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APPENDIX I

Technical Analysis of Watershed Works

TECHNICAL ANALYSES OF WATERSHED WORKS

I. Description of Conservation Works from the FFD Project Paper, 1981.

The plan developed for all watersheds begins with a preliminary topographical survey of the main water channel within the watershed or drainage basin. The survey develops a stream profile which serves as the basic technical guide in spotting the location of the first dike to be constructed. Location is key as this dike becomes the reference point for building other structures both upstream and downstream. Social and land use considerations enter the decision on where the first dike will be located. Factors include population distribution, slope of hillsides, shape of stream channel, abundance of rocks and fill material, and ease of transport for any required construction equipment. At the same time the building of terraces and small catchment devices are initiated in the headwater region.

In general, dikes and catchment dams in the headwaters of the basin serve to slow down and hold back a portion of the water. Dikes and catchment dams in the lower portion of the watershed serve to catch eroded soil, transforming the up-stream side of the structures into large areas of fertile farm land.

Commonly used soils and water retention structures are described as follows.

a. Check dams or dikes

The purpose of a check dams or dikes (also known as torrent control dams) is to stabilize the valley profile of a watershed by breaking the slope of the streambed. Ideally, the slope between the dams is reduced to between 1 and 2 percent. By decreasing the rate of water flow, the sediment in the stream can settle out to form productive agricultural land. This process also allows greater water infiltration into the soil, increasing the underground water storage (aquifer) capacity and creating a functional ground water recharge area.

These dams vary in dimension and design according to the erosion problem. Large dams, up to 200 meters in length, are set on foundations dug 2 to 3 meters deep in the river bed. Large rocks are used for the base. The dams are provided with spillways and the larger dams have rock aprons or settling basins to protect them against the turbulance of occasional flash flooding.

The dams are constructed with rocks using rubble or dry masonry techniques according to soil characteristics in the proximity. Check dams are extensively built of gabions, strong wire "cages" approximately 1 m x 1m x 1.5m. These wire enclosures hold smaller rocks, carefully fit by manual chipping or breaking to form a more compact and solid structure. Soil sediment fills the void between the rocks and "cements" the overall structure. Since they are structured in net wire, gabion dams have the advantage of settling with any movement in the stream and are less likely to crumble over time.

Estimating the number of work days required to accomplish the construction of check dams or dikes is difficult. Distance, availability of stones and the depth of foundations vary greatly between different dikes. Average information for a small, medium and large sized dike has been calculated by the MDR below:

Dike	Average Size (Meters)	Rock Fill (m^3)	Workers employed	Person/ Days Labor	Cost of Wages	Cost of Materials	Total Cost
Small	10x2.5x1.4	30	12	270	20 000 ($420)	5 000 ($100)	25 000 ($520)
Medium	30x4.5x1.8	200	40	2 200	165 000 ($3,400)	15 000 ($310)	180 000 ($3,700)
Large	200x6x2.5	3,000	70	15 000	1 200 000 ($25,000)	200 000 ($4,200)	1 400 000 ($29,200)

b. Subterranean dams

Subterraneas dams are similar to dikes but are set on foundations of bedrock below the surface level and made impermeable with concrete. The height is raised as the area behind the dam fills with sediment. Subterranean dams serve as catchment basins for water which is then piped by gravity flow to lower areas for use in irrigated farming.

c. Rock wall terraces

Stones are generally abundant to construct rock retaining walls on steep slopes using dry masonry techniques. The foundation of an average wall is about 40 centimeters (16 inches) deep x 60 centimeters (24 inches) wide and 80 centimeters (32 inches) high. Terrace walls are constructed on slopes up to 60 percent, the distance between terraces varying from 10-30 meters.

d. Contour Ditches

Contour ditches are dug into hillsides where stones are not readily available and the gradient is less. The cut is about 25 centimeters (10 inches) deep, bordered by an eartehn rise on the down-hill side averaging 10-20 centimeters high. (See illustrations on following pages).

II. Discussion of Conservation Works from the C.I.D. Report on Tarrafal Water Resources, 1982.

Soil Conservation

The contract called for technical assitance in soil conservation to control erosion and reduce sedimentation in the proposed storage reservoirs. Prior to the initiation of the project, most of the soil conservation work on Santiago Island consisted of the construction of dikes across the stream bed, either large hand-placed rock or smaller rock in wire gabions. The principal objective of these dikes is to trap the sediment behind the one to two meter high dikes and create level areas to enhance infiltration, or in some cases, provide areas that could be cultivated.

The dikes have been reasonably successful, but do nothing to reduce the amount of erosion taking place on the slopes of the watershed. Consequently, one of the principal efforts of the soil conservation phase of the project has been to redirect the emphasis to increasing the water infiltration and reducing soil erosion where it is taking place. In June 1979 a pilot watershed was selected and various practices were designed and installed in conjunction with the training course.

Tarrafal Experimental Watershed-Monte Covado. The Tarrafal experimental watershed is a tributary to the Ribeira Cincho, situated on the northern slope of Monte Covado. It was selected as a site to demonstrate and evaluate various soil conservation practices. The principal objective of applying these practices was to maximize the infiltration during and following rainfall, thereby increasing soil moisture availability and reduding soil erosion from runoff. Based on the soils map of the watershed prepared by Southard and Queiroz (1980) and intake data on similar soils nearby, the soils on the watershed appear to have moderate to high infiltration rates and adequate water holding capacities. Therefore, all efforts have been directed at holding the rainfall on the watershed for a sufficient time for infiltration to occur.

The following treatments are delineated on the topographic map of the area (Fig. 3).

Contour Tree Planting. (Treatment No. 1): Permanent tree cover, planted on level contour benches, was established on the parts of the watershed that are too steep for agriculture, generally greater than 30 percent slope, including the upper parts of the watershed and the short, steep slopes near the watercourses. The contour benches were at a 3 m vertical interval. Two species of acacia were alternated at 3 m spacing along the contour, Acacia americana and Acacia martins. A typical cross-section of the level contour bench is shown in Figure 4.

Level Terraces. (Treatment No. 2): Level terraces were constructed where agricultural crops are to be planted on slopes up to approximately 30 percent. The vertical interval for these terraces was determined from the formula:

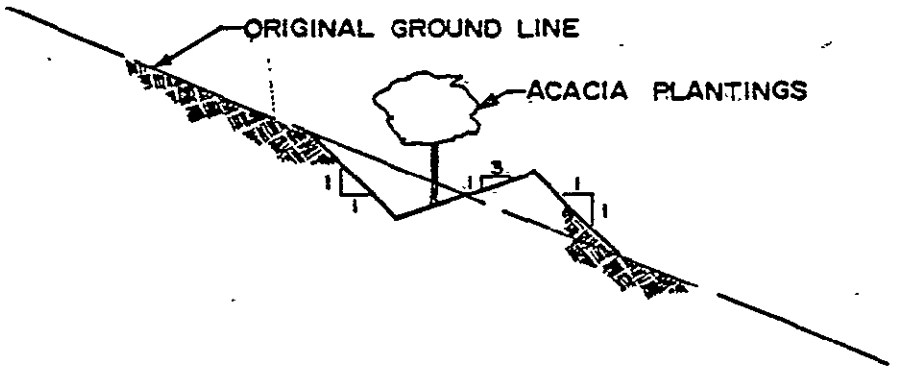


Figure 4. Typical Section of Level Contour Bench for Tree Planting.

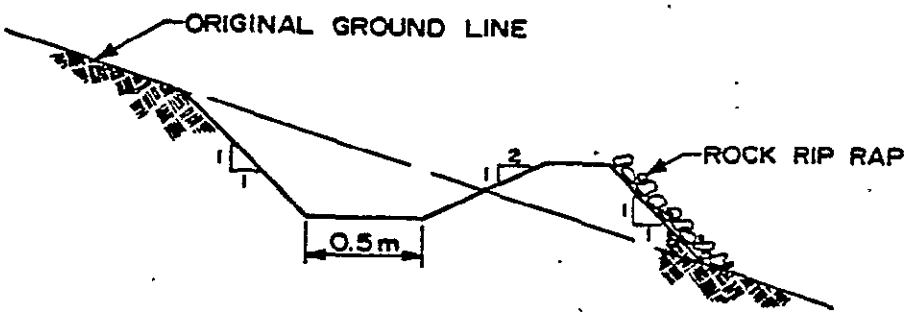


Figure 5. Typical Section of Level Terrace.

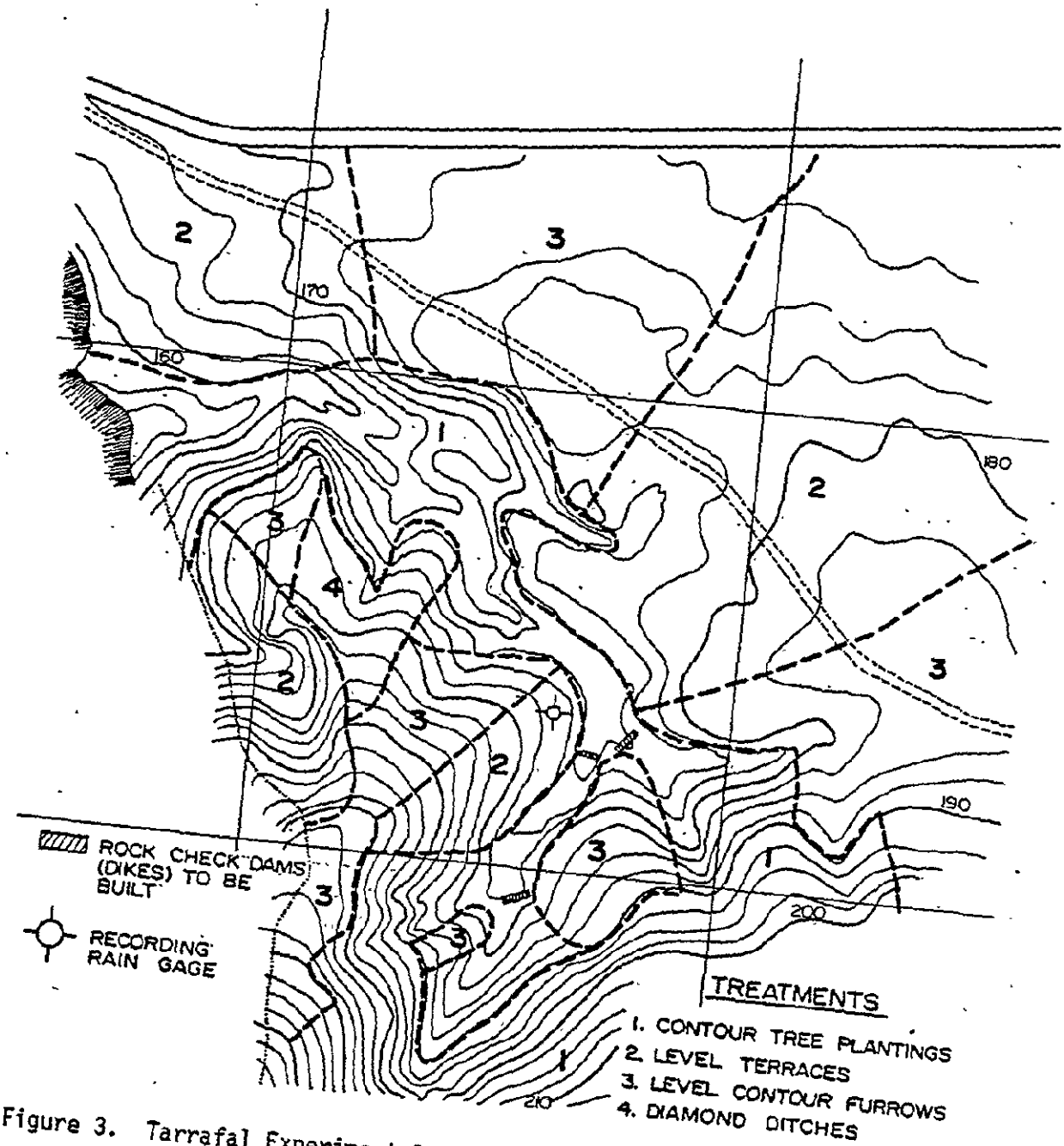


Figure 3. Tarrafal Experimental Watershed (Monte Covado).

$$VI = 0.6 + \frac{S}{13}$$

where VI = vertical interval in meters and S = slope of the terrain in percent.

