relative humidity during the day in Rwanda, it is possible to dry beans and grain to the 12.5% level by exposing them to sun and air during the dryer time of the day. The question then becomes one of how the farmer can continue to keep beans and grain close to the 12.5% moisture level? The traditional methods have proven inadequate in stopping loss due to mold as the stored beans and grain are continually exposed to the high humidity. Also, exposure to high humidity causes a rapid deterioration in germination viability for stored seed using traditional methods.

Insect Infestation

2.9 A trip to any market or farmer's home to analyze stored beans and grain immediately points out the loss caused by insects. It is not uncommon to find 50% of the grains with holes caused by insects. Not only is there a tremendous weight loss (40% infestation translates into a 10% weight loss), but also the weight loss is centered on the softer, more nutritious portion - the germ.

2.10 Traditionally the farmer has used sunning and mixing ash and cow urine with stored beans and grain to fight loss due to infestation. Chemical insecticides (largely DDT), introduced for commercial crops such as coffee, are starting to be used more and more by the farmer on beans and sorghum. However, continued high loss to infestation continues.

Cropping Cycle and Price

2.11 The cycle of crops in Rwanda shows that the most important time for storage also coincides with the highest humidity levels. The major bean crop, planted in September and harvested in January, must be stored during the rains that start in February and continue into April and May. Another planting of beans or sorghum

occurs during February and March, being ready for harvest in June or July. This crop must fulfill the family needs during the months of June to September and guarantee seed for the September planting of beans. The period from October to early January represents the lean season. When rains are irregular and crop yields fall below the level of subsistence, the farm family finds itself in a dire situation during this time.

2.12 From the major crop harvested in January, the rural family usually sun-dries and stores 50-70% for family use and sells the remainder to a local trader. The cash income is required to cover government taxes, school fees for children and family needs. The farmer's stored beans usually run out by October. With money received from the sale of coffee, the family must repurchase from the local trader enough beans to guarantee the family's existence until January.

2.13 Thus, the Rwandan farmer finds himself selling at a low price to the trader in times of large supply and being forced to repurchase from the trader at prices 50 to 100% higher during the months of September to January. The only one that profits from this system in the end is the trader.

2.14 Being aware of this problem faced by the Rwandan farm family, the Rwandan Government has attempted to bring about greater price stability by setting a minimum buying price from the farmer for beans at 20 RF/Kg. Because of the inability to enforce this price structure, beans were being purchased for 12-17 RF/Kg. in May, 1977. In 1976 the repurchase price in November varied between 27-35 RF/Kg. In years of real scarcity, such as 1974, the price difference becomes staggering - selling at 8-15 RF/Kg. after the January harvest and repurchasing at 60 RF/Kg. in November.

PROPOSED RESPONSE: LOCAL COOPERATIVE GRAIN STORAGE

3.1 A good grain storage facility is a place to keep grain safe until the farmer wants to sell it, to eat it or to plant it.

3.2 Catholic Relief Services, with many years experience in Rwanda, felt several years ago that they could respond to:

1. the widespread malnutrition existing in Rwanda,
2. the approximately 25% loss of beans and grain resulting from inadequate local storage, and
3. the costly fluctuations in market prices for subsistence foods,

by assisting in the construction and operation of local storage centers. These centers (silos), built in conjunction with Catholic Missions, act essentially as banks where the farm family deposits beans and/or grain and in return receives the official buying price. At any time by paying the buying price and nominal fee for handling, the same family can withdraw an amount equivalent to the quantity deposited. For example, at the time of 'deposit' the farm family is paid the official purchase price of beans by the storage center -20 RF/Kg.- and is issued a receipt. Later upon presentation of the receipt, the beans may be repurchased as 'withdrawn' by paying the deposit price plus actual storage costs - usually less than 3 RF/Kg.

3.3 This system enables the farm family to cut on-farm storage losses and helps stabilize market prices in the areas served by the storage facilities. Such a system also has proven that it:

1. takes into account the farm family's immediate need for cash at the time of harvest,
2. assures the availability of the stored grain to the farm family upon their request, and
3. guarantees that the farm family receives the official stated price for beans and grain upon sale (deposit) and assures a post-storage purchase (withdrawal) price proportional to the family's earning power.

This system has attracted strong local and government support.

3.4 CRS has settled on a functional design of 6 air-tight and water-proof chambers each holding approximately 13 tons of beans or grain. The basic design has proven technically successful over a 2 year period. Loss due to insect infestation and mold has been negligible due to fumigation in an air-tight environment and the placing of adequately dried beans and grain in a continuing non-humid environment until the need to withdraw.

3.5 The Cooperative League in conjunction with the Government of Rwanda plans to take into the cooperative sector the same basic structural design and storage system as proven by CRS to assist local cooperatives in offering a needed and valuable service to the locality.

PROJECT DESCRIPTION:

4.1 The project will have 3 distinct but interrelated components. These are:

1. Cooperative selection and construction of storage centers,
2. Actual operations of storage centers, and
3. Appropriate training.

4.2 It is anticipated that through a phased pattern of implementation, all three of the components will be in operation within ten months of the beginning of the project. (See Annex B. -- Implementation Schedule)

Cooperative Selection and Construction

4.3 Seven storage centers will be built and operating by the termination of the project. These seven centers will be divided between several geographic regions. The initial region selected by the Government of Rwanda and CLUSA is the Prefecture of Kibungo. (See Annex C). This area is in general a surplus production region for beans and a deficit region for sorghum. The region has several well-operating cooperatives. Other regions to be chosen will include deficit production areas. It is felt by the government and CLUSA that both surplus and deficit regions can benefit. Such a geographic split offers greater opportunity to gather valuable information on storage and cooperative operations, to analyze the effect these have on the local situation and to surface problems with which the project will have to deal.

4.4 The actual selection of cooperatives to be assisted by the project will be done by the project manager in conjunction with the Ministry of Social Affairs, based upon local cooperative interest and willingness to participate and contribute. Initial criteria for cooperative selection is found in Annex D.

4.5 Once specific cooperatives are singled out, the actual site selection for the storage centers becomes important for successful operations. While criteria for site

selection can change with total project development, those criteria listed in Annex F will initially be used by the cooperatives and project management.

4.6 Once site selection has been finalized, actual construction should take 4-7 months. Supervision will be done by two Peace Corps volunteers under the direction of the Project Manager. Actual construction will be done utilizing labor of cooperative members and local masons. All of the major materials, e.g. bricks, rock and sand, not able to be furnished by the cooperative will be purchased locally with project funds as will all cement and steel rod. Components such as storage hatches, ladders, etc. will be built utilizing local artisans. The required construction components and estimated costs are listed in Annex F. Total construction costs for one storage center should be approximately \$16,400.

4.7 The basic design to be utilized (Annex G) offers each cooperative the opportunity to add office and storage space, drying floors, a room for the People's Bank (the only functioning rural banking institution in Rwanda, operating on the lines of a credit union), etc. according to need and expected growth in operations. It should be emphasized that each cooperative will be expected to contribute and participate in the planning, site selection and construction as much as is reasonable on a cooperative by cooperative basis.

4.8 Capacity for the storage centers has been calculated by using Catholic Relief Service gathered statistics and design research at 80 tons. (See Annex H). This capacity will cover the tonnage expected after a full year's operations. Architectural plans will be made available to this project by the architect of the CRS silo project and CRS. The design will permit two additional storage cells of 13.5 tons each to be easily added if volume so requires.

Operations of Storage Centers

4.9 It is planned that upon completion of construction, the storage centers will become the property of each cooperative to which they are attached. A manager of the center along with other necessary employees will be selected by the cooperative. These people are all expected to come from the local population.

4.10 The facilities of the storage centers will be available for use by all of the local population, though membership in the cooperative will mean slightly lower storage costs and guarantee of deposits and withdrawal when the center is working to capacity.

4.11 Prices set by the government will be followed for purchase of beans and grain. A price differential of 3 RF/Kg. between deposit and withdrawal will be used during the first year's operation to cover operating costs (salaries, insecticides, etc.). After one year's operation this difference will be adjusted by the cooperative and project management to better reflect actual operating costs and the related operations of each cooperative.

4.12 It is expected that records of each center's transactions will be forwarded monthly to the project management in Kigali. After project completion such records will be forwarded to the Ministry of Social Affairs for their scrutiny, analysis and assistance if so needed or requested.

4.13 A purchasing fund will be made available to each cooperative for storage center purchases (deposits). It is calculated that a sum of \$14,000 will be required. Since approximately 65 tons is the initial expected volume, using the following formula indicates purchasing funds required:

$$\begin{aligned} \text{PF} &= \text{Tons} \times 1000\text{Kg.} \times 20\text{RF (beans)} \\ \text{PF} &= 65 \times 1000 \times 20\text{RF} = 1,300,000 \text{ RF} = \\ &\quad \text{approx. } \$14,000 \end{aligned}$$

4.14 Once withdrawals from the storage center begin, the money in the purchasing fund will commence to turnover. Unless the government increases the minimum prices set for beans and sorghum, this purchasing fund should remain adequate.

4.15 Any beans or grain not withdrawn by depositors within a year can be sold by the cooperative as it wishes. If more deposits are made than there is storage capacity of if additional beans or grain need to be imported into a region to storage centers for local use, it is expected that this will be done through the AID supported national warehousing program (GRENAWA).

Cooperative Functions and Operational Training

4.16 The project will concentrate on the initial operations of the storage centers and their integration into each cooperative's activities. This will be done by training those directing and working with the centers in the necessary management, accounting, grain storage knowledge and operations required to ensure smooth operations.