The minimum cross-sectional area of the terrace channel was designed to store 35 mm of runoff from the areas between terraces, plus freeboard. Small cross dikes were placed at about 6 m intervals along the terrace channel to limit the amount of water released in case of overtopping or a break in the terrace. A typical section of the level terraces is shown in Figure 5.

Rocks from the terrace channel excavation were used to face the backside of the terrace dike to protect it from wind and water erosion. Recommendations were made to establish some permanent vegetative cover on the terraces to protect them. Much of the terracing work done on the islands has been destroyed or damaged by wind erosion of the unprotected terraces. Lantana was suggested as a possible vegetation that would provide some fuel as well as protection against erosion, but there is a question as to the adequacy of rainfall in the experimental area.

The two spaces between three consecutive terraces had the additional treatment of level contour furrows. This allowed comparison o the combined treatments with each of them individually. These combined treatments were done on approximately one-fourth to one-third of the area identified as Treatment No. 2.

Level Contour Furrows. (Treatment No. 3): Level contour furrows were used on landslopes of up to about 30 percent. Horizontal spacing of these furrows varied from 1 m to 1.5 m depending on crops to be grown and the slope of the field. The steeper slopes did not permit spacings less than 1.5 m, while closer spacings on the flatter slopes were possible. Typical level contour furrows are shown in Figure 6. Plantings in these areas were to be made close to, but not in, the bottom of the furrows where the crop could make maximum use of the additional stored water with some provision for sedimentation in the furrow bottom. MRD later decided to exclude all farming and grazing from the experimental area.

Diamond Ditches. (Treatment No. 4): Diamond ditches are gradient ditches running across the slope in opposite directions, intersecting each other and forming diamond-shaped areas between them. Various spacings and grades were tried in the field layouts. About the minimum spacing was 4 m with a 4 percent grade in the ditches themselves. This grade is greater than optimum from the standpoint of expected flow velocities and erosion hazard, but was the minimum that could be used and have the ditches diverge on the land slopes involved. A typical field layout is shown in Figure 7.

During the training course in June 1979, a sample area of each of the four treatments was laid out with the paticipants. The terraces, furrows, ditches, etc. were constructed to serve as a model for the remainder of the experimental watershed. It was planned to monitor intensity in the experimental watershed area by use of a recording rain gauge.

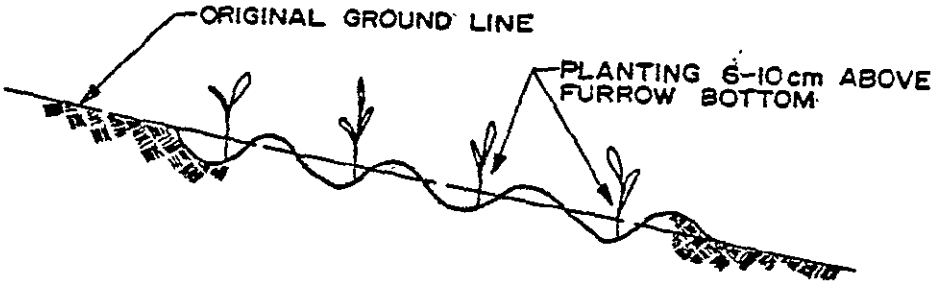


Figure 6. Typical Section of Contour Furrows.

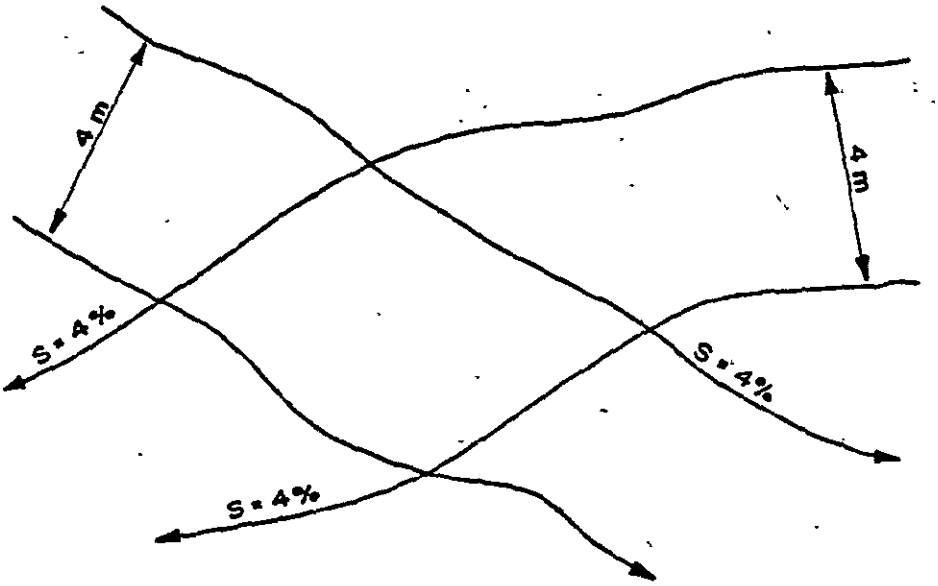


Figure 7. Typical Layout of Diamond Ditches.

Results. The MRD decided to exclude all grazing and farming from the experimental area so there was no opportunity to evaluate the effects of the contour furrows on crop yield. They were the most effective treatment in terms of reducing runoff andrequired no maintenance. During four rainy seasons since their establishment there has been no runoff from these furrows on one meter intervals, even on slopes up to 30 percent. Total annual rainfall for these years was 221, 228, 121 and 80 mm for 1979 through 1982, respectively.

The diamond ditches were the least effective, although they did reduce the erosion somewhat, and were difficult to maintain. The level contour benches for the tree platings were also very effective in retaining additional water for tree development. They required some maintenance in repairing breaks, particularly on the steeper slopes, where it was difficult to construct channels with sufficient storage capacity.

In general, the conservation work on the experimental watershed has been very effective; in terms of increasing infiltration, improving vegetative growth, reducing runoff and demonstrating these conservation practices. For instance, on September 8, 1981 39 mm of rain fell and was all retained. Some of the effects are shown in the colored photos.

The contour tree planting practice was adopted by MRD and over a three year period practically all of the watersheds of Ribeiras Garça and Cincho were reforested.

III. Discussion of Conservation Practices from the Watershed Management Evaluation, 1982.

The Impact of Project Technologies on the Environment

1. Perennial vegetation. In this project, congo beans and trees are used in soil conservation. Perennials help stop erosion, through their root system and through reduction of impact which water drops have on soil, and slowing water flow due to grasses and humus on ground. The humus also helps to "build" more fertile soil; many perennials are nitrogen fixing which improves soil. Improved infiltration can also occur but may not be so in the case of the very permeable Cape Verdean soils. Most perennials do use more water annually than most seasonal; in total water balance equations this must be considered.

Perennial vegetation is the only feasible method of soil and water conservation possible on many of the steepest sloping lands. On lands which are too dry to support other crops perennials in association with other land shaping methods are often the most feasible. Most importantly perennial vegetation is the basis of almost all soil and water conservation methods. It is the most preferred solution considered, because it is the least disruptive, usually the least expensive, requires the least maintenance, and most of the time not only protects, but also produces (e.g. beans, wodd, fruits, lumber, forage... etc.).

At the present time, too small a percentage of funds are expended toward the promotion and planting of perennials. This is true partly

because of the project's designa as a construction-oriented employment project. A proper balance between vegetative and physical construction needs to be done within the framework of developing a general project plan.

2. Contour ditches. These ditches dug along contour lines on hillside shorten the unrestricted flow of water overland thereby slowing runoff, reducing erosion and gullying, and increasing infiltration and ground moisture in the vicinity of the ditch. They perform well on mild slopes for forestry type planting and may be more useful in close spacings and small sizes, and in conjunction with plants and/or contour walls.

The project has hardly used contour dithes at all because of the problems associated with them. Heavy maintenance is required because of damage occuring from animal and human trampling and during heavy rains when their uncompacted embankment are over-topped. But due to their low cost and potential benefit and due to the minimal amount research done on them to date they still qualify as a viable experimental element in a watershed management plan.

Dr. Sam Kunkle, formerly head of the Forestry Support Program, Science and Technology, at A.I.D., argues that ditches, dug at proper intervals, hold as much water as do terraces, are no more likely to break and that furthermore, maintenance may be an equally important consideration for contour walls. The "downside risk" of walls collapsing, creating gullys of flood water may in fact be more potentially damaging to the environment than the breakdown of contour ditches, which are smaller, especially if the ditches are used in conjunction with erosion-controlling vegetation.

In the original project paper it was assumes that ditches would be constructed by farmers, at no cost to the project. This was clearly not realistic.

3. Contour walls. The next higher level of structural means of sideslope control is contour-walls. They function as do contour ditches, but may have fewer maintenance problems due to their rock masonry. They are expensive from a farm investment point of view, and it seems unlikely that farmers can afford to build them theselves (which is not the case with ditches). Still, they are the proven method of side-slope stabilization in this project. If an upstream-downstream approach had been used one would therefore expect to see a large amount of effort go into their construction. For a stabilized watershed one would expect a significant amount of the total budget for the stabilization of the watershed would be spent for planted or physically stabilized sideslopes. For the São Miguel Watershed less than 5 % of the labor budget has been spent thusly. The 2000 ha target was not based upon any analysis of required hectares but rather on what was believed achieveable. But this number of hectares is not an unreasonable number to target. At this point in time fewer check dams and more hectares of contour walls plantings would have been expected.

Project and Ministry of Rural Development officials were virtually

unanimous in preferring contour rock walls over contour ditches. The rock walls were seen as more permanent, requiring much less maintenance than dtiches. Because soils are not compacted, there is fear that ditching simply will not stand up under the torrential rains. Although contour ditches cannot be used in all circumstances, in many cases they present an alternative to rock walls.

To get a sense of the costs of the technologies, the contour walls (arretos) were analyzed, to see under what conditions they might be economical, and then contour ditching was analyzed as a possible (under some conditions) alternative.

First, the walls affect agricultural productivity. Based on data collected by Dr. Richard Pellek and theevaluation team, corn yields were higher on either side of the walls, which had served to spread and slow down water. The increases were on the order of 5 %. An earlier study had found increases of 49 % (The effects are highly dependent on yearly rainfall, it is thought(. The direct effects on agricultural productivity are thought to be concentrated on an area of from 1 to 2.5 meters on each side of a wall. If this is so, each kilometer of wall affects at most 5 hectares. If planted in the traditional corn and beans (which was the case in the samples), and if the maximum yield increase of 49 % were experienced yearly for 20 years, the benefit-cost ratio would still be a very low .12 (if labor is costed at its wage). The implication of the analysis is that shadow-priced labor and other benefits besides agricultural productivity must be considered to justify the structures, economically.

The walls do indeed bring other benefits. They slow down water runoff, reduce soil erosion. and spread water. An attempt was made to construct a small computer model to determine the types of assumptions which would have to be made to make the structures pay, using fully-priced labor. The analysis indicated that if each wall were to affect an area of 500 meters down from it (i.e., 50 hectares per kilometer) and if soil losses of about 3.5 % per year over a 20 year project were prevented, then the walls would be a breakeven proposition. These are exceedingly generous assumptions. If labor were shadow-priced at 50 % of its wage, then even a 1 % prevented soil loss each year would make contour walls pay.

An attempt was made to compare the costs and benefits of contour walls and contour ditches. Basically, the question is whether labor is more productively spent in wall or ditch construction. Data were obtained on the costs of contoured walls from the project paper; data on ditches from work done by Utah State CID at the Tarrafal project site. Because the ditching costs seemed greatly understated, and because they did not include administration costs, they were multiplied by a factor of ten. It was assumed that walls required no maintenance, but that ditches required 25 % repair per year. The capital-intensity rates of the two should be similar, so the issue is one of conserving labor: a change in the assumed wage would make little if any difference. It was assumed that ditches would have to be placed a meter apart to be effective (otherwise water velocity would increase and lead to washout);

walls were assumed to be placed 10 meters apart.

Surprisingly the analysis indicated that the discounted costs of walls are, in a 20 year project at a 15 % rate of discount, approximately twice those of contour ditches. (See Appendix C, Tables 1-5).

In the Tarrafal project, three years of study revealed no tich breakdown, even on slopes of 25-30 %. (It is important to note that Tarrafal has less rainfall than the project area, and that the results are not directly transferable). One would nevertheless be forced to conclude that contour ditches have overwhelming cost advantages, that trials should be conducted in their use, and that the project ought to consider the conditions of slope, soil compaction, convexity/concavity of land, etc., under which ditching might be a feasible alternative.

4. Check dams. Check dams are one of the best methods of attaining gully and/or channel stabilization and torrent control. They also increase infiltration and soil-moisture content, reduce run-off and may recharge aquifers. They can be very small, essentially a modification of a contour wall into a check dam, for stabilization of a gully which is forming on a side-slope. They can be very large -- veritable engineering feats on large streams -- as in Ribeira Seca. They collect sediment behind them as does any dam and once filled are still useful as they have reduced the effective slope of the stream bed therefore reducing water velocity and soil erosion. The sediment which is trapped can become useful cropland or it can be very poor for crops. Though vertification through demonstration is required, the engineering evaluator believes that the quality of sediment increases as its quantity decreases with the upstream treatments in a soil conservation program. That is, the upstream/downstream approach, especially using vegetation, also has a beneficial effect upon the quality of soil retained behind check dams or catchment dams. In fact sediment in general is enriched.

The number of dams constructed seems small but the volume of cubic meters constructed is already 78.6 % of the total after less than half the project funds are used. Also in São Miguel over 70 % of total funds for construction were used on dikes.

5. Catchment dams. Catchment dams are simply impermeable dams with walls extending down to bedrock and a system for trapping the groundwater trapped behind them. The groundwater recharge produced by the entire system upstream is trapped through the use of these catchment dams.

Because of the obvious and quick benefits they provide, these dams have been constructed more quickly than originally planned and more have been constructed than planned. This is logical and will undoubtedly continue as more viable areas for such structures are created due to the system upstream.

6. Groins. Groins have not been constructed as called for in the project paper, nor have long low dikes at the lower end of the watersheds for lack of the heavy equipment.

This is good, because these are the last elements to be constructed in an upstream/downstream approach. New equipment options should be explored; improvised draglines and bulldozer excavation are possibilities. In the meantime, the watersheds are being treated upstream and

therefore the sediments that will eventually be trapped may be of higher quality soil.

7. Wells. Wells have been improved and constructed under the project, although not called for in the project paper. This activity is a consequence of trapping water for agricultural purposes; farmers and their families strongly support well construction as part of the overall construction. (See the discussion of social impact of the project). Given the demand for domestic water sources, the project should consider incorporating wells more fully into its construction plans.

8. Flat terraces. The terrace concept of erosion control is based upon reducing the effective slope of hillsides. This slows runoff and increases infiltration, which, in turn increases soil moisture, reduces erosion and possibly recharges aquifers. The terraces can take many forms from the most commonly recognized flat terraces to contour plowing. Flat terraces have only been constructed by this project in a few relatively large and less steep areas where full-scale vegetation was possible. However, farmers seem to stair-step even very steep rainfed slopes with flat terraces. The risk of landslides due to flat terraces increases with slope, as does the cost. Nonetheless, such stair-stepping should be considered for the experimental paired watersheds to determine their effectiveness in increasing soil moisture. To date, the project has spent little effort experimenting with or costing out flat terracing as a technology. It has concentrated on two other types of terracing, contour ditches and contour walls.

THE IMPACT OF STRUCTURES ON AGRICULTURE

1. Dikes. Direct effects of dikes on agricultural production vary from site to site depending on geology and topography of an area, age of the dike, and proximity of other conservation structures. In Ribeira Seca a considerable area of arable land has been reclaimed behind dikes and is being exploited in a variety of mixed cropping systems: corn/bean association during the rainy season; recession agriculture involving sweet potatoes, squash, and other vegetables on residual moisture from November to March; temporary and permanent irrigated areas. Much of this land has a high percentage of clay (at least for the present) and therefore good fertility and moisture-holding capacity. In São Miguel, however, due to the steep and narrow nature of areas where dikes have been constructed, an estimated total of only 3.5 ha of arable land has been reclaimed behind 92 dikes. Moreover, soils trapped behind these dikes tend to be sandy and silty, have a reduced moisture-holding capacity in relation to heavier soils, and thus are generally not as favorable for recession agriculture as in Ribeira Seca. Therefore, only a small total increase in production is expected behind the São Miguel dikes based on the rainfed crops which have been planted there.

A methodology to measure differences in production between land behind dikes and land unaffected by dikes has been developed by the USAID/PASA soil conservation advisor. Two samples of ten corn plants each were harvested from a 10 m x 20 m plot behind the dike and in a

similar area near the dike but beyond its influence. Green field weights and oven-dry weights are measured for ears (cobs and grain) and total plant biomass. Population densities of each area are estimated and production per hectare calculated. Data from four sites (Appendix A) show that corn production behind dikes is significantly higher than in adjoining control areas. However, it is difficult to say how much of the increase is due to the diking action and how much to topographic differences between dike and control areas. It does seem apparent, though, that increased soil moisture and microclimatic conditions (protection from winds, higher humidity) in these water drainages behind dikes result in favorable sites for tree planting. Deep roots and the permanent nature of trees put them in a much better position than annual crops to take advantage of increased soil moisture. Fruit trees and/or multipurpose trees such as tamarind should be given high priority in the utilization of these new areas. If the trees are planted along the edges of this land they will be protected from periodic torrents and will leave space for continued cultivation of other crops.

2. Catchment Dams/Wells/Irrigation Systems. Structures in this category have had the largest direct impact on agriculture, and are the source of most of the economic benefits of the project. Increased water availability has allowed increased production on already existing temporary irrigated areas, and resulted in 35 ha of new land being brought into irrigated cropping. The long term benefits of these developments will depend on a number of factors, including (a) Efficient management of the water resource. This requires regular monitoring of groundwater levels and the quantity and quality of water delivered, established policies for water distribution, and introduction of efficient methods for conserving water from its source to end use on the crop. (b) Maintenance and protection of the systems. This includes establishment of regular inspection and maintenance procedures, as well as such preventive measures as stabilization of slopes along which irrigation pipes are laid (a landslide has already knocked out a section of pipe in the Flamengos system) and protective walls was necessary along the borders of irrigated perimeters. (c) Rate of adoption of improved farming techniques and higher value crops. (This is discussed in more detail in Section II.C).

3. Contour Walls. Contour walls appear to have a positive impact on agricultural production. By their action in slowing runoff, increasing infiltration, and decreasing evaporation, more soil moisture becomes available for crop use in the vicinity of the walls. If complimented by other methods, especially some degree of permanent vegetative cover, they can play an important anti-erosion role and thus help maintain the productive capacity of the soil. According to interviews with MDR technicians and with farmers, the latter's attitudes toward construction of contour walls on their land have changed considerably since the works program began in 1976. Whereas there was initially skepticism and resistance to the idea. after seeing the results for themselves, farmers now request that their land be selected for improvement with contour walls.

What is still uncertain is the quantitative value of the influence

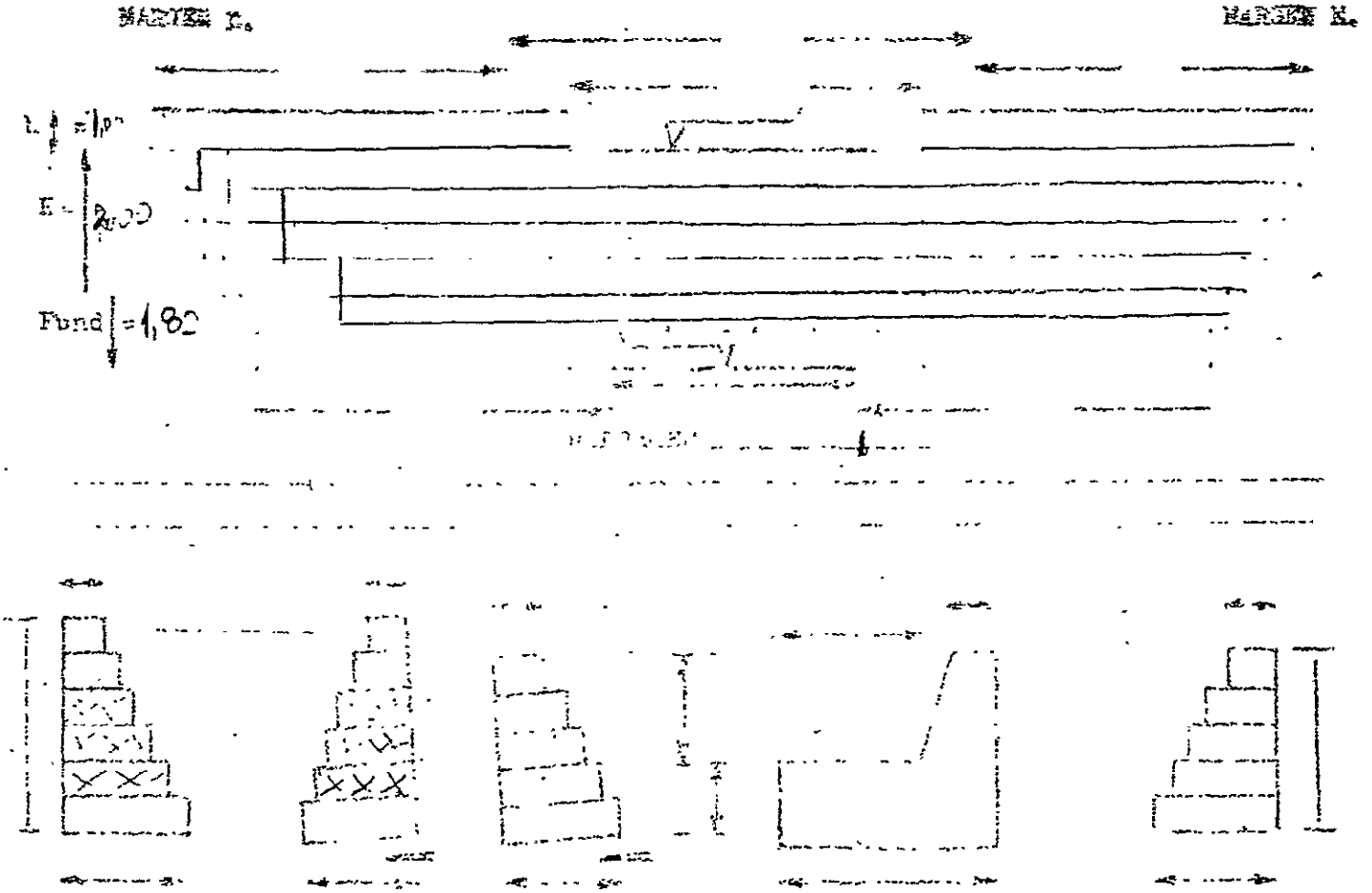
of the walls. The amount of rainfall received in a particular year plays a crucial role in determining whether walls result in significant production increases or not. For example, in the relatively favorable rainy season of 1980, MDR comparisons of corn yields in adjacent areas with and without contour walls showed an average increase of 49 per cent on the treated land (Gonçalves, 1981). In 1982, however, after a very poor rainy season, the effect ranged from nil to small. Preliminary observations indicate that increased soil moisture this year is limited to a narrow band on either side of the wall. The area of this band represents perhaps 25 % of the total treated zone. The height of corn plants in this band was about 20 per cent greater than in control areas, whereas plant height midway between walls was equal to that of the controls. Thus, production increases over the total area are estimated at 20 % increase x 25 % of the area = 5 % increase with contour walls, a very modest effect. (This estimate is based on the assumption that plant height is roughly correlated to yield of grain and biomass). Results of sample harvests in the same areas corroborate the conclusion that contour walls are of little value in increasing production in low rainfall years.