4.17 The project manager will work closely with the Ministry of Social Affairs and Cooperative Movement in developing training material and short courses for the leaders, managers and operating personnel of the cooperative and storage centers. The initial material will focus upon accounting systems, reporting systems and control of storage operations. Once this material has been developed, tested and in operation, attention will turn to other areas vital for greater services offered by cooperatives. Included will be developing member relations, better functioning of the Board of Directors or the equivalent and relationships between members and management.

4.18 Cooperative inspectors in the communes where there are cooperatives acquiring centers will also receive training.

4.19 Within the Ministry of Social Affairs and Cooperative Movement, the project will give in-depth training to 4-6 staff members in the areas of management, accounting, cooperative operations, member roles, etc. The group will form a team that is capable of helping strengthen cooperatives and preparing them for increased services such as offered by storage centers.

4.20 It is planned that the CLUSA project manager will be capable of developing and helping to implement such training programs in direct linkage with the Ministry. The training and materials development budget allows for short-term courses taken by personnel of the Ministry at such places as the Pan-African Institute of Development in the Cameroun.

BENEFICIARIES:

5.1 The project will directly benefit 4,400 families utilizing the storage centers. The benefits will accrue to them through greater family income, a sharp reduction in storage loss and a guaranteed supply of beans and grain during the lean period of the year at prices within the purchasing power of the farm family. In addition, 13,100 other families living in the project areas will benefit through a greater local supply of beans and grain as well as more stable prices.

5.2 In 1976 (a good year for production) the average price paid farmers for beans in January was 14-17 RF/Kg. In November the farmer was buying back beans at 30-33 RF/Kg. If the higher selling price and the lower buying price are used, the difference the farm family had to pay was 13 RF/Kg. for beans. This represents a loss of money to the farm family and a net gain by grain merchants.

5.3 Under the system proposed by this project, the selling (deposit) price to the farmer would be that established by the Government--presently 20 RF/Kg. for beans--while the buying (withdrawal) price would be no higher than 3 RF/Kg. more than the selling price. Whereas in 1976 the farm family had to pay a difference of 13 RF/Kg. for beans between January and November, the same farm family under this project would only pay a price of 3 RF/Kg. for the equivalent. In addition, the beans and grain are stored in a safe environment free from loss due to mold, infestation and rodents.

5.4 These advantages can be translated as follows (assuming a storage center of 80 ton capacity is filled to 65 tons in January and the total stock of beans are sold during the lean period of October through December):

Present System

Sold by Farm Family	65,000 Kg. x 17 RF/Kg. = 1,105,000 RF
Bought by Farm Family	65,000 Kg. x 30 RF/Kg. = <u>1,950,000 RF</u>
Lost by Farm Families	- 845,000 RF

Proposed System

Deposit by Family	65,000 Kg. x 20 RF/Kg. = 1,300,000 RF
Withdrawal by Family	65,000 Kg. x 23 RF/Kg. = <u>1,495,000 RF</u>
Cost of Storage to Farm Families	- 195,000 RF

5.5 In other words, the savings to farm families utilizing a storage center at 4/5 capacity in a normal year such as 1976 would be 650,000 RF or \$7,222.22.

5.6 In addition, seed stored in the storage centers will be guarded in a better state of germination than through traditional methods. With fewer seeds needing to be planted per hectare because of higher germination rates, extra amounts of beans and grains will be available for local consumption.

5.7 Increased food availability in the project areas will occur by reducing loss in storage. A center operating a full capacity could be responsible for placing an additional 20 tons of beans and grain into the area each year by cutting storage losses.

5.8 Another positive effect is that the storage center will influence local price stability, thus benefitting all people living in the area. Center operations will only suffer if local grain merchants begin to offer prices higher than minimum prices set by the government. In this case the farmer benefits from the higher prices offered.

5.9 Besides the direct benefits this project offers the farm family, the increased operating capacity and better functioning generated in the local cooperative will mean greater services to members at cost. The understanding of cooperative ways and operations by the members should lead to greater participation by the farm family in its own development and that of the area.

5.10 Finally, the Ministry of Social Affairs and Cooperative Movement should be in a position to more effectively assist cooperative development by the time this project is over. Government personnel will receive added training. The training will be of a nature so that these personnel can better provide assistance and expertise to cooperative operations.

BACKGROUND INFORMATION:

Demographic

6.1 According to the U.S. Department of Commerce's Foreign Demographic Analysis Division, Rwanda has the world's lowest per capita income. Annual income in 1976 was 11,661 RF (\$126) of which 6,996 RF (\$76) came from monetary circulation. At the same time Rwanda has one of the highest population densities and growth rates found on the African continent. Among its 26,388 Km² of hilly land is a population numbering over 4,300,000, giving Rwanda a population density of more

than 150 people per KM². More than half of the population is under 18 years of age. (See Annex I for Population Growth Graph).

Geography

6.2 Slightly less than half of the total land area of 2,633,800 hectares is suitable for cultivation. Of this amount only 808,000 hectares are available to support the food requirements of the total population. This averages out to .2 hectares per person. The remaining cultivatable land is used for the commercial production of tea, coffee and pyrethrum.

6.3 All in all, going from east to west, the country may be described briefly as follows: sparsely populated savannah with a relatively dry climate in the east, high lands with a relatively humid climate and more people in the central zone, and thickly populated zones on the Congo-Nile ridge and the volcanic slopes of the north-west. This rough description omits mention of the micro-climates. Due to the particular structure of the country, ecological conditions may vary completely in two - albeit neighboring regions. This situation radically influences agricultural production.

Agriculture

6.4 Rwanda is a rural based country with more than 90% of its population engaged in agricultural activities. Ministry of Agriculture statistics show that from 1971 to 1975 total food production increased 17% while the population increased by 19%. (See Annex J). The increased food production was accomplished by putting under cultivation 20% more land in 1975 than in 1971. The consequent decrease in yield per hectare from 1971 to 1975 indicates that the pressure for more food is forcing the rural population to increasingly turn to marginal land for production gains. The devastating affect that this procedure has on erosion, already serious, is easily visible throughout the Rwandan countryside.

6.5 Rwanda agriculture closely follows a regime of self-maintenance. Food supplies consist almost entirely of what is produced on the family plot of land. The major food crops are beans, sweet potatoes, manioc, potatoes, sorghum, peas and maize. Bananas, the largest single crop, are used almost exclusively in making the local brew. There are almost no stocks of food readily available to the rural population due to primitive storage techniques.

6.6 The agricultural cycle begins in September when the first rains have fallen after the dry season and beans are planted for January harvesting. The months of October to December represent the most difficult period for food supplies. As beans are harvested in January another crop of beans or sorghum is planted to be harvested in June or July. In May and June sweet potatoes are planted.

6.7 It is apparent by looking at Annex K and K1 that food consumption is directly related to the farming calendar. When beans are readily available they are the preferred food. As beans become less available and more expensive, consumption turns to other sources such as sweet potatoes and manioc. This type of farming cycle, dependent upon the rainy seasons, means that the farmer and his family are at the mercy of nature, but worse, also at the mercy of those merchants that deal in bean and grain transactions.

Nutrition

6.8 The effects of little increase in per hectare productivity and a rapidly expanding population is pushing Rwanda deeper into a nutritional crisis. The chart in Annex L, taken from a national nutritional survey published in 1975*, indicates the lack of available human energy resources throughout Rwanda. Constantly, and throughout the year, 50% of energy needs are covered by two foods: beans and sweet potatoes. The bean crop clearly influences the whole picture, while sweet potatoes act as the general diet regulator.

6.9 The above mentioned survey found alarming the average body weight for Rwandans when compared to established reference norms. The study states, "Since it is accepted that genetic factors do not influence the average weight of adults, it must be assumed that the low weight found are due to an inadequate food supply."

*A National Nutritional Survey in the Republic of Rwanda, H.L. Vis, et al, Musee Royal de L'Afrique Centrale; Tervuren, Belgium.

The Farm Family

6.10 The Rwandan farm family continually borders on or just above the subsistence level. In the past as population pressures surfaced, many Rwandans moved to still available cultivatable land to help keep production ahead of the increase in family numbers. However, the rural Rwandan family, still growing, has just about run out of any options for increasing the area planted except to bring marginal land under the hoe.

6.11 Unlike many countries, an unequal distribution of land among farm families does not exist in Rwanda. According to Rwandan statistics, only 6% of the farm families cultivate more than 1.5 hectares, 30% cultivate between 1 and 1.5 hectares and 55% cultivate less than one hectare. The farm family is thus faced with a must situation of achieving greater production from the land. With average yields that are low, the potential for greater yields exists. However, as on the national level the critical point for the farm family is more food now.

6.12 Because of the pattern of cropping cycles the farmer traditionally sells 30% of the major January harvest of beans so that he can pay his taxes to the government, pay school fees for his children and have money to purchase necessary items for the family. Because of heavy supply in January and February, the farmer receives a price for his beans which is very low. Later in the same year the farmer must buy beans from the market at high prices to feed his family and to have seed with which to sow his fields.

6.13 While coffee is grown by almost every Rwandan farm family, the cash income from the sale of coffee has been traditionally low. Beans are becoming more a major cash crop in the life of the farmer.

JUSTIFICATION FOR COOPERATIVE INVOLVEMENT:

7.1 Cooperatives already play a suprisingly important role in the development efforts of Rwanda. They are unique in this area of Africa because they are truly cooperative, not controlled by the Government and function well in the social structure. Already, cooperatives in Rwanda are beginning to give the farm family institutional access to means of production, the market, agricultural knowledge and the financial system.

7.2 The Government of Rwanda has placed a heavy emphasis on the development of cooperative activities while at the same time not wishing to control their free functioning. The government is promoting the establishment of multifunctional cooperative development in each commune, having as a base both marketing and supply functions.

7.3 The present strength of Rwandan agriculture cooperatives is 33 with another 60 awaiting further organization and registration to move from the pre-cooperative stage to fully recognized cooperatives. In addition there are some 52 other cooperatives operating in such areas as consumer services, fisheries and handicrafts. This scope (Annex M.) of Rwandan cooperatives gives an indication of the institutional framework which cooperatives offer. Weak management and accounting, lack of capital and a dearth of people capable of assisting and promoting cooperative operations and functions constantly plaques cooperative development. But, cooperatives in Rwanda offer more than any other institutions:

1. the real chance for the farm family to participate in local development efforts and be a beneficiary at the same time,
2. to act as a local catalyst for development through the introduction of improved agricultural practices, services and knowledge, and
3. a structure controlled by the local population in a country where communication channels often mean isolation.

LINKAGES AND RELATED ACTIVITIES

Catholic Relief Service

8.1 Under funding from UNICEF, CRS is planning on constructing additional storage silos to add to seven silos (partially AID funded) already completed. CRS is linking these new silos to commune and/or Catholic mission operations, whereas this project seeks to work with established cooperatives. Planning for this project has received valuable help from CRS personnel in Kigali. Such cooperation is expected to continue. No overlapping in site selection and storage center operations is anticipated due to cooperation between CRS and CLUSA and the site selection process that involves the Government of Rwanda.

Food Storage Marketing Project (GRENAWA)

8.2 Two years ago AID established the Food Storage Marketing Project in conjunction with the Rwandan government. To date this project has received high marks by those concerned with storage and marketing. The present storage capacity of GRENAWA is approximately 5,000 tons spread over 5 locations, with additional capacity of 4,500 tons presently being discussed by construction in 3 other areas. GRENAWA works to provide buffer stocks and market intervention activities to stabilize prices at the national level for beans and sorghum. Peas and maize will also be included in their operations.

8.3 GRENAWA does not deal directly with the cultivator and offers no mechanism to fulfill the local storage needs of the farm family. The effectiveness of GRENAWA is hurt due to its reliance on purchasing from grain merchants and also selling its stock back to grain merchants. Any chance for price stability suffers, as the grain merchants do not feel bound to follow official posted prices. This proposed local storage project complements and can be vertically integrated commercially with GRENAWA.

8.4 This project offers a direct means of supply to GRENAWA from the farmer once local needs are dealt with. Any surplus can be sold to GRENAWA. Also, GRENAWA offers the local storage centers the opportunity to stock the centers with commodities for local use which are surplus in one area and deficit in another.

8.5 This project and GRENAWA should be mutually beneficial. (See Annex N for more information on GRENAWA)

Agency for International Development

8.5 USAID/Rwanda is interested in utilizing the experience, work and findings of this project to support a larger bilateral effort for local cooperative grain storage. A PID prepared by AID/Rwanda has already been approved which conceives of this project as Phase I with the bilateral effort becoming Phase II. It is anticipated that this project can resolve initial problems, train people in the Ministry of Social Affairs and establish procedures which can be readily utilized in a Phase II. Thus a smooth transition into a larger AID supported bilateral program can be expected from success in this project.

People's Bank

8.7 There is a growing demand for branches of the People's Bank in rural areas. The People's Bank is the only institution that is operating and offering services in the rural areas. This Bank (similar to credit union operations and supported by Swiss financial and technical assistance) has been used successfully beside storage center operations assisted by CRS. Many of the cooperatives to be assisted by the project either have a local branch (often in the same building) or have plans to establish a branch of the Bank. The close working relationship that a storage center and bank can develop for their mutual benefit cannot be underestimated. Building a People's Bank office attached to the physical storage center will be encouraged.

GOVERNMENT SUPPORT

9.1 The Government of Rwanda in its Second Development Plan (1977-1981) has placed highest priority on increasing agricultural production. Taking into account the rapid growth in population, increased production remains the principal force against famine. The Plan strongly supports the creation of storage centers to help conserve production and thus guarantee a larger food supply for the population.

9.2 Heavy emphasis has been given to the cooperative movement in each commune to assure the following services:

1. Collection, conservation and marketing of agricultural products,
2. Buying and furnishing supplies for increased production,
3. Provision of consumer supplies, and
4. A close linkage to the People's Bank.

9.3 This project supports directly or indirectly all of those points emphasized above. Government support for this project is underscored by letters found in Annex O.

SOCIAL SOUNDNESS ANALYSIS

10.1 Rwandans have a long history of working together to achieve different economic and social goals. UMAGANDA is the name given to the time freely devoted each week to some communal endeavor. The cooperatives in this project not only have this tradition, but also the active economic interest of members to pull upon for strong, local participation.

10.2 It is anticipated that actual construction assistance for the storage centers will be largely male. However, the actual storage operations will see greater involvement by women than men due to the division of labor as practiced in Rwandan society.

10.3 The link-up between the farm family, local storage centers and GRENAWA should mean that business for the local grain merchant will be reduced if the merchant is unable to effectively compete with this system. If greater services, reduced margins and better storage conditions cannot be offered in the areas of local storage centers, then the amounts of beans and grain passing through the hands of private dealers will be diminished. However, the net gain (financial and nutritional) for the rural family will offer more to Rwandan development than will reduced grain operations of local grain traders.

MANAGEMENT PLAN

11.1 This project will be administered by a project manager hired by and responsible to the Cooperative League. This individual will work in close contact with the Ministry of Social Affairs and Cooperative Movement in all aspects of the project. The Ministry will assign a full-time counterpart to the manager to assist in the implementation of this project as well as to gain practical experience in project development, design and functioning.

11.2 The project manager will be responsible for all necessary reporting through appropriate channels to the Government of Rwanda and the donor agencies participating in the project. In addition a management, financial and accounting system is to be developed for use by local cooperatives receiving grain storage facilities that will also enable the project to do adequate monitoring and analysis of all activities connected with the project. The logical framework gives the base for overall project evaluation.

11.3 Two Peace Corps volunteers will supervise the construction of the centers. Since the centers will be located in at least two geographic regions, it is felt that two such construction supervisors will be required to ensure proper technical construction. Except for these two individuals, all construction activities will be carried out by Rwandans.

11.4 It is anticipated that the project, with assistance from the Ministry, can develop courses and activities leading to managerial capability in each cooperative to successfully operate and integrate the planned storage operations into the local cooperative.

11.5 Coordination of inputs from UNCDF, CLUSA (AID grant) and Peace Corps will be the responsibility of the project manager. All GOR inputs will fall under the responsibility of the counterpart to the project director.

11.6 Once this project is completed the equipment supporting the project, i.e. vehicles, office equipment, etc., will become the property of the Ministry of Social Affairs and the Cooperative Movement.

FINANCIAL PLAN

12.1 The budget for this project is \$566,714.00 (51,004,240 RF). In addition to this total are:

1. Salary of the counterpart (for two years) amounting to \$4,266.66
2. Salaries of others from the GOR receiving training and assisting this project (6 men years) amounting to \$12,800.00, and
3. The labor and inputs contributed by the participating cooperatives.

12.2 Total divided costs are:

1. UNCDF Grant	\$231,584.00
2. CLUSA (AID Grant)	327,130.00
3. GOR	<u>8,000.00</u>
TOTAL	\$566,714.00

12.3 It is anticipated that the AID grant to this project will flow from AID/W to CLUSA/W and thence to project activities. The UNCDF grant can flow in the same manner or the money can be channeled to the UNDP Resident Representative and then to the project.

PROJECT BUDGET

	<u>R. Francs</u>	<u>Total</u>	<u>Dollars</u>	<u>Total</u>
I. Construction Costs for 7 Centers (See Annex F)				
A. Material*	5,934,726		\$65,941.40	
B. Transport*	2,030,000		22,555.54	
C. Masons & Labor*	1,605,095		17,834.39	
D. Equipment*	742,732		8,252.58	
		10,312,553		\$114,583.91
II. Purchasing Fund* for 7 Centers	8,820,000		98,000.00	
		8,820,000		98,000.00
III. Logistical Support				
A. Toyota Stout*	900,000		10,000.00	
B. Honda 125cc(2)*	180,000		2,000.00	
C. Maintenance*	630,000		7,000.00	
		1,710,000		19,000.00
IV. Office Support				
A. Rent**	720,000		8,000.00	
B. Typist+	600,000		6,666.67	
C. Accountant+	286,000		3,177.78	
D. Equipment+	120,000		1,333.33	
		1,726,000		19,177.78

PROJECT BUDGET

	<u>R. Francs</u>	<u>Total</u>	<u>Dollars</u>	<u>Total</u>
V. Project Vehicle				
A. VW Combi+	900,000		10,000.00	
B. Maintenance+	630,000		7,000.00	
		1,530,000		17,000.00
VI. Training				
A. Material & Course Development+	45,000		5,000.00	
B. Printing+	45,000		5,000.00	
C. International Training+	90,000		10,000.00	
D. Courses and Extension+	2,700,000		30,000.00	
		4,500,000		50,000.00
VII. Technical Assistance+	21,955,688		218,935.20	
VIII. Evaluation+	450,000	21,955,688	5,000.00	243,952.09
		<u>450,000</u>		<u>5,000.00</u>
	PROJECT TOTAL	51,004,240		<u>\$566,713.78</u>

* UNCDF Grant
+ CLUSA (AID Grant)
** GOR

Technical Assistant Breakdown (AID OPG)