Given the high cost of contour walls, the question that arises is, can their effectiveness in terms of agricultural production be increased? One way of doing this is to select as construction sites only those areas where agricultural potential (considering slope, soil type, microclimatic conditions, etc.) is high enough to take full advantage of the improvements. A low-cost proposal which has been expounded by MDR personnel is to sow strips of Congo beans alongside the walls as well as at contour levels between them. This is a worthy proposal which should be adopted at once. In areas where wall construction is already completed, field extension agents will play a major part in persuading farmers to undertake such a plan. In considering new areas for walls, MDR could set the condition for farmers that following construction, a certain minimum amount of permanent vegetative cover be established. Not only would this serve the technical objectives of erosion control and increased food production (in most years), but it would also involve farmer participation and help instill the idea that farming practices are intimately involved in the overall soil and water conservation program. Note that this proposal does not aim to replace the traditional corn/bean cropping pattern (which would certainly start with considerable resistance), but rather to complement it in border strips. Congo bean is seen as the primary species for this "permanent" vegetation in conjunction with walls, but low-growing firewood species could also be considered in certain situations.

APPENDIX II

MDR Construction Records

MDR/SP/ 76 Fiscaliz. por:	BACIA HIDROG. DA RIBEIRA Sêca	Local: Vila Auchile Ribeira Sêca MARGENS (recta-curva) Nº 1 / / / DIQUE LONGITUDINAL (Ribeira) (36 gabiões)
INICIO 16/6/85 CONCL. 16/7/85	2ª Quinz. julho : 8 x 4 gab. 100 = 11.638 Kgs ano — Jornada de material — CUSTO TOTAL	



Datas de serviço	Componente da estrutura/ou localização	Datas de trabalho	Quantidade tipo do gabião	Dimensões em m. larg.	comp.	Volume em m³	
5ª	[illegible]		10 = 2x1x1	1,00	24,00	29	
4ª	[illegible]		56 = 2x1x1	1,50	56,00	54	
3ª	[illegible]		39 = 2x1x1	2,00	40,00	79	
2ª	[illegible]		36 = 2x1x1	3,00	24,00	72	
1ª	[illegible]		37 = 2x1x1	3,00	25,00	81	
3ª	[illegible] Muro de [illegible]		2 = 2x1x1	1,00	4,00	4	
2ª	[illegible] Muro de [illegible]		6 = 1,50x1x1	1,50	6,00	9	
1ª	[illegible]						

. de trabalho Ribeira [illegible] — BACIA HIDROGRÁFICA DA RIBEIRA [illegible] — ILHA DE [illegible]

ocal (zona pop.) Vila Quente — PROJECTO: [illegible] — PROCESSO: [illegible]

beira de " " — FINANCIADO POR: USAID

ctividade iniciada em ... / Junho / 19 83 — DOTADO COM: ... $..., em .../.../19...

tividade interrompida em ... / — / 19 — — REFORÇO DE: ... $..., em .../.../19...

ctividade recomeçada em ... / — / 19 — — REFORÇO DE: ... $..., em .../.../19...

tividade concluída em ... / Junho / 19 [illegible] — REFORÇO DE: ... $..., em .../.../19...

(Inicio sempre por Janeiro ou Maio ou Setembro) MES	A	JUNHO		JULHO					
N.º do documento de despesa	B	191	221	252					
spesa — por quinzena	C	41.522.00	39.887.70	33.2[illegible]					
spesa — total acumulado	D		81.409.70	114638.40					
de trabalhadores na quinzena	E	59	55	52					
mero de ornas — por quinzena	F	616,0	559,5	451					
mero de ornas — total acumulado	G								
ice de frequência	H=F/E								
or médio da jorna	I=C/F								
mero de diques — em construção na quinzena	J								
mero de diques — concluídos na quinzena	L								
mero de diques — total acumulado	M								
sto médio de cada dique	N=D/M								
ensão de terços ou banquetas abertas — na quinzena	O								
ensão de terços ou banquetas abertas — total acumulado	P								
to médio de 1 metro linear	Q=C/O								
lúmero e tipo de gabiões utilizados — 2×1×1 =2×n×m³	R								
lúmero e tipo de gabiões utilizados — 2×1×0 ll n×m³	S								
lúmero e tipo de gabiões utilizados — 2×1× = ×n×m³	T								
ume correspondente de alvenaria	U								
sto de mão-de-obra por m³	V=D/U								
erais	X								
	Z								

od. 3/CSA — M.D.R. — Dep. C. Solo e Águas

MINISTÉRIO M.D.R.	ILHA Santiago	CONCELHO S.ta Cruz	PROJECTO ST-76-104	PAG

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 1ª de Junho de 1985

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Escavação do Dique nº 1 (Embrião)

LOCALIDADE Vila Quente

CHEFE DE GRUPO Felix Garcia

MEIOS EMPREGADOS			DIAS DA QUINZENA/NÚMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	Controlador Principal	H	Tolerância de Ponta	1	30m³	—		2	—	—	1	—	—		1	—	1	5,30		
	Responsável	A		1	1	1		1	1	1	1	1	1		1	1	1	12	110.00	1320
	Operador de Dumper	A		1	1	1		1	1	1	1	1	1		1	1	1	12	130.00	1560
	Inverter 1ª classe	A		12	8	9		10	12	11	12	11	9		10	13	13	128	72.50	9280
	Ajudaria	A		2	2	2		2	2	2	2	2	2		2	2	2	24	57.50	1380
	Picareta	A		6	4	4		3	4	4	4	4	5		2	4	3	47	3.00	141
	Pá manual	A		6	4	5		7	8	7	8	7	5		3	6	7	78	3.00	234

OBSERVAÇÕES

Produção - C = 23,00 x L = 3,40 x A = 1,70 = m³

DIAS 176	TOTAL/SUB-TOTAL	13518$

PRODUÇÃO (P) 132,94 m³

CUSTO UNITÁRIO ($/P) 101,685/m³

RENDIMENTO UNITÁRIO (P/DIAS) 0,75 m³/dia

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO H.D.R.	ILHA Santiago	CONCELHO Sta Cruz	PROJECTO ST-76-104	PÁG.

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 1ª de Janeiro de 1983

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Transporte de pedras para o dique nº 1

LOCALIDADE Vila Cruzante

CHEFE DE GRUPO Felix Furtado

MEIOS EMPREGADOS			DIAS DA QUINZENA/NUMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	pisoeiro 2ª classe	d	Tabelas de Rendimentos	19	27	27	}	31	33	26	29	26	19	}	23	25	21	306	57$50	17595$00

OBSERVAÇÕES Produção – 306,00 m³ de pedras

DIAS 306	TOTAL/SUB-TOTAL	17595$00
PRODUÇÃO (P) 306 m3		
CUSTO UNITÁRIO ($/P) 57$50/m3		
RENDIMENTO UNITÁRIO (P/DIAS) 1 m3/dia		

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO	ILHA	CONCELHO	PROJECTO	PÁG.
N.D.R.	Santiago	Sta Cruz	ST-76-109	

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 1ª de Junho de 1983

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Armação de Gabiões para o Dique n.º 1

LOCALIDADE Vila Quente

CHEFE DE GRUPO Felex Varela

MEIOS EMPREGADOS			DIAS DA QUINZENA/NUMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	Gabioneiro	d	Feriado nacional	4	3	4	S	4	3	3	3	4	4	S	4	4	4	44	90.00	3960
	Alicater	d		4	3	4	S	4	3	3	3	4	4	S	4	4	4	44		

OBSERVAÇÕES Produção – 59 - Gabiões de 2x1x1, Armado e 34 de 2x1x0,50 - cozidos, e 26 de 2x1x0,50 Armado.

DIAS 44	TOTAL/SUB-TOTAL	3960
PRODUÇÃO (P) 118,3		
CUSTO UNITÁRIO ($/P) 2882 escudos		
RENDIMENTO UNITÁRIO (P/DIAS) 4,045 m3/dia		

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO M.D.R.	ILHA Santiago	CONCELHO Tarrafal	PROJECTO ST-TE-104	PÁG.

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 2ª de Junho de 1985

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Fundação do Cegue nº 1 em Gabiãi

LOCALIDADE Cidade Cuaçate

CHEFE DE GRUPO Felix Pereira

MEIOS EMPREGADOS			DIAS DA QUINZENA/NUMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
	Controlador Principal	H	2	4	–		30m	–	–	–	–	–		–	–	–	–	6h30m		
	Responsável	d	1	1	1		1	–	–	–	–	–		–	–	–	–	4	110.00	440.00
	Operador de Dumper	d	1	1	1		1	–	–	–	–	–		–	–	–	–	4	130.00	520.00
	Pedreiros	d	12	11	8		12	–	–	–	–	–		–	–	–	–	43	80.00	3440.00
	Serventes 2ª classe	d	12	11	8		12	–	–	–	–	–		–	–	–	–	43	57.50	2472.50
	Aguadeiro	d	2	2	2		2	–	–	–	–	–		–	–	–	–	8	57.50	460.00
	Gabionairo	d	4	3	3		4	–	–	–	–	–		–	–	–	–	14	90.00	1260.00
	Serventes 1ª classe	d	1	2	2		3	–	–	–	–	–		–	–	–	–	~~8~~	72.50	580.00
	Alicate	d	4	3	3		4	–	–	–	–	–		–	–	–	–	14	3.00	42.00
	Pás Mamuais	d	1	2	1		2	–	–	–	–	–		–	–	–	–	6	3.00	18.00
	Picaretas	d	–	–	–		1	–	–	–	–	–		–	–	–	–	1	3.00	3.00

OBSERVAÇÕES Produção = 34 gabiões de 2x1x0,50 mais 36 de 2x1x1 - dia

DIAS	124	TOTAL/SUB-TOTAL	4122$50
PRODUÇÃO (P)	106 m3		
CUSTO UNITÁRIO ($/P)	38,53/m3		
RENDIMENTO UNITÁRIO (P/DIAS)	0,851 m3/dia		

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO M.D.R. | ILHA Santiago | CONCELHO Ste Cruz | PROJECTO ST-46.104 | PAG

RELATÓRIO QUINZENAL DE ACTIVIDADES | QUINZENA 2ª de Junho de 1982

CÓDIGO | DESCRIÇÃO DOS TRABALHOS Construção do Muro Gabiões - Degue nº 1. | LOCALIDADE Vila Cruz

CHEFE DE GRUPO Felix Cirelo

MEIOS EMPREGADOS			DIAS DA QUINZENA/NÚMERO DE UNIDADES																NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
	Controlador Principal	H	-	-	-		-	1	1	-	1	-		1	-	1	1		5,30 m³		
	Responsável	d	-	-	-		-	1	1	1	1	1		1	1	1	1		9	110.00	990
	Operador de dumper	d	-	-	-		-	1	1	1	1	1		1	1	1	1		9	130.00	1170
	Pedreiros	d	-	-	-		-	6	11	8	11	9		10	12	10	9		86	80.00	6880
	Serventes 2ª classe	d	-	-	-		-	6	16	13	11	16		10	12	10	9		103	57.50	5922
	Gabiqueiros	d	-	-	-		-	4	3	4	3	2		3	3	2	3		27	90.00	2430
	Serventes 1ª classe	d	-	-	-		-	2	1	1	-	-		1	2	1	1		9	72.50	652
	Ajudantes	d	-	-	-		-	2	2	1	2	2		2	2	2	2		17	57.50	977
	Motorista	d	-	-	-		-	1	1	1	1	1		1	1	1	1		9	30.00	270

OBSERVAÇÕES Produção = 59 gabiões de 2x1x1, 28 gabiões de 1,50x1x1 e 1 gabião de 2x1x0,50 cheio.

DIAS 260	TOTAL/SUB-TOTAL	19022 $
PRODUÇÃO (P) 121 m³		
CUSTO UNITÁRIO ($/P) 157121/m³		
RENDIMENTO UNITÁRIO (P/DIAS) 0,46 m³/H		

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO M.O.P.	ILHA Santiago	CONCELHO S. Cruz	PROJECTO ST-76 109	PÁG

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 2ª de Junho de 1985

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Transporte de pedras para Construção de aqueduto n.º 1.