<u>Line Item</u>	<u>Detail</u>	<u>Total</u>
1. Salary for Project Manager		
A. 1st Year	\$23,000	
B. 2nd Year	25,000	
C. Termination Pay	1,440	
		\$49,440.00
2. Fringe Benefits		
A. Workmen's Compensation	12,216	
B. Other Benefits	4,944	
		17,160.00
3. Travel & Transportation		
A. U.S. Travel	400	
B. International Travel to Post & Return	6,000	
C. Emergency Medical Travel	1,000	
D. R & R Travel	2,700	
E. Unaccompanied Baggage	4,550	
F. Household Effects	8,000	
G. Storage Household Effects	1,620	
H. Parking & Transport H.H.E.	1,200	
I. Taxi - US & enroute	100	
J. In-Country Transport	4,000	
		29,570.00
4. Allowances		
A. Per Diem - Recruitment & Orientation	1,050.00	
B. Quarters	32,000.00	
C. Post-Differential	12,000.00	
D. Education Allowance	6,600.00	
E. Post Allowance	2,740.00	
F. Per Diem - in-country	5,400.00	
		59,790.00
5. Commodities		
A. Procurement of one stove, refrigerator, etc.	2,500.00	
		2,500.00

Technical Assistant Breakdown (AID OPG)

<u>Line Item</u>	<u>Detail</u>	<u>Total</u>
6. Other Direct Costs		
A. Communications	\$2,400.00	
B. Miscellaneous	5,000.00	
		\$7,400.00
7. Evaluation	3,787.87	
		<u>3,787.87</u>
	Sub-Total	\$169,647.87
	Overhead @32%	54,287.33
	Overhead @32% on other pro- ject support (\$78,177.78)	25,016.89
		<hr/>
	TOTAL	\$248,952.09

Direct Project Support (AID OPG)

<u>Line Item</u>	<u>Detail</u>	<u>Total</u>
1. Training		
A. Material & Course Development	\$ 5,000.00	
B. Printing	5,000.00	
C. International Training	10,000.00	
D. Courses & Extension	30,000.00	
		\$50,000.00
2. Office Support		
A. Typist	6,666.67	
B. Accountant	3,177.78	
C. Equipment	1,333.33	
		11,177.78
3. Logistical Support		
A. Vehicle	10,000.00	
B. Maintenance	7,000.00	
		<u>17,000.00</u>
		\$78,177.78

LOGICAL FRAMEWORK

<u>NARRATIVE SUMMARY</u>	<u>OBJECTIVELY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>MAJOR ASSUMPTIONS</u>
<u>GOALS</u>			
1. Increased Supply of beans and grains in project areas.	1a. Local supply of beans and grain increased by a minimum of 10% after 2 years operations by each storage center.	1a. MOA communal statistics, GRENAWA Statistics and Project records.	Production of beans and grains does not drop dramatically
	1b. Price for beans and grain more stable in project areas than in the past.	1b. Project records, MOA and GRENAWA statistics and information.	Continued GoR commitment to project
2. Greater Services Offered by Cooperatives to Local Areas.	2a. People's Bank Branch attached to co-ops.	2a. People's Bank Annual Reports, Visual	
	2b. Storage services offered local residents.	2b. Ministry of Social Affairs and Project reports, Visual	
<hr/>			
<u>PURPOSE(S)</u>			
1. Reduction in Storage losses for farm families.	1a. Storage loss reduced in project area by 20% for beans and grain kept in storage centers.	1a. Storage center records and statistics, Project statistic and MOA records.	Farm families will utilize storage centers
	1b. Germination of seed stored in centers is 25% greater than traditionally stored seed.	1b. Project records	Local cooperatives remain viable economic entities
2. Increased Farm Family Income	2a. Farm family income for those utilizing storage facilities increased by an invisible average of \$2.40 per year.	2a. Comparison of past price differentials with differentials from project records	
	2b. Price for beans sold in market average near storage center offered price.	2b. Project records, local investigation and statistics of GRENAWA and MOA.	
3. Improved Cooperative Services and Operations	3a. Storage centers in operation.	3a. Ministry and Project records, Visual	

NARRATIVE SUMMARYOBJECTIVELY VERIFIABLE INDICATORSMEANS OF VERIFICATIONMAJOR ASSUMPTIONSOUTPUTS

1. Seven Storage Centers Constructed and in Operation.	1a. Construction finished on seven storage centers.	1a. Project records, Visual	Personnel from cooperative available for training and participation in project
	1b. Seven storage centers operating: 4 at 60% of capacity (after one year of operations) 3 at 40% of capacity (after 6 months of operations)	1b. Project records, co-op records.	
2. Operating fund in place and being utilized.	2a. Mechanism established for accounting of operating fund at end of first six months.	2a. Project records, Visual	GOR personnel available for advanced training Motivation of cooperatives to manage and operate storage units.
	2b. Operating fund disbursed as follows: 4 centers utilizing 60% of funds 3 centers utilizing 40% of funds	2b. Project records	
3. Managers and Accountants trained in Storage Center Operations.	3a. Seven co-op managers and accountants each received three weeks of instructions in areas relevant to storage center operations.	3a. Project and Ministry records.	
	3b. GOR co-op team assisted co-op management and operations in field.	3b. Project report and co-op reports and team reports.	
4. Accounting and Reporting Systems in Place and Functioning.	4a. Systematic accounting procedure for storage center operations established in first six months of project by Project management.	4a. Project records, Visual	
	4b. Systematic reporting system for all components of project established in first six months of project.		
5. GOR Personnel receive appropriate training as established by Project Management and Ministry of Social Affairs.	5a. 4-6 GOR personnel each received 1-3 months of intensive training in areas selected by the Project Management.	5a. Ministry and Project records, Personal interviews.	
	5b. Co-op team assists all seven co-ops receiving storage centers.	5b. Co-op and Project reports.	

NARRATIVE SUMMARYOBJECTIVELY VERIFIABLE INDICATORSMEANS OF VERIFICATIONMAJOR ASSUMPTIONSOUTPUTS (Continued)

6. Courses and Material Developed and in use for Member Relations, Board of Directors and Mangers

6a. 6 cooperative related courses developed and being taught in-country to local cooperative personnel.

6a. Project reports, course material and Ministry reports.

6b. Material for assisting co-op operations and member understanding printed and in circulation as well as material for courses mentioned above in 6a.

6b. Visual and Project records

INPUTS

1. Construction
 a. Land
 b. Cement, Steel, etc.
 c. Sand, Rock, Water
 d. Labor
 e. Supervision
 f. Misc.

1a. Land given to co-ops by GOR, cleared by co-ops.

1a. Co-op and Project records, Visual.

1b. Cement, steel, bricks, etc. purchased by Project utilizing UNCDF funds.

1b. Project records, Visual

1c. Sand, rock, etc. supplied by local co-ops (if local co-ops unable to furnish all, UNCDF funds will be utilized)

1c. Project records, Visual

1d. Labor furnished by local co-ops (If unable to furnish all necessary labor UNCDF funds will make up the difference)

1d. Project records, Visual

1e. Two Peace Corps volunteers supervise all facets of construction

1e. Project records and Peace Corps reports.

1f. Vehicle(s) and other equipment supplied by UNCDF funds.

1f. Project records, Visual

2. Operating Fund available

2a. UNCDF makes operating fund available to project for each storage center

2a. Project reports and records

Construction materials available and other inputs available in timely sequence.

Availability of qualified project manager, counterpart and PC volunteers.

NARRATIVE SUMMARY

INPUTS(Continued)

3. Project Management Develops Courses and material for local co-op use and in-country training.

4. Project Management Develops reporting and accounting Systems for Storage Centers.

5. GOR Personnel receive appropriate training as established by Project Management and Ministry of Social Affairs.

6. Co-op Participation in:
a. Decision for Construction of Storage Center
b. Construction
c. Operations
d. Training Programs

OBJECTIVELY VERIFIABLE INDICATORS

3a. One cooperative specialist supplied by CLUSA for Project Management (supported by AID funds) that can operate in areas of training and finance and overall project supervision.

3b. GOR furnish counterpart of Project Manager and office space for project.

4a. Systematic accounting procedure for storage center operations established in first six months of project by project manager.

4b. Systematic reporting system for all components of project established in first six months of project.

5a. 4-6 GOR personnel each received 1-3 months of intensive training in areas selected by the Project Management.

5b. Co-op team assists all seven co-ops receiving storage centers.

6a. Co-ops and co-op members active in project.

MEANS OF VERIFICATION

3a. Project records, CLUSA records.

4a. Project records.

5a. Project and Ministry records.

5b. Project records.

5c. Project and Ministry records.