LOCALIDADE Vila Cruzeiro

CHEFE DE GRUPO Pedro Lopes

MEIOS EMPREGADOS			DIAS DA QUINZENA/NÚMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
CÓD.	CATEGORIAS	U.M	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
	Responsável	A	1	1	1		1	-	-	1	-	1		+	+	1	1	8	110$00	880$00
	Servente 2ª classe	A	13	13	18		14	16	6	3	11	-		12	9	8	9	149	57$50	8567$50
	Aguadeira	A	1	1	1		1	1	1	1	1	1		1	1	-	-	11	59$50	652$50

OBSERVAÇÕES Produção = 80 m³ de pedra.

DIAS 168	TOTAL/SUB-TOTAL	10050$00

PRODUÇÃO (P) 861.3

CUSTO UNITÁRIO ($/P) 120$00/m³

RENDIMENTO UNITÁRIO (P/DIAS) 0,47 m³/dia

ORIGINAL PARA A DIRECÇÃO REGIONAL

MINISTÉRIO M.D.R.	ILHA Santiago	CONCELHO Pª Cruz	PROJECTO ST-76.107
PAG			

RELATÓRIO QUINZENAL DE ACTIVIDADES

QUINZENA 1ª de Julho de 1985

CÓDIGO

DESCRIÇÃO DOS TRABALHOS Transporte de pedras para elevação do muro

LOCALIDADE 1ª Covão Vila Nova

CHEFE DE GRUPO Felix Aurelio

MEIOS EMPREGADOS			DIAS DA QUINZENA/NÚMERO DE UNIDADES															NUMERO TOTAL DE UNIDADES	CUSTO UNITÁRIO EM ESCUDOS	CUSTO TOTAL EM ESCUDOS
Nº	CATEGORIAS	U.M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	Responsável	d	1	1		1	Feriado	-	-	-	-		-	1	1	1	1	7	110.00	770$00
	Jornaleiro 2ª classe	d	4	6		18		7	12	5	7		9	15	7	5	8	105	57.50	6037$50
	Aguadeira	d	-	-		1		1	1	1	1		-	-	-	-	-	5	57.50	287$50

DIAS	TOTAL/SUB-TOTAL	7095$00
PRODUÇÃO (P)		
CUSTO UNITÁRIO ($/P)		
RENDIMENTO UNITÁRIO (P/DIAS)		

OBSERVAÇÕES Produção = 52,5 m² de pedras

ORIGINAL PARA A DIRECÇÃO REGIONAL

QUADRO I - CUSTOS MÉDIOS POR UNIDADE DE TRABALHO DE C.S.A. EXECUTADOS NO ÂMBITO DOS PROJECTOS EM CURSO - 1982/83.-

BACIAS HIDROGRÁFICAS	DIQUES				Arretes	Banquetas	Arborização		Terraços	Espigões
	Pedra seca (m3)	Alv.argamassada (m3)	Betão ciclópico	Gabiões	(m^3)	(m/lin.)	Ab.Cev-Á.Plan		(muros de sup.(m3)	(m3)
ibã. Seca	570$00	1 200$00		1 300$00	170$00	-	-	-	-	-
ibã. Picas	540$00	1 380$00	1 830$00	1 250$00	170$00	-	-	-	-	-
. Domingos	386$00	-	-	-	120$00	-	-	-	-	-
ão Varela	630$00	-	-	-	122$00	4$62	4$53	-	400$00	-
raia Formosa	602$00	974$00	-	1 480$00	126$00	-	4$80	-	480$00	505$00
.J.Baptista	553$00	-	-	-	-	4$80	4$60	-	-	-
.J.Baptista/R.	-	-	-	-	160$00	-	-	-	640$00	-
ta. Cruz	539$64	-	-	-	72$92	-	-	-	374$95	-
altes	-	-	-	-	-	-	-	-	-	-
lamangos	560$00	1 180$00	-	1 295$00	-	-	-	-	-	-
. Miguel	-	-	-	-	-	-	-	-	-	-
O T A L	4 380$64	4 734$00	1 830$00	5 325$00	940$92	9$42	13$93		1 894$95	505$00

APPENDIX III

FOOD FOR DEVELOPMENT ACCOUNT

A

Annex

DESCRIPTION OF GOCV SYSTEM FOR COLLECTING, PROGRAMMING AND ACCOUNTING FOR PL 480 LOCAL CURRENCIES

Since the signing of the first PL 480 agreement in 1977, the GOCV has been following the same system for the collection, budgeting and disbursement of funds generated from food sales. The following is a brief description of each process which eventually results in the disbursement of funds for sub-project activities:

Collection - The responsibility for receiving, storing, distributing and marketing donated (from all countries) food commodities rests with a GOCV public corporation, EMPA (National Food Supply Company). Food is sold by EMPA through its numerous marketing outlets in the nine islands and the funds derived from those sales are eventually transmitted to EMPA central headquarters in Praia. The funds are never physically segregated for the various donors and are comingled in EMPA's general cash account. EMPA periodically remits the local currrency to the Ministry of Economy and Finance for deposit in its accounts.

Budgeting - Funds are allocated to the various sub-projects in the following manner:

1. Four months prior to the beginning of each calendar year (Cape Verde's fiscal year is January 1 to December 31), each Ministry responsible for implementing a particular project presents its budget to the MEF and the NDF. The budget contains a description of the project, total estimated costs for the project (disaggregated by years), total number of employees to be hired and cost of materials and a detailed budget for the upcoming year.

2. The budget is subject to adjustment by the MEF and NDF. A fiscal line item budget is approved for the ensuing year. The individual line item and total budget amounts are controlled by the MEF and the NDF during the implementing year and cannot be exceeded without justification.

Disbursement - Once the fiscal year begins, money is disbursed to the projects in the following manner:

1. On the 15th and 30th of each month, each implementing agency reports the amount of money required for salary and procurement obligation incurred during that period to the MEF.

2. The MEF requests EMPA to transfer the required amount to its account and then writes a check to each minister who has responsibility for that project. The Minister then endorses the check to the responsible individual implementing the project.

3. This individual cashes the check and the money is handcarried to the project site to pay the salaries of workers and vendors who have supplied materials.

To account for the funds disbursed, each ministry basically implements the following:

a. Detailed payroll control sheets are maintained and payment is certified to by a second individual (note that the majority of laborers in Cape Verde are illiterate so that obtaining of signatures for receipt of pay is impossible).

b. Receipts are obtained for all materials purchased.

c. Copies of a. and b. above are maintained at the project sites.

4. Originals of the payroll sheets and invoices are returned to Praia and maintained in the files of the implementing ministry.

5. Copies of the above along with a summary of disbursements are then forwarded to the MOF and NDF where controls on expenditures in relation to budget are maintained.

Prepared by John Davidson, AFR/PRM, AID/W, March 28, 1983

Annex

REVIEW OF EMPA ACCOUNTING PROCEDURES

On February 23, I visited two of EMPA's warehousing and distribution centers - one in Santa Catarina and one in Santa Cruz. The purpose of the visit was to review, in general: (1) the process by which EMPA controls food shipments from its central warehouse to the distribution centers; (2) the system used by the center to sell commodities and the controls in place; and (3) the process for reporting sales and remitting funds back to the home office.

These two centers receive on the average of one shipment of food per day. As the food is received, it is counted and entered on stock cards maintained in the warehouse and in the center's accounting office. Sales are made to local retailers by the sales office (all sales are made in cash except for sales made to other government agencies which are made on credit) and a two-part sales slip is prepared. The original is kept by the cashier and the copy retained by the purchaser for presentation at the warehouse. Using this form, the warehouse foreman turns over the commodities purchased and records the sale in his stock card. Each month physical inventories are taken and the stock records from the accounting office and the warehouse are compared for control purposes. Adjustments are made for any differences between physical and book counts.

As stated above, all non-government sales are made in cash. In both locations cash sales are balanced out between the cashier and the accounting office on a daily basis. In Santa Catarina, proceeds are then deposited in the branch office of the Bank of Cape Verde. However, in Santa Cruz, because there is no branch bank (as is the case with many other distribution centers), cash is locked in a vault until picked up by messenger truck every seven days. At time of pick-up the messenger compares all summary cash receipts for sales and gives the regional sales director a receipt. Internal controls over cash sales at each location appear to be satisfactory.

At the end of each month, summary balance sheets and income statements are prepared for all sales locations and forwarded to Praia. At this time, daily sales summaries are balanced to the monthly summaries and bank deposits. It is from this information that the central EMPA office in Praia remits, on a periodic basis, proceeds from the sale of U.S. corn and other donor commodities to the NDF accounts maintained by the MEF.

Approximately 1 1/2 hours was spent at each location reviewing warehouse facilities and sales and accounting records. Neither Regional Director had prior notice that I was arriving, but there was no reluctance or lack of cooperation on their part. Based on this brief review, my impression of EMPA's administrative operation is quite favorable. I found their decentralized operation to be efficient and well controlled. Both regional directors were extremely cooperative and appeared to know their jobs well.

Prepared by John Davidson, AFR/PMR, AID/W, March 28,1983

PL-480 TITLE II - SECTION 206 PROGRAM REVIEW
TRANSFER AUTHORIZATION No. 659-XXX-000-2606
MANAGEMENT REVIEW OF PROGRAM COMPONENTS

	Jan.1,1982-June 30, 1983			July 1,1983-Dec. 31, 1984			Life of Project Totals			Percent of Proceeds
	Planned Budget	Actuals	Differ-ence (-)	Planned Budget	Estimated	Differ-ence (-)	Planned Budget	Estimated	Differ-ence (-)	
A. Commodity Imports										
Corn - Metric Tons	22,500	29,939.15	7,439.15	22,500	15,000	(7,500)	45,000	44,939.15	(60.85)	
- Value (US$)	3,285,000	4,252,176.	967,176.	3,285,000	2,175,000	(1,110,000)	6,570,000	6,427,176.	(142,824)	
- Ocean Freight (US$)	3,622,500	3,247,886.	(374,614)	3,622,500	1,710,000	(1,912,500)	7,244,000	4.957,886.	(2,286,114)	
Cost - Sub-Totals (US$)	6,907,500	7,500,062	592,562	6,907,500	3,885,000	(3,022,500)	13,814,000	11,385,062.	(2,428,938)	
B. Resource Generations										
1. Sales - Metric Tons	22,500	22,898.08	398.08	22,500	21,953.06	(546.94)	45,000	44,851.14	(148.86)	
Adjustments	-0-	20.82	20.82	-0-	49.54	49.54	-0-	70.36	70.36	
Sub-Totals	22,500	22,918.90	418.90	22,500	22,002.60	(497.40)	45,000	44,921.50	(78.50)	
2. Gross Proceeds (Est.) (Millions of CVE$)	187,500	191,096	3,596	217,500	236,078	18,578	405,000	427,174	22,174	
EMPA Costs (Est.)	51,750	52,666	.916	51,750	50,492	(+1,258)	103,500	103,158	(+.342)	
Net Deposits	135,750	138,430	2,680	165,750	185,586	19,836	301,500	324,016	22,516	
C. Applications of Resources (Millions of CVE$)										
1. EMPA Costs (Est.)	51,750	52,666	.916	51,750	50,492	(+1,258)	103,500	103,158	(+.342)	24.2 %
2. Project Implementation										
(a) Eastern Santiago	78,529	52,595	(25,944)	94,671	74,830	(19,791)	173,100	127,425	(45,735)	29.8 %
(b) Sao Filipe/São Tiago	11,039	-0-	(11,039)	13,289	9,259	(4,030)	[illegible]	9,369	(15,059)	2.2 %
(c) Tarrafal, Santiago	23,931	30,859	6,928	28,871	[illegible]	-0-	[illegible]	50,890	6,929	14.0 %
(d) Agrarian Center	[illegible]	[illegible]	(1,618)	-0-	1,618	1,618	[illegible]	6,765	-0-	1.6 %
(e) State Auto	[illegible]	-0-	(4,171)	[illegible]	[illegible]	(4,171)	[illegible]	[illegible]	(8,342)	1.8 %
Sub-Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(62,217)	49.4 %
3. Internal Support	[illegible]	-0-	[illegible]	[illegible]	[illegible]	-0-	[illegible]	[illegible]	470	.3 %
Total	176,694	141,287	(35,407)	201,234	173,602	(27,632)	377,927	314,889	(63,038)	73.7 %
D. Resource Availability (Millions of CVE$)										
Gross Proceeds (B-2)	187,500	191,096	(+3,596)	217,500	236,078	(+18,578)	405,000	427,174	(+22,174)	
Less Costs (all C)	176,694	141,287	(35,407)	201,234	173,602	(27,632)	377,927	314,889	(63,038)	
Balance Unallocated	10,806	49,809	39,003	16,266	62,476	(46,210)	27,073	112,285	85,212	26.3 %

D

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DIRECÇÃO GERAL DE COOPERAÇÃO

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COOPERAÇÃO—PRAIA

File
FFD

Praia, 21 de Abril de 1983

C/ 0018 /83

Exmo Senhor,

Queira encontrar em anexo os autos de recepção correspondentes respectivamente a duas partidas de 5 000 toneladas de milho cada vindos no N/M DEL VALLE e descarregadas nos portos de Mindelo e Praia a 23 e 28 de Março.

Aceite, Exmo Senhor, os protestos da nossa alta consideração.

O Director Geral

-ADÃO ROCHA-

REPÚBLICA DE CABO VERDE
Direcção Geral de Cooperação

EXMO SENHOR
THADDEUS A. KAMINSKI
COORDENADOR DOS PROJECTOS AGRÍCOLAS
USAID/PRAIA

CD/JAF

EMPRESA PÚBLICA DE ABASTECIMENTO

- E M P A -

AUTO DE RECEPÇÃO DE AJUDA INTERNACIONAL Nº 02 /83

PO/OF/ 2 /983

IDENTIFICAÇÃO DA MERCADORIA:

PRODUTO: Milho

QUALIDADE: 2ª

QUANTIDADE: 5.000 Tons

EMBALAGEM: Sacos de 45,36 Kgs cada

PAÍS DOADOR: E.U.A.

FORNECEDOR: E.U.A.

NAVIO: Del Valle

DATA DE CHEGADA: 23.3.83

PORTO DE ORIGEM: Houston, Texas

PORTO DE RECEPÇÃO: Mindelo

CONTROLE DE RECEPÇÃO:

QUANTIDADE MANIFESTADA 110.230 sacos C/ 5.000,03280 TON

QUANTIDADE DESCARREGADA (a) 110.381 sacos C/ 4.998,80686 TON

(a) Foram inclusos 5 sacos vazios, 24 sacos de varreduras e 52 sacos de inutilização

DIFERENÇA : 1,22594 TON

SENDO:

EM BOM ESTADO	4.970,23128 Ton	TON %	99,4284
ARROMBADA ~~DESTRUIDO~~ (b)	25,77510 Ton	TON %	0,5156
VARREDURA ~~QUEBRADO~~	0,85000 Ton	TON %	0,0170
INUTILIZAÇÃO	1,95048 Ton	TON %	0,0390
(b) -	4.998,80686 Ton	TON %	100,0000

Correspondentes a 808 Sacos.

RELATÓRIO SOBRE A QUALIDADE DA MERCADORIA

Segundo o n/Gabinete Técnico, o milho em questão é de 2ª qualidade e encontra-se em bom estado de conservação e de comercialização.

Apresenta as seguintes características :

Teor de Humidade-13,9%; Grãos Partidos-7%; Corpos Estranhos-1%; Fungos-2,5%; Grãos Defeituosos-1%; Insectos Vivos-0%; Insectos Mortos-0%.

Praia, aos 19 de Abril 1983

O Director de Aprovisionamento

O Director Geral

Empresa Pública de Abastecimento - Sede - Praia - República de Cabo Verde

Distribuição: Original Dab - Duplicado DG Cooperação - Triplicado Gab. SECTUR quadriplicado - Fornecedor e Quintuplicado F.D.N.

- E M P A -

AUTO DE RECEPÇÃO DE AJUDA INTERNACIONAL Nº 2A /83
PO/OF/ 2 /983

IDENTIFICAÇÃO DA MERCADORIA:

PRODUTO: Milho
QUALIDADE: 2ª
QUANTIDADE: 5.000 Tons
EMBALAGEM: Sacos de 45,36Kgs cada

PAÍS DOADOR: E.U.A.
FORNECEDOR: E.U.A.
NAVIO: Del Valle
DATA DE CHEGADA: 28.3.83
PORTO DE ORIGEM: Houston, Texas
PORTO DE RECEPÇÃO: Praia

CONTROLE DE RECEPÇÃO:

QUANTIDADE MANIFESTADA 110.230sacos C/ 5.000,03280 TON
QUANTIDADE DESCARREGADA 110.260sacos C/(a)4.988,34432 TON
DIFERENÇA : 11,68848 TON

SENDO:

EM BOM ESTADO 4.961,79432 Ton TON % 99,46776
ARROMBADA (b) 24,03000 Ton TON % 0,48173
VARREDURAS 2,52000 Ton TON % 0,05051
100,00000

(a) - No total de peso estão incluidos 2.520 Kgs de varreduras, correspondentes a 70 sacos.
(b)- Correspondentes a 873 sacos.

RELATÓRIO SOBRE A QUALIDADE DA MERCADORIA

Segundo o n/ Gabinete Técnico, o milho em questão é de 2ª qualidade e encontra-se em bom estado de conservação e de comercialização.

Apresenta as seguintes características:
Teor de Humidade - 13,9%; Grãos Partidos-7%; Corpos Estranhos-1%; Fungos-2,5%; Grãos Defeituosos-1%; Insectos Vivos-0%; Insectos Mortos-0%.

Praia, aos 19 de Abril

O Director de Aprovisionamento

O Director Geral

Empresa Pública de Abastecimento - Sede - Praia - República de Cabo Verde

Distribuição: Original DAP - Duplicado DG Cooperação - Triplicado Gab. SECTAR quadriplicado - Fornecedor e Quintuplicado F.D.N.

E

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COOPERAÇÃO—PRAIA

Praia, 22 de Setembro de 1983

C/ 2060 /83

ASSUNTO: - Envio do Relatorio Trimestral

Exmo Senhor;

Junto temos o prazer de anexar um exemplar do relatório Nº 9/83 referente ao 2º trimestre de 1983 concernente a 10.000 toneladas de milho, ajuda alimentar dos E.U.A. no quadro do programa PL 480 Titulo II Secção 206 cuja chegada foi a 28/3/83 no N/M DEL VALLE.

Aceite, Exmo Senhor, os protestos da nossa elevada consideração.

Pel' O Director Geral,

EXMO SENHOR
THADDEUS A. KAMINSKI
COORDENADOR DOS PROJECTOS AGRICOLAS
USAID/PRAIA

CD/.JRG

ANO 198 3
TRIMESTRE 2.º

RELATÓRIO TRIMESTRAL S/MERCADORIAS RECEBIDAS DA AJUDA INTERNACIONAL

1. IDENTIFICAÇÃO:

PRODUTO: MILHO 2.ª
QUANTIDADE: 10.000 TONS
EMBALAGEM: SACOS C/45,36 KGS CADA
ORIGEM: HOUSTON, TEXAS
DATA DE CHEGADA: 28/3/83
LOTE: DEL VALLE

2. DESCRIMINAÇÃO DAS QUANTIDADES:

MANIFESTADA: 10.000,06560 TONS
RECEBIDA: 9.999,88294 TONS
QUEBRAS NO TRANSPORTE: 12,73176 TONS
ENTRADA EM ARMAZÉM: 9.987,15118 TONS

3. QUALIDADE DO PRODUTO E ACEITAÇÃO PELA POPULAÇÃO:

BOA

4. QUALIDADE E ADAPTABILIDADE DA EMBALAGEM:

BOA

5. RITMO DE VENDA:

A QUANTIDADE VENDIDA FOI DE 6.296,9342 TONS

6. QUEBRAS EM ARMAZÉM E MOVIMENTAÇÃO INTERNA:

-

7. INUTILIZAÇÃO (QUANTIDADES E RAZÕES):

2,80048 TONS, DEVIDO À INFESTAÇÃO DE INSECTOS.

8. STOCK ACTUAL EXISTENTE:

3.644,68738 TONS

9. FUNDOS GERADOS PELO PRODUTO PARA O FDN:

42.189.459$14

10: REFERÊNCIA A RELATÓRIOS ANTERIORES SOBRE O MESMO PRODUTO:

-

Praia, 20 de Setembro de 1983

O Director de Aprovisionamento

O Director-Geral

SECRETARIA DE ESTADO DA COOPERAÇÃO E PLANEAMENTO

DIRECÇÃO GERAL DE COOPERAÇÃO

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Endereço Telegráfico
COOPERAÇÃO-PRAIA

Praia, 13 de Outubro de 1983

C/ 2188 /83

Exmos Senhores,

Junto temos a honra de remeter o Relatório de utilização da Ajuda alimentar dos E.U.A. para o ano fiscal 1983 e referente ao 1º Semestre.

Com os nossos melhores cumprimentos

Pel' O Director Geral,

/ JOSÉ LUIS ROCHA /

À

U S A I D/PRAIA

JLR/MJRG

MINISTÉRIO DA ECONOMIA E DAS FINANÇAS

FUNDO DE DESENVOLVIMENTO NACIONAL

AJUDA ALIMENTAR DOS ESTADOS UNIDOS DA AMÉRICA A CABO VERDE EM 1983

RELATÓRIO SEMESTRAL

I - Introdução

De acordo com as normas estabelecidas na Autorização de Transferência AID nº 659 - xxx-000-2602 e no âmbito do Programa de Desenvolvimento Alimentar-PL 480, para o Ano Fiscal de 1983, foi, pelo Governo do Estados Unidos da América formalizado o fornecimento a Cabo Verde de uma ajuda alimentar de 15.000 TM de milho cujos fundos derivados da venda dessa mercadoria estão sendo empregues no financiamento de diversos projectos anteriormente acordados entre o Governo de Cabo Verde e a USAID.

Essa ajuda foi pois, em devido tempo, concretizada, com a chegada a Cabo Verde de :

II - Ajuda recebida

Produto	Navio	Porto de descarga	Tons.recebidas	Data de chegada
Milho	"Del Valle"	Mindelo e Praia	9.987,15118	20-03-83
Milho	"Sunset"	Praia	4.993,39524	25-05-83

No que concerne às 10.000 toneladas de milho do Lote "Del Valle" acima indicado, constatou-se a seguinte movimentação:

QUADRO I

1. Quantidade manifestada	10.000,06560 tons.
2. Quantidade recebida	9.987,15118 "
3. Quantidade vendida (2º trimestre).....	6.296,9342 "
4. Quebra no transporte	12,73176 "
5. Inutilização devido à infestação de insectos.....	2,80048 "
6. Receita liquida apurada	12.189.459.14
7. Stock em 1-7-83	3.644,65738 tons.

No tocante às 5.000 toneladas de milho recebidas no navio "Sunset" em Maio último, constatou-se a seguinte movimentação:

QUADRO II

1. Quantidade manifestada	5.000,032800	tons.
2. Quantidade recebida	4.993,395240	"
3. Quantidade vendida(no 2º trimestre)	1.681,03056	"
4. Quebra no transporte	7,590120	"
5. Receita líquida apurada	11.262.904.75	
6. Stock em 1-7-83	3.308,373	tons.

Assim as receitas apurada foram as seguintes:

1. Saldo existente, vidé parte final, Fls (13) do relatório do ano de 1982 ..... 26.672.605$13

2. Venda apurada no 2º trimestre do milho dos lotes "Del Valle" e "Sunset", atrás indicados ..... 53.452.363$89

Total : 80.124.969$02

III - Utilização dos fundos gerados

A contrapartida com a venda do milho então recebido foi utilizada no financiamento de diversos projectos orçamentados para o ano fiscal de 1983, e que detalhadamente, se passa a fazer o relato de cada um no fim do 1º Semestre:

Projecto Hidroagrícola do Tarrafal

1. Conservação do solo e água

1.1. Luta Anti-Erosiva e Recarga de Aquíferos

Os trabalhos realizados neste Sector abrangeram as Bacias Hidrográficas de Fontão, Cincho, Lapa Inglesa, Garça, Ribeira Grande, Ribeira do Rau Passo, e Ribeira da Prata

.../...