6. Co-op reports and Project records and reports.

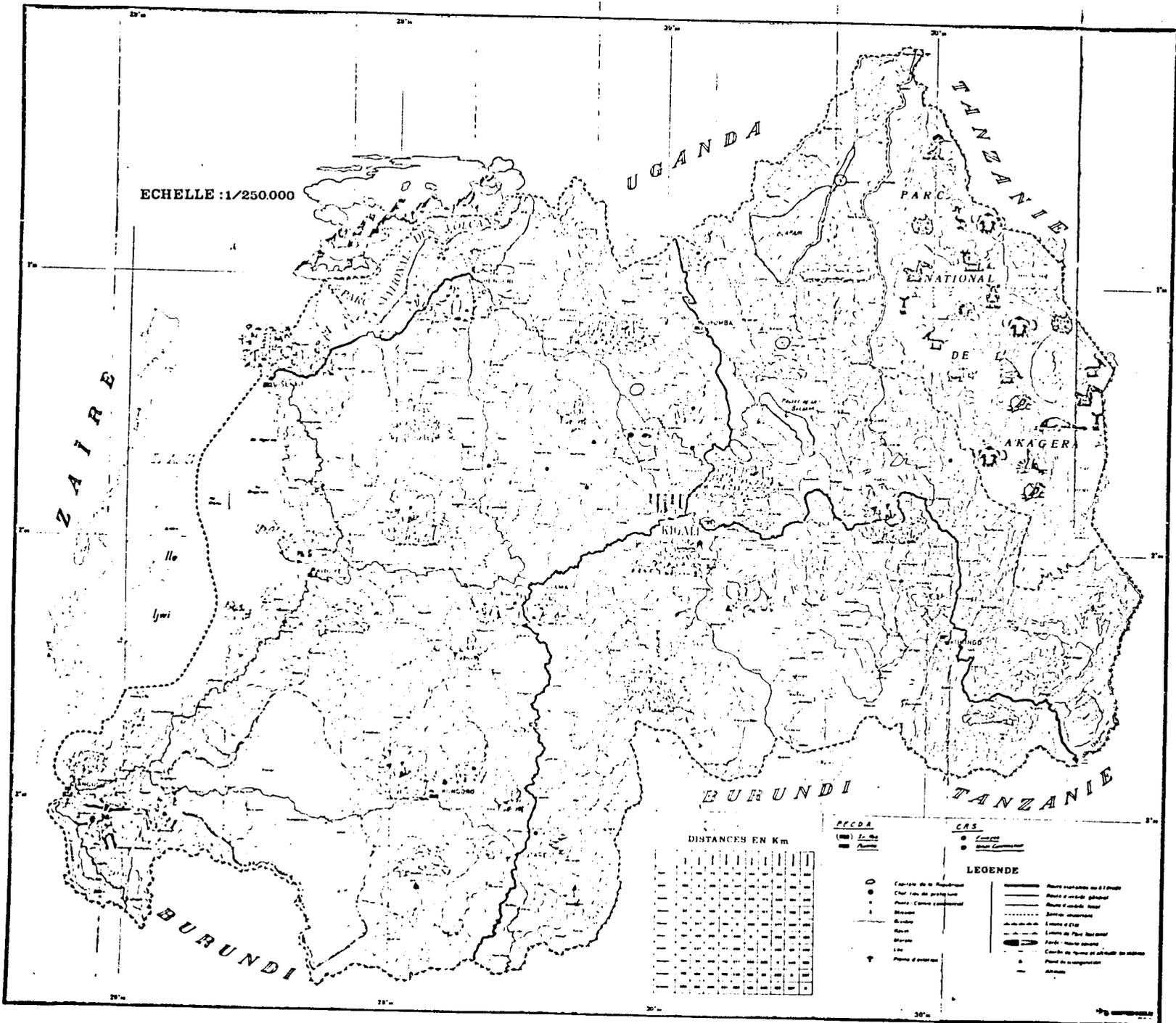
MAJOR ASSUMPTIONS

RELATIVE HUMIDITY READINGS

PLACE: KIGALI	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AVE.	79.2	79.9	81.3	84.7	83.0	74.1	65.0	56.6	72.5	77.1	83.4	80.9
MAX.	97.9	98.0	98.5	99.0	98.6	95.8	89.7	86.7	94.7	97.0	98.9	98.1
MIN.	49.0	50.2	52.0	56.2	56.5	49.4	42.4	39.3	43.2	46.9	53.4	49.8

PLACE: KAMEMBE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AVE.	84.2	83.8	83.4	85.5	84.9	79.9	73.9	67.2	75.0	81.2	84.4	83.2
MAX.	96.1	93.9	95.9	96.7	96.8	95.6	92.9	89.2	93.0	95.1	96.0	96.0
MIN.	57.9	58.9	59.9	62.7	61.1	53.6	45.4	39.7	48.5	55.8	60.1	58.5

PLACE: BUTARE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AVE.	78.1	78.2	80.3	84.4	83.2	73.4	64.6	57.4	68.1	74.9	81.8	77.9
MAX.	94.2	94.4	95.2	96.6	95.9	89.7	81.9	75.9	87.7	92.3	95.4	95.6
MIN.	52.5	52.9	55.9	60.5	60.5	50.9	43.5	36.8	42.5	49.4	56.2	55.3



CRITERIA FOR COOPERATIVE SELECTION

1. Understanding by management and Board of Directors of rationale and functioning procedures for storage centers and their active request for such a center
2. Commitment from cooperative for participation in site clearing, construction and material inputs
3. Registered with the Government of Rwanda
4. Presently has active activities and is an economic unit
5. Number of active members
6. Possibilities for expansion of cooperative activities in the local area taking into account logistics and commercial patterns
7. Geographic position vis-a-vis GRENAWA warehouses

*Selection of each cooperative will be done after in-depth investigation work by the project management and the Ministry of Social Affairs. Criteria will be added or changed as is felt necessary by the project management.

Criteria for Site Selection

1. Construction

- Availability of qualified masons
- Availability of laborers
- Local participation

2. Transportation

- Distance from Kigali
- Road conditions
- Availability of local transport
- Availability of TRAFIPRO link-up
- Distance to: 1) brick 2) rock 3) sand 4) wood
5) gravel 6) warehouse facilities

3. Skills/Local Workshops

- Availability of carpentry, welding and other facilities for local fabrication of storage center parts.

4. Location

- Proximity to market
- " " Communal Offices
- " " other activities of cooperative
- " " Banking Facilities
- Other activities and participation of local population
- Population density
- Local businessmen and private interests
- Local government support

*Much of the above has been developed and utilized by Catholic Relief Service in their site selection process

Construction Materials and Costs Needed Per Storage Center

	<u>NAME</u>	<u>QUANTITY</u>	<u>PRICE/UNIT</u>	<u>TOTAL</u>
	<u>Material</u>			
1.	Cement	300 Sacks	900	270,000
2.	Steel Rod 8mm	300 KG	-	-
3.	Steel Rod 10m	18 pieces	680	13,240
4.	Tar	2 sacks	-	-
5.	Roofing Paper	1 role	3600	3,600
6.	Cement Additive	40 liters	-	-
7.	Wire	25 KG	260	6,500
8.	Nails 6cm	2 KG	120	240
9.	Nails 8cm	8 KG	100	800
10.	Nails 10cm	10 KG	100	1,000
11.	Roofing	85 pieces	905	76,925
12.	Ridge Caps	14 pieces	850	11,900
13.	Roofing Ties	300 pieces	-	-
14.	Roofing (clear)	5.5 m	1,100	6,050
15.	Washers	300 pieces	50	15,000
16.	Nuts	300 pieces	60	18,000
17.	Claustral	24 pieces	40	960
18.	Door	1 piece	15,000	15,000
19.	Lock	1 piece	900	900
20.	Window	1 piece	5,500	5,500
21.	Window Lock	1 piece	500	400
22.	Window Panes	12 pieces	200	24,000

ANNEX F,
(Continued)

Construction Materials and Costs Needed Per Storage Center

<u>NAME</u> <u>Material</u>	<u>QUANTITY</u>	<u>PRICE/UNIT</u>	<u>TOTAL</u>
23. Putty	3 KG	200	600
24. Safe	1 piece	4,000	4,000
25. Safe Lock	1 piece	-	-
26. Support Pivot	1 piece	-	-
27. Pivot Arm	1 piece	1,500	1,500
28. Pulley	2 pieces	-	-
29. Covers	6 pieces	5,500	33,000
30. Bolts	36	1,500	54,000
31. Ladders	6	5,000	30,000
32. Bricks	45,000	3	135,000
			<u>706,515</u>
		INFLATION FACTOR @ 20%	<u>141,303</u>
		TOTAL	847,818
<u>Labor</u>			
One Mason @ 250 FR/DAY for 5 months			31,500
Two Mason Assistants @ 150 FR/DAY for 5 months			37,800
1600 Man Days Labor @ 100 FR/DAY			<u>160,000</u>
		TOTAL	229,300
<u>Transportation</u>			
2000 FR/KM x Distance from Kigali			
2000 FR/KM x 145 KM (Average)		TOTAL	290,000

Furnishings Required Per Storage Center

<u>NAME</u>	<u>QUANTITY</u>	<u>PRICE/UNIT</u>	<u>TOTAL</u>
1. Locks	20	375	6,900
2. Seals for Covers	36	40	2,240
3. Seals for Exits	14	25	336
4. Pully	1	1,800	1,800
5. Rope	1	1,000	1,000
6. Balance & Weights	1	18,000	18,000
7. Scraper	1	500	500
8. Moisture Meter	1	2,700	2,700
9. Batteries	3	630	1,890
10. Gloves	4 pr.	200	800
11. Gas Masks	1	1,800	1,800
12. Dust Masks	6	1,860	11,160
13. Malathion	25 KG	-	-
14. Phostoxin	16 Tubes	-	-
15. Sacks	40	90	3,600
16. Deposit Slips	20 pads	225	4,500
17. Withdrawal Slips	20 pads	125	2,500
18. Receipt Slips	10 pads	125	1,250
19. File Cards	5,000	138/100	6,900

ANNEX F1.
(Continued)

Furnishings Required Per Storage Center

<u>NAME</u>	<u>QUANTITY</u>	<u>PRICE/UNIT</u>	<u>TOTAL</u>
20. Reporting Forms	200	20	4,000
21. Carbon Paper	25 pads	45	1,125
22. Envelopes	250	5	1,250
23. File	1	350	350
24. Calculator	1	9,000	9,000
25. Paper	10 reams	800	800
26. Glue	1 bottle	420	420
27. Fire Extinguisher	1	3,600	<u>3,600</u>
		Sub-Total	88,421
		INFLATION FACTOR @ 20%	<u>17,684</u>
		TOTAL	106,105