O programa inicial foi de terminar os trabalhos nas Bacias de Cincho, Lapa Inglesa e depois concentrar o pessoal nas Bacias de Fontão e Ribeira Grande sendo nesta a partir de Ganxemba, Moerão de Baixo, Ribeira de Bugiganga e Portal que são dois afluentes da margem da parte alta da Ribeira Grande. O programa de trabalhos para as Bacias de Cincho e Lapa Inglesa foram realmente concluidos antes dos fins de Maio do que resultou a cobertura da Achada Tomás com sulcos de controle de escorrimento superficial, assim como covas nos referidos sulcos para plantação de essências florestais.

Na Bacia Hidrográfica de Lapa Inglesa foram abertos sulcos de controle de escorrimento superficial aumentando assim a recarga dos furos SST-21 e SST -24.

Pode-se afirmar que os trabalhos de luta anti-erosiva e recarga de aquíferos por meios mecânicos foram concluidos nas Bacias de Cincho, Lapa Inglesa e Garça, restando apenas a plantação de essências florestais nos novos sulcos e banquetas abertas este ano, para então se concluir a parte de luta enti-erosiva com a utilização de meios biológicos.

Na margem esquerda da Ribeira de Fontão na zona conhecida por descida de Banches, foi feita este ano uma experiência nova, com a plantanão de "Aaloe Barbadiensis" conhecida vulgarmente por Babosa.

1.1.1. - Meios Mecânicos

Construção de diques

Fontão	40	diques	c/	2.513,34 m3
Cincho	7	"	c/	472,02 m3
Ribª Grande	34	"	c/	3.266,66 m3
Ribª Mau Passo	3	"	c/	504,36 m3
Ribª da Prata Ribeirinha	12	"	c/	981,58 m3
	Total			7.737,96 m3

Construção de Banquetas

As banquetas foram construidas nas Bacias Hidrográficas de Fontão e Cincho, totalizando 43.112 metros.

Abertura de Sulcos

Este trabalho (Contour Furrows) proposto pela Direção Técnica do Projecto e realçado a sua eficácia no controle do escorrimento superficial, foi localizado nas Bacias Hidrográficas de Fontão, Cincho, Garça, Ribeira Grande e Zonas de Achada Tomás e Achada Boi.

Foram abertos 183, metros de sulcos.

Construção de Arretos

A construção de arretos (Terrace Walls) foi localizado nas Bacias Hidrográficas de Fontão, Cincho, e Ribeira Grande.

Foram construidos 36,768 metros de arretos com aberturas médias de 0,60 metros.

Reparação de Pequenos Caldeiras

Foram reparados pequenas caldeiras em meia lua no mês de Janeiro deste ano, nas zonas de Achada Tomás e Garça de modo a se conseguir melhor aproveitamento das precipitações conhecidas por Invernadas.

1.1.2.- Meios Biológicos

Reparação de viveiro e essências florestais enviveiradas.

Este ano houve grandes dificuldades na aquisição de sementes, principalmente da Acácia Martins, e aquisição de vasos de plásticos por outro lado.

A nível experimental foram enviveiradas duas essências que nunca foram utilizadas no Concelho do Tarrafal. As essências referidos são Acácia Oleoserícea para zonas baixas e Atriplex para fixeção de encostas e dunas.

Essências Florestais Enviveiradas

Acácia Americana	43.546
" Martins	20.000
" Oleoserícea	10.000
Atriplex	4.794
Total ∝	78.340

.../...

O número de plantas enviveiradas este ano é de longe inferior ao ano transacto (1982) que foram 120.000 plantas. A razão de ser da grande diferença residiu principalmente na aquisição de sementes, referida atrás e vasos de plásticos que não haviam disponíveis no mercado. A nível de curiosidade pode-se dizer que no ano transacto das 120.000 plantas enviveiradas foram fixadas só 26.666 plantas em três fracas precipitações, dos quais só 13.296 plantas, cerca de 50%. Para fixação das essências florestais citadas atráz, foram abertas 80.000 covas.

PLANTAÇÃO DE "AALOE BARBADIENSIS (Babosa)

Na margem esquerda da Ribeira de Fontão, e na zona conhecida por Descida de Sanches foi então escolhido o sítio como zona experimental de demonstração de algumas práticas de conservação de solo e água, fixando "Aaloe Barbadiensis" em fia - das e em curvas de nível acima dos arretos. Na parte inferior dos arretos propõe-se a fixação de Acácia Martins com um compasso de 20 metros visto tratar-se de zona de cultivo. Distribuidos sementes de "Cajanus Cajam" aos agricultores dessa zona para semearem entre os arretos, conjuntamente com milho e feijão.

ZONA EXPERIMENTAL DE DEMONSTRAÇÃO DE DIFERENTES PRÁTICAS CULTURAIS EM GAMXEMBA

Na zona de Gamxemba instalou-se um posto udométrico. Existem três sub-bacias com três diques respectivamente.

Na sub-bacia que domina o dique nº 1, foi tratada com arretos, e sulcos com 20 a 30 cm de profundidade, em curvas de nível. Os sulcos ficaram distanciadas de 1 m. Foram fornecidos aos agricultores sementes de "Cajanus Cajam", recomendando-os que fizessem a sementeira de milho e feijão e Canajus nos sulcos. Fêz-se o levantamento topográfico de pormenor nesta sub-bacia, que se pretende comparar com um novo levantamento após a época das chuvas e ver o volume de material sólido depositado.

A sub-bacia que domina o dique nº 2 foi tratada apenas com arretos em curvas de nível havendo também distribuição de feijão congo.

A sub-bacia que domina o dique nº 3 não foi tratada.

.../...

Houve também distribuição de feijão congo. A finalidade desse trabalho é de o comparar medir e quantificar o efeito dos vários tratamentos sobre escorrimentos superficial, erosão e o rendimento das culturas.

2. - PROSPECÇÃO GEOLÓGICA E DE ÁGUA SUBTERRANEAS

2.1. - Prospecção Geológica e de águas Subterraneas

Foram feitos os seguintes furos com o camião sonda "Speed Star":

S.S.T 35 Em Achada Tomás c/ 125 m e ∅ 8" (não entubado)
S.S.T 36 em Achada Carreira (covão de Nora) c/ 141,30 m ∅ 8" (não concluido, e portanto não foi entubado).

O primeiro furo não foi entubado por falta de tubos.

O segundo não foi concluido devido a avaria no camião Sonda Speed Star.

Não se conseguiu abrir mais furos devido à avaria ocorrida a 18 de Fevereiro no camião Speed Star o que após várias tentativas de reparação local de perfuração, foi retirado de Covão de Nora a 12 de Maio e recolhido às Oficinas do Projecto.

A Sonda encontra-se presentemente na Variante para reparação e revisão geral do motor aos 100.000 Km.

2.2. - TRABALHOS DE PROTECÇÃO DE FUROS

Fêz-se a protecção do furo SST-26 da Ribeira Grande, em alvenaria hidraúlica sobre um antigo muro em gabião ficando com altura de 2 metros. Fêz-se também uma rampa de acesso à casa do motor no mesmo local em alvenaria hidraúlica, totalizando o muro e a rampa, 86 m3 de volume.

2.3. - CONTROLE DA CONDUCTIBILIDADE ELÉCTRICA E DOS CAUDAIS DE EXPLORAÇÃO

Semanalmente o controle da salinidade é feito e dos caudais dos seguintes furos em exploração:

FT 29 Ribeira Grande
SP 19 Ribeira Prata
SST 21 Achada Boi
SST 24 " "

O controle dos restantes furos piezométricos, devido à falta de materiais próprios como sonda eléctrica e apanha-amostras, vem sendo feito trimestralmente pelo pessoal da D.S.E.G.A.S..

2.4.-LEVANTAMENTO TOPOGRÁFICO E IMPLANTAÇÃO DOS FUROS NAS CARTAS MILITARES 1/25.000 e 1/12.500

Para implantação dos furos nas cartas, foram reconstruidos 3 marcos de rede de apoio: Monte de Achada Grande, Touro Brava e Manuel Lopes, sendo os dois últimos indispensáveis para coordenação dos furos SST 27 e 28 localizadas na Ribeira Grande e cerca de 8 Km de Chã Bom.

Foram sinalizados os marcos que faziam parte das figuras a serem observadas, para coordenação dos marcos reconstruidos. Os marcos reconstruidos foram definitivamente sinalizados com bocados de tubo de 1,00 m ficando aproximadamente 0,50 m de fora. Foi ainda reparado o marco Base SW.

Foram implantados todos os furos do Projecto Tarrafal até SST 35, assim como foram reconstruidos todos os marcos da zona do impacto do Projecto, necessária à coordenação e levantamentos topográficos.

3. - APROVEITAMENTO DE ÁGUAS PARA IRRIGAÇÃO E ABASTECIMENTO ÀS POPULAÇÕES

3.1. - EQUIPAMENTO DOS FUROS DE ACHADA BOI

A 20 de Março entraram em funcionamento os dois furos da Achada Boi, que desembocava sensivelmente a meio da zona do Colonato, foi desviado para junto do tanque nº 1, do modo que a água proveniente destes furos, passou a dominar toda a área irrigada do Colonato e não parte dela. Com esta alteração e com a construção de uma câmara de decantacção, junto do tanque nº 1 e do tanque que armazena água para a população da Vila e arredores, qualquer avaria na moto-bomba do furo ST 19 da Ribeira da Prata é compensada fácilmente com a água dos furos da Achada Boi que desemboca junto aos tanques.

Conseguiu-se assim resolver o problema da falta de água que constantemente afligia a população da Vila e arredores.

3.2. - CONSTRUÇÃO DE PILARES DE SUPORTE DOS TUBOS

Foram construidos pilares de suporte em alvenaria hidraúlica nas linhas de água, de modo a garantirem a segurança da tubagem.

3.3. - CONSTRUÇÃO DE CASAS PARA MOTORES E ABRIGOS PARA MOTORISTAS

Foram construidos casas para motores do furo SP 19 da Ribeira da Prata e SST 26 da Ribeira Grande, ambas cobertas com telhas Lusalite, com 8 metros de cumprimento por 5,5 de largura.

Construiu-se dois abrigos para motoristas, sendo um na Ribeira Prata e outro na Achada Boi, junto ao furo SST 24.

3.4.- LANÇAMENTO SUBTERRÂNEO DE TUBAGEM

Foram lançados 300 metros de tubo PVC de Ø4", no campo de experimentação a partir do tanque nº 3, de modo a não interferir com o sistema de irrigação gota-a-gota e aspersão já instalados tendo sido necessário à abertura de valas, de modo a que os tubos ficassem a uma cota inferior a dos tubos dos dois sistemas já instalados. Essa tubagem ficou com três saidas de água com válvulas de serviço de 3". O objectivo foi de aproveitar o terreno a jusante do tanque nº 3 e dos sistemas de irrigação instalados, para irrigação superficial ou seja tradicional.

Para apoiar às válvulas de serviço de 3", foram construidas 400 metros de levadas secundárias em pedra argamassada e três câmaras de visita e tomadas de água.

Para o lançamento da tubagem de Ø 4" e construção das levadas secundárias, foi necessário fazer-se estudo topográfico que se resume em 4 perfis no campo de experimentação, sendo um longitudinal e três transversais.

Foi ainda necessário abrir uma vala de 300 metros de comprimento para 0,50m de largura.

3.5. - CONCLUSÃO DO TANQUE DA PONTA FURNA E CONSTRUÇÃO DE UM FONTENÁRIO

No seguimento do programa ABASTECIMENTO DE ÁGUA AS POPULAÇÕES foi concluido o tanque da Ponta Furna, com capacidade de armazenamento de 50 m3. Esse reservatório é abastecido pela aerobomba DEMPSTER 14 com um débito de 13 m3/horas. Foi construido relativamente perto do reservatório um fontenario com duas torneiras de serviço de 1".