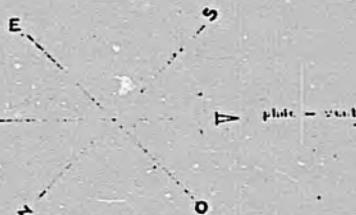
FAÇADE NORD

FAÇADE SUD

FAÇADE EST

couverture voir détail plan n° 211-13

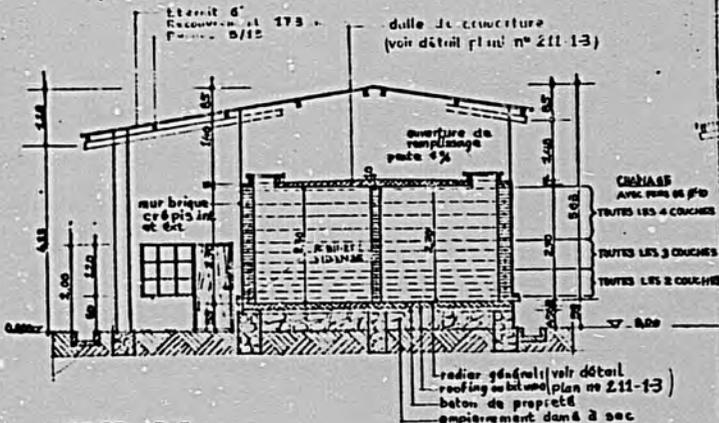
ouverture de remplissage



caniveau prof. 0.20
long 0.40

Eternit G
Raccourci et 175
Panneau 5/15

dalle de structure
(voir détail plan n° 211-13)



COUPE B-E

Béton armé
(voir détail plan n° 211-13)

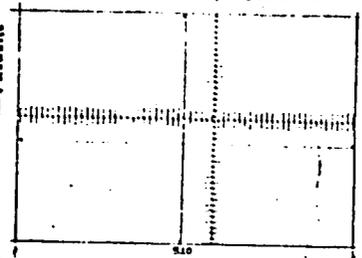
FAÇADE OUEST

SILOS DE
STOCKAGE DES
VIVRES
REPUBL. RWANDA

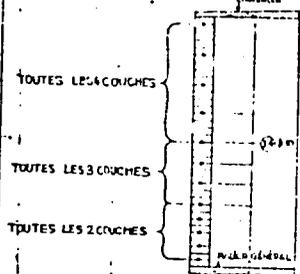
DESSIN	ALD	BUREAU D'ARCHITECTURE
DATE	22/11/72	
PROJET	SILOS DE STOCKAGE DES VIVRES	
EMPLACEMENT	05/1/73	
ARCHITECTE	BERNARD JIBIR	
PL N°	211-11	
DATE	22/11/72	
SCALE	1/400	

ANNEX G

RADIER GENERAL ECHELONNÉ



CHAINAGE



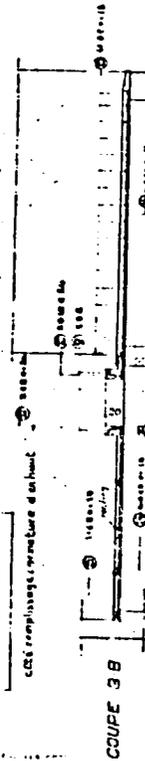
TOUTES LES 4 COUCHES
TOUTES LES 3 COUCHES
TOUTES LES 2 COUCHES

LISTE DES FERS

NO	DESIGNATION	QUANTITE	PROFONDEUR	ESPACEMENT	LONGUEUR	PESO
A	RADIER GENERAL	1	0.30			36.00
B	CHAINAGE	2	0.30			36.00
C	COUVERCLE	1	0.30			36.00

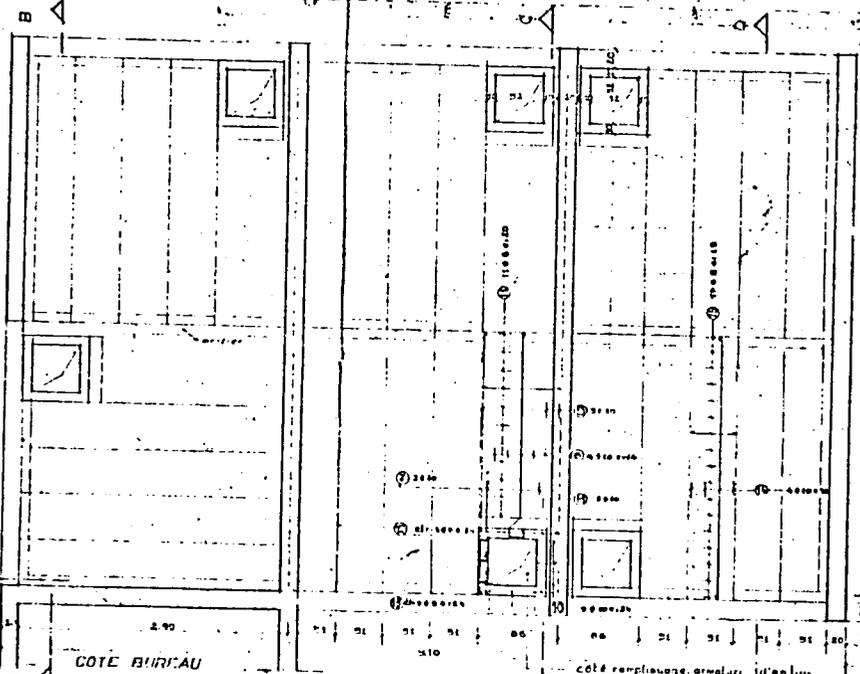
RECAPITULATION

1925.02m de Ø 10: 17.5/2 X 0.617 = 17.777kg
362.12m de Ø 8: 36.25 X 0.375 = 49.47kg
poids de l'armature: 131.15kg



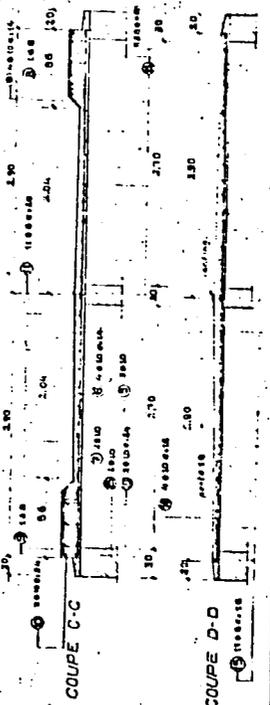
COUPE B-B

COUPE E-E



COTE BUREAU

côté remplissage armature d'angle



COUPE C-C

COUPE D-D

SILOS STOCKAGE
DETAIL BETON AR.
211-13

RATIONALE FOR STORAGE CENTER CAPACITY

The following formula has been utilized to determine the capacity needed to adequately serve an area covered by a local cooperative.

$$TC = (IIR^2 \times PD) \times (B+S \times NS) \times AP \times SC$$

Where:

TC = Total capacity

R = Radius that people normally are willing to walk to market and/or other centers

PD = Population Density, 150 people/Km²

B+S = Beans and Sorghum Production/capita, 38
35 Kg. respectively

NS = Per cent of beans and sorghum normally sold

AP = Average participation expected

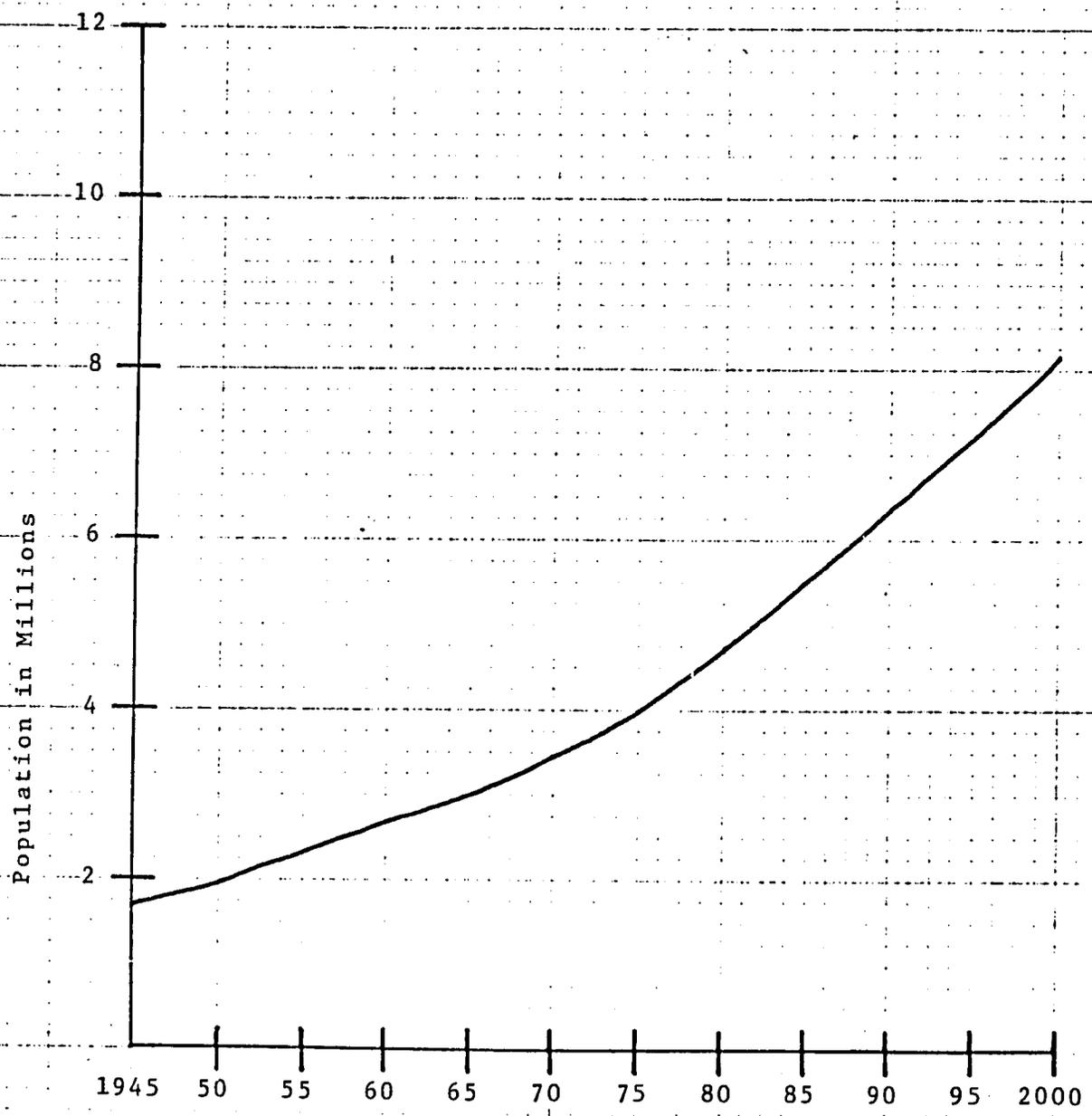
SC = Surplus capacity

Substituting the appropriate figures, the equation for storage capacity becomes:

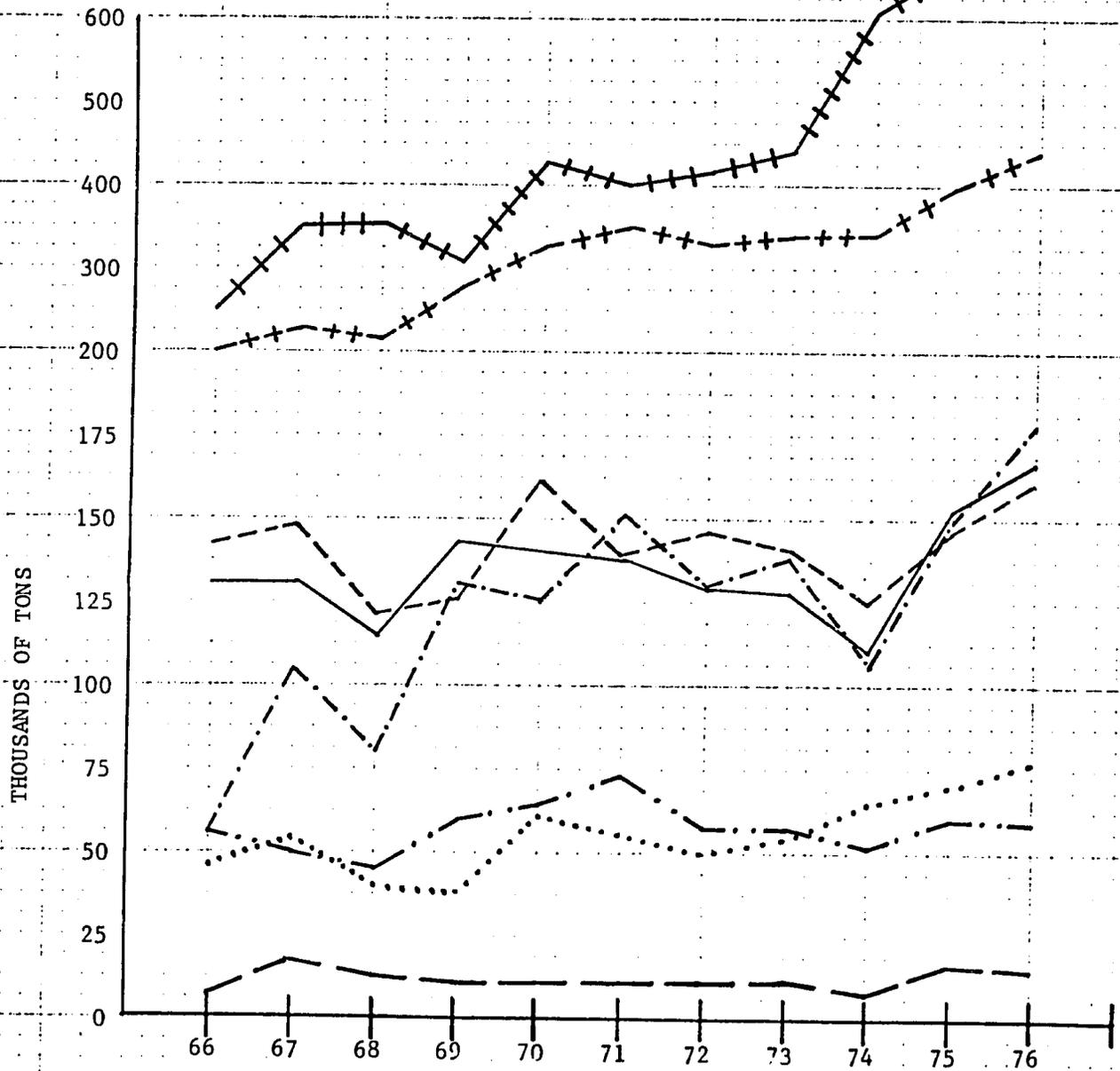
$$TC = 11850 \times 21.9 \times .25 \times 1.25$$

$$TC = 80 \text{ tons approximately}$$

POPULATION GROWTH IN RWANDA

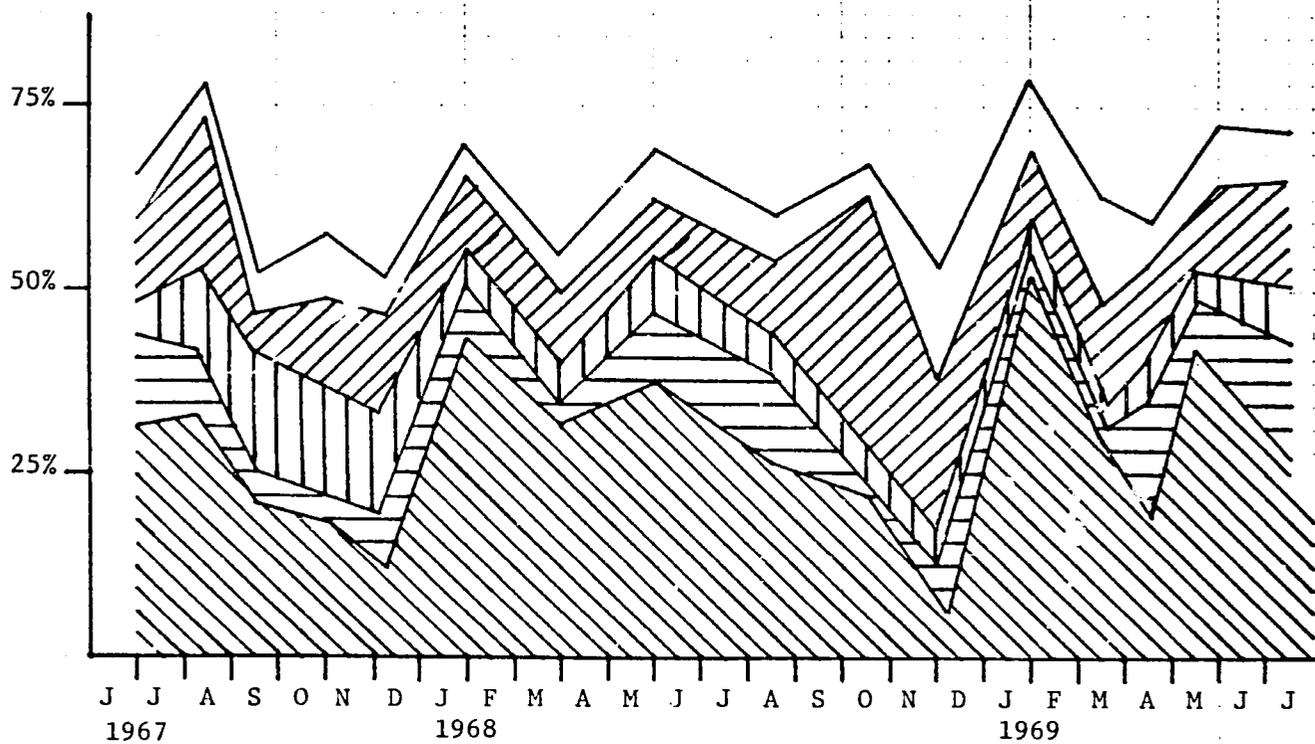


PRODUCTION FIGURES
1966 - 1976



- BEANS
- - - SORGHUM
- · - · - POTATOES
- + + - MANIOC
- · · · · MAIZE
- · - · - PEAS
- - - PEANUTS
- + + - SWEET POTATO

KAMEMBE
 ENERGY SUPPLIES
 In % of Theoretical Needs
 (F.A.O. = 100%)



Beans



Cassava



Sweet Potatoes

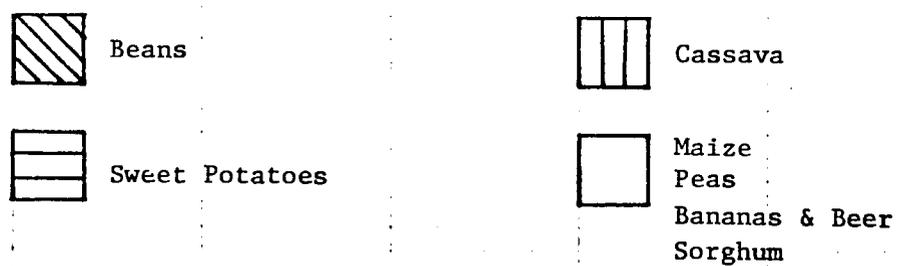
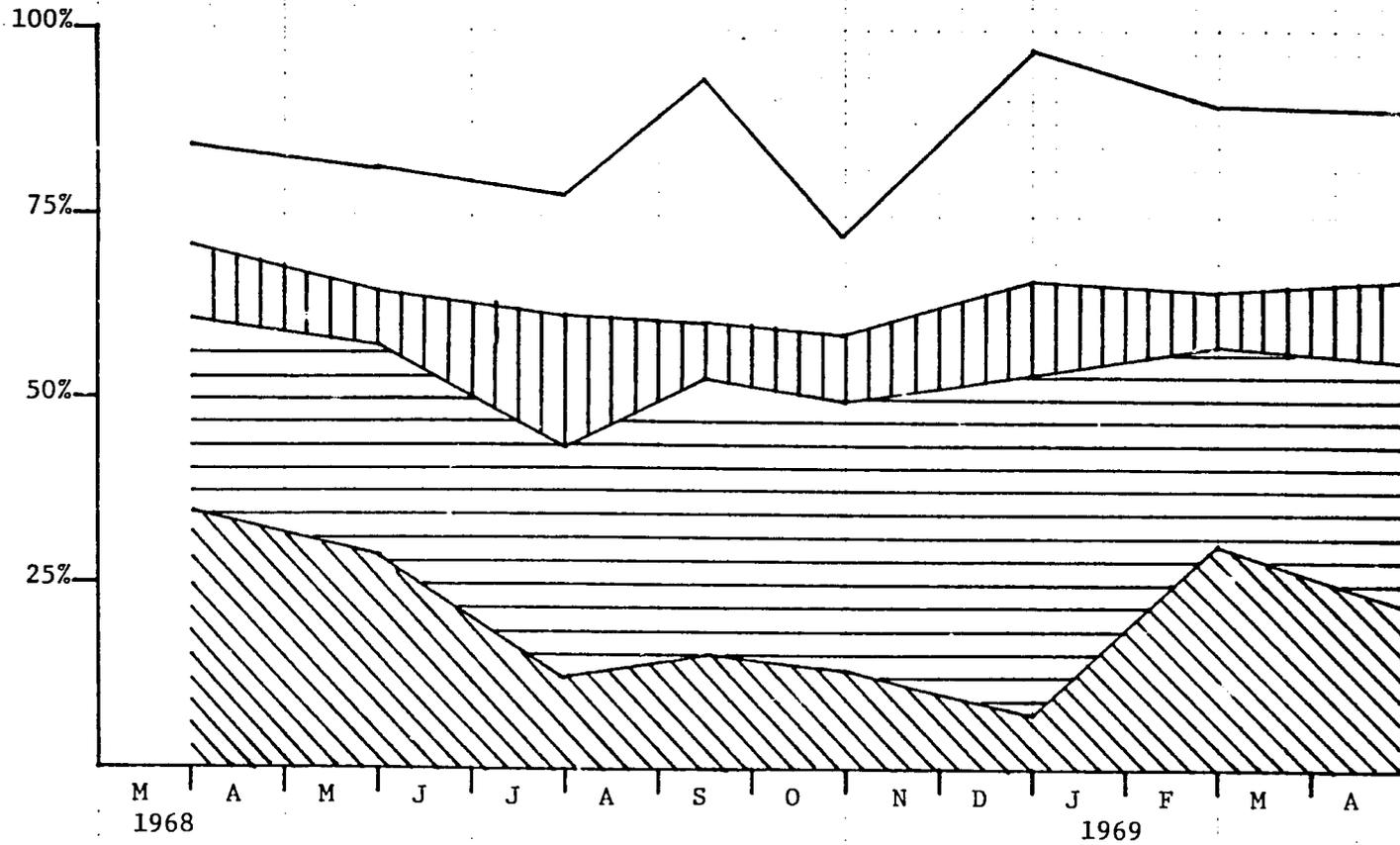


Bananas and Beer



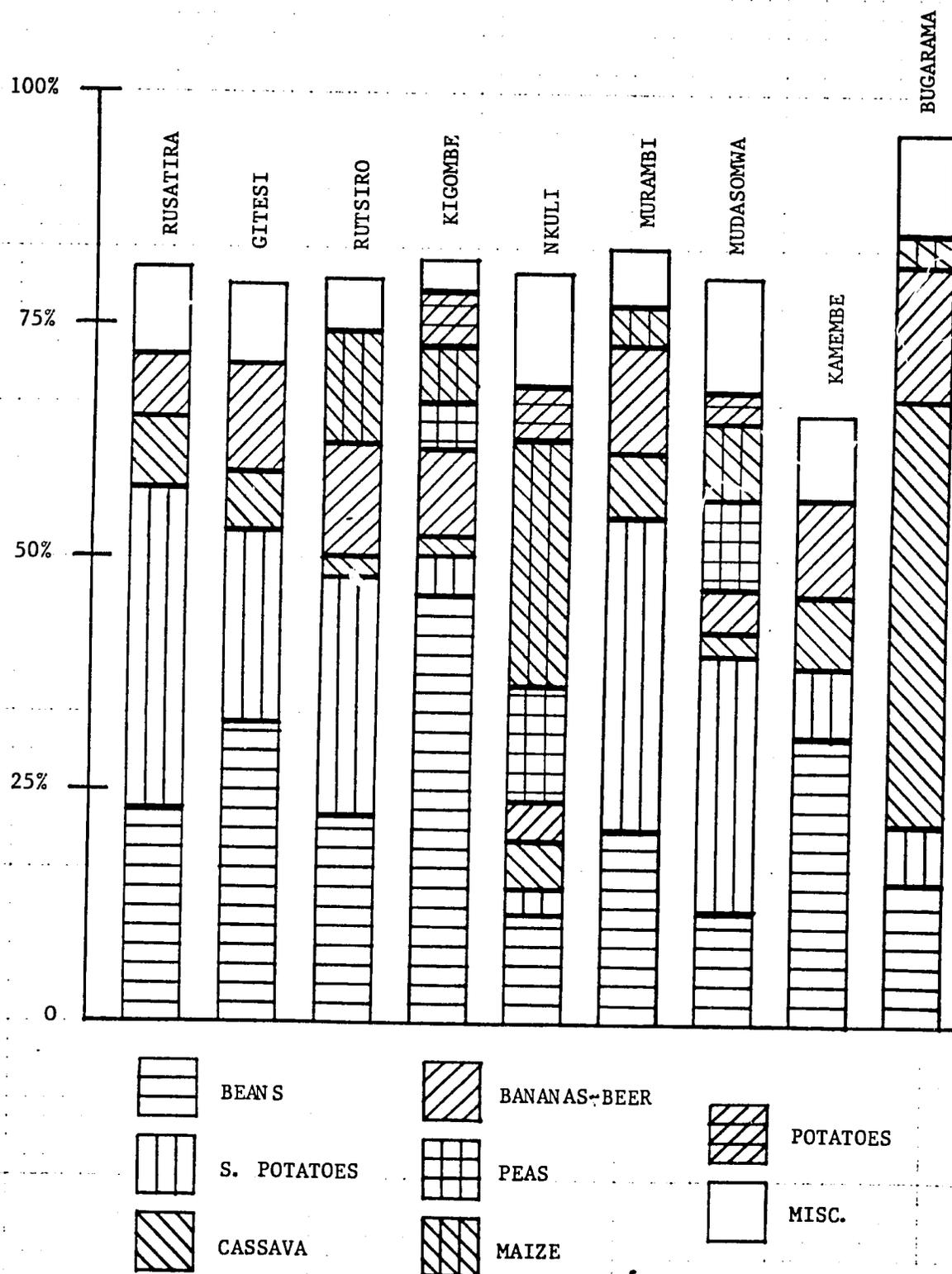
Misc.

MURAMBI
 ENERGY SUPPLIES
 In % of Theoretical Needs
 (F.A.O. = 100%)



ENERGY SUPPLIES IN % OF THEORETICAL NEEDS

(F. A. O. = 100%)



Cooperatives-Activities, Number and Membership

Categories	Cooperatives	Pre-Cooperatives
<u>Production</u>	<u>56</u>	<u>78</u>
Agricultural	33	60
Handicraft	14	5
Industrial	5	-
Mining	1	6
Fish	1	3
Livestock	1	3
Bee-Keeping	1	1
<u>Consumer</u>	11	24
<u>Service</u>	11	23
<u>Mixed</u>	7	15
TOTAL	85	140
TOTAL MEMBERSHIP 72,000		

Food Storage Marketing Project

Food Storage Marketing

The FSM Project (GRENARWA) has been in operation for more than two years. In that time it has made some notable achievements. Four warehouses have been constructed and the fifth is started. Five warehouses are now in operation with more than 3,500 tons of beans in stock and in good condition. The Project has more than 5,000 tons storage capacity, more than 2½ times its original design of 2,000 tons. Office staff have been trained and are working.

The FSM Project (GRENARWA) objective is to create an organization for price stabilization of staple foods through the use of a buffer stock and funds. In operation, such an organization needs sufficient funds and storage capacity to buy and sell adequate quantities of staple foods at an appropriate time, thus having a beneficial effect on prices. Additionally, it needs a trained cadre of managers, warehousemen, accountants, statisticians, etc. to properly store, condition and account for the goods held by the price stabilization organization. These elements have been successfully developed in the FSM Project (GRENARWA).

But the Project cannot end there. The Project goal is price stabilization. Storage and marketing are used as a means to this end. This objective is that of an economic project, not a storage project. The basic assumption is that more stable and higher prices to the farmer will reduce uncertainty and encourage production. In economic terms this means that there will be a supply response to higher and more stable prices.