3.6- REPARAÇÃO DAS LEVADAS SECUNDÁRIAS E TERCIÁRIAS NO COLONATO

Antes da entrega dos títulos de posse útil aos beneficiários, foram reparados e construidos 850 metros de levadas secundárias e terciárias na Ex-Unidade de Produção Ernestina Silá (colonato).

3.7. - ALTERAÇÃO DE VÁLVULAS DE PASSAGEM À SAIDA DO FURO ST 19 NA RIBEIRA PRATA

Foi alterado o sistema de uma só válvula de passagem, para duas válvulas, permitindo no local, dentro da casa do motor, a distribuição de água para câmara que fornece água à Vila - ou para o reservatório de 200 m3 de capacidade. Acabou-se assim com o desamarrar e amarrar do Tubo PVC que ora era ligado para o tanque ora era ligado para a câmara.

3.8. - TANQUE NA RIBEIRA DA PRATA

Foi concluido a construção desse reservatório de 200 m3 de capacidade com a instalação de válvulas de segurança e de passagem à saida de água.

Passou-se a fornecer uma hora de água por dia, do furo SP 19, ao citado reservatório, após consultados os especialistas no dominio de Águas Subterraneas.

Presentemente, os agricultores aproveitando essa água cultivaram cerca de 1,5 ha de regadio.

3.9. - POÇO DA RIBEIRA DA PRATA

Fêz-se a limpeza do poço da Ribeira da Prata, a jusante de furo SP 19, que tinha sido entupido pelas cheias do ano trasacto.

4. - ESTABELECIMENTO DE ENSAIOS DE IRRIGAÇÃO

Fêz-se [illegible] com amendoim, variedade Australiano de 4 grãos, com diveros tipos de armação de terreno de modo a ver-se qual é a mais indicada para esta cultura, utilizando a rega tradicional.

Preparou-se fichas de controle das datas de aparecimento de doenças, tipo de doenças infectantes, data da sementeira, do aparecimento das primeiras folhas, insecticidas etc.

Fez-se também ensaios com repolho utilizando a rega tradicional de duas diferentes variedades, tentando produzir "fora da época", o que não é costume. Do mesmo modo preparou-se fichas de contrôle.

.../...

5. - CONSTRUÇÃO DE BASES E ACESSOS À SONDA

5.1. - BASES CONSTRUIDAS E CAMINHOS ABERTOS

Foram construidos 2 bases para sonda e abertos 7.600 metros de caminhos carroçáveis na Ribeira Grande para permitir o acesso às sondas aos locais de perfuração. Infelismente com avaria da Sonda Speed Star não se chegou a utilizar a totalidade desses caminhos. Foi utilizado apenas cerca de 5.000 m para construção de diques em alvenaria hidraúlica.

5.2. - REPARAÇÃO DE ESTRADAS

Foram reparados 5 Km de estrada Ribeira da Prata-Chão Bom e cerca de 2 Km no troço Achada Carreira- Ponte Furna

6. - DIVERSOS TRABALHOS

- Trabalhos efectuados na sede do Projecto:

  - Conclusão da casa de banho para homens com instalação de um urinol.
  - ligação dos tubos metálicos flexiveis, do tubo galvanizado embutido, para as torneiras de duas casas de banho;
  - pintura de uma sala com pano de parede de 114 m2;
  - aplicação do mosaico vinílico em três salas cobrindo uma área de 67,7m2;
  - armazenamento e expedição de materiais diversos, combustíveis, lubrificantes, etc;
  - aquisição de 222 kG de feijão congo (Cajanus Cajan) para distribuir aos agricultores das zonas sub-húmidas e húmidas
  - aquisição e transporte de materiais adquiridos nos mercados da Praia, Santa Catarina e Tarrafal.

7. - TRABALHOS DA OFICINA MECÂNICA

- reparação e manutenção das máquinas e viaturas do Projecto de Tarrafal
- apoio a outros serviços Estatais sediados no Tarrafal, em regi-

carroçaria de um camião.

-Adaptação de um carregador de batarias no motor gerador Lister ST 3, com a ajuda de um electricista da Variante.

Relativamente a este projecto foram dispendidos no conjunto dos trabalhos efectuados e durante o 1º Semestre 11.456.663.57, sendo:

Em salários	8.464.959.77	
Em materiais	2.991.703.80	11:456.663$57

Referindo-se agora às Bacias Hidrográficas de Ribeira Seca, dos Picos e S. Domingos que também fazem parte dos projéctos que vêm sendo financiados no quadro do PL 480, e, tendo em atenção as acções desenvolvidas pela Divisão de Conservação de Solo e Água nas referidas Ribeiras, constata-se no tocante ao trabalho realizado algumas dificuldades que se reflectiram no normal andamento dos trabalhos conforme se passa a explicar:

A irregularidade na disponibilidade de camiões e maquinas, com frequência parados devido a avarias.

Só em principios de Junho foi possivel trabalhar com um maior número de camiões que por vezes eram também solicitados por outros serviços, agravando-se ainda o facto de terem um fraco apoio de máquinas.

Por esse motivo viu-se na necessidade de adiar alguns trabalhos, sem mesmo poder começar outros, isso devido a carência no abastecimento de pedras nalguns frentes. Contudo, para este inconveniente foi decidido incrementar a construção de diques nos covões, locais que não necessitam de apoio mecânico.

O quadro que se segue dá-nos a posição do volume dos trabalhos efectuados nas 3 Bacias e bem assim das despesas efectuadas em salários e materiais no decorrer do 1º Semestre.

.../...

QUADRO I - PROJECTO PL 480 - 1º SEMESTRE DE 1983

Bacias Hidrográficas	Diques construidos		Arrastos construidos		Números de Covas Abertas	Nº de Plantas enviveiradas	Nº Máximo de Trabalhadores	Despesas		Total
	Nº.	Volume	(m)	(Vol.)				Salários	Materiais	
Ribª Seca	97	8.764,9,	6.262	3.131,0	14.048	18.036	850	5.753.334$80	1.296.848$50	7.050.183$
Ribª dos Picos	52	5.090,6	5.590,3	5.997	15.997	42,502	819	5.751.548$30	1.382.363$60	7.133.911$
Ribª de S.Domingos	16	1.540,0	770,0	2.000	2.000	-	181	1.328.983$20	553.606$00	1.882.589$
										16.066.684$

.../...

Por último citaremos o projecto de Centro de Estudos Agrários que tratará da construção de uma Secção da Sede Administrativa do Centro de Estudos Agrários em São Jorge, na ilha de Santiago de modo a reforçar a capacidade institucional do Centro, com vista a uma pesquisa agronómica de aplicação directa e actividades de desenvolvimento rural.

Os trabalhos deverão terminar para os fins de Novembro. Está-se a concluir o último andar do edifício e bem assim aos retoques, pintura e carpintaria nos dois outros andares.

Dispendidos cerca de 2.819.126$00 sendo em salários 2.317.366$00 e materiais 501.760$00.

Relativamente aos projectos das Ribeiras de Langue, S.Filipe/São Francisco e bem assim do de Desenvolvimento agrícola de Santo Antão, informa-se que os mesmos não tiveram inicio pelas razões apresentadas pelo Engº HORÁCIO SOARES, Coordenador do Projecto e que constam do relatório a ser apresentado por aquele Técnico à Direcção Geral da Cooperação.

Finalizando passa-se a apresentar em resumo e no fim deste 1º Semestre o seguinte movimento.

Receita apurada (vidé fls 2 deste relatório)		- 30.124.969$02
Despesas		
Projecto : Hidroagrícola Tarrafal.....	- 11.456.663$60	
Ribeira Seca	- 7.050.153$30	
Ribeira Picos	- 7.133.911$90	
Ribeira S.Domingos	- 1.582.559$20	
Centro Estudos Agrários	- 2.519.126$00	30.3[illegible]7.[illegible]
Saldo a transitar para o 2º Semestre		- 19.782.495$[illegible]

Praia, 7 de Outubro de 19[illegible].-

File

EMBASSY OF THE
UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT

Praia, Cape Verde
July 7, 1983

Ms. Fátima Fortes
National Development Fund
Praia

Re: Transfer Authorization
AID 659-XXX-000-2606
Amendment No. 1 dated
November 23, 1982

Dear Ms. Fortes,

Reference is made to recent meetings held between representatives of the National Development Fund (NDF), the Ministry of Economy and Finance (MEF), members of the USAID staff and a representative of AID/Washington to reach agreement on the procedures to be implemented for the "special account" described in subject agreement.

We have reviewed the Government's system for accounting for local currencies generated from the sale of commodities and the subsequent disbursement of those local currencies to the agreed upon sub-projects and program support activities and found the system to be adequate for proper financial management and accounting of those funds. We, therefore, agree with your proposal that no changes or modifications be made in the current system.

We have also reviewed the current system used to report to AID on the receipt and sale of corn and the financial report for the utilization of local currencies generated. As a result, we would like to request that certain changes be made with regard to the content and frequency of the reports.

At present, these reports are submitted to AID as follows:

1. A receiving report from EMPA each time a corn shipment is received in port describing the quantity and quality of corn received.

2. A quarterly report from EMPA which contains the following information:

   a. Gross quantity of corn received and net quantity of corn that can be sold (as a result of contamination, lossage in shipment, etc.)

   b. Quantity of corn sold

   c. Quantity of corn in inventory at the end of the quarter; and

   d. Amount of local currency sold during the quarter.

3. A yearly report prepared by the National Development Fund describing all program activity during the year, including utilization of local currencies for sub-project activities.

Instead of the above, we would like to request that the reports be consolidated into one report to be submitted to AID each quarter. The following is a brief summary of the information that should be included

in the report:

1. A summary showing the physical movement of corn during the quarter in the following format:

   a. stock on hand at beginning of quarter by location (central warehouse, Praia, Santa Cruz, Santa Catarina, Fogo, etc.);

   b. shipments received during the quarter;

   c. metric tons distributed to the various locations (Santa Cruz, Fogo, etc.);

   d. metric tons sold during the quarter by location; and

   e. stock on hand at the end of the quarter.

2. A summary cash flow statement which ties into the physical movement of commodities during the quarter. The cash flow should reflect:

   a. balance of funds at beginning of quarter;

   b. gross sales by EMPA during the quarter;

   c. local currencies (net of internal transportation and distribution costs) remitted by EMPA to the NDF;

   d. disbursements made from de Fund to each individual sub-project; and

   e. balance at end of quarter.

3. A brief written summary, similar to the yearly report currently provided, for each sub-project describing the physical movement accomplished during the quarter. The report should be related to the summary cash flow statement required under 2 above. This section of the report should contain information such as numbers of walls and dikes completed during the quarter, numbers of walls and dikes begun, numbers of workers employed, appropriate cost data, etc..

As project activities progress, we may require certain additional information to assist us in monitoring sub-project activities. Any changes or modifications in the reporting requirements will be discussed with you.

We are enclosing formats A, B, C and D for the Quarterly Financial Report, which we believe cover all of the information mentioned above. As we have just received a report for 1982, we would like now to receive a report covering the six months (Jan.-June, 1983) by July 31, 1983, after which we would like to receive regular quarterly reports. We will be happy to collaborate in its preparation.

We would appreciate it if you would indicate in the space below your agreement with the contents of this letter and send us a copy. If before signing you have any questions I would be happy to discuss them with you.

Sincerely,

Frank Dimond
Program Officer, USAID/Praia

THE CONTENTS OF THIS LETTER IS APPROVED.

Fatima Fortes

Over...

QUARTERLY FINANCIAL REPORT

ON PL-480

A. CORN STOCKS

1. Shipments Received

Date ..... Ship .... MT

2. Stocks at EMPA Warehouses

	Distribution TO	Sales FROM
	Beginning of quarter (MT)	End of quarter (MT)
Central Warehouse		
Praia		
Santa Cruz		

3. Losses due to spoilage, wastage . . . . MT

B. MINISTRY OF ECONOMY AND FINANCE ACCOUNT

1. MEF Account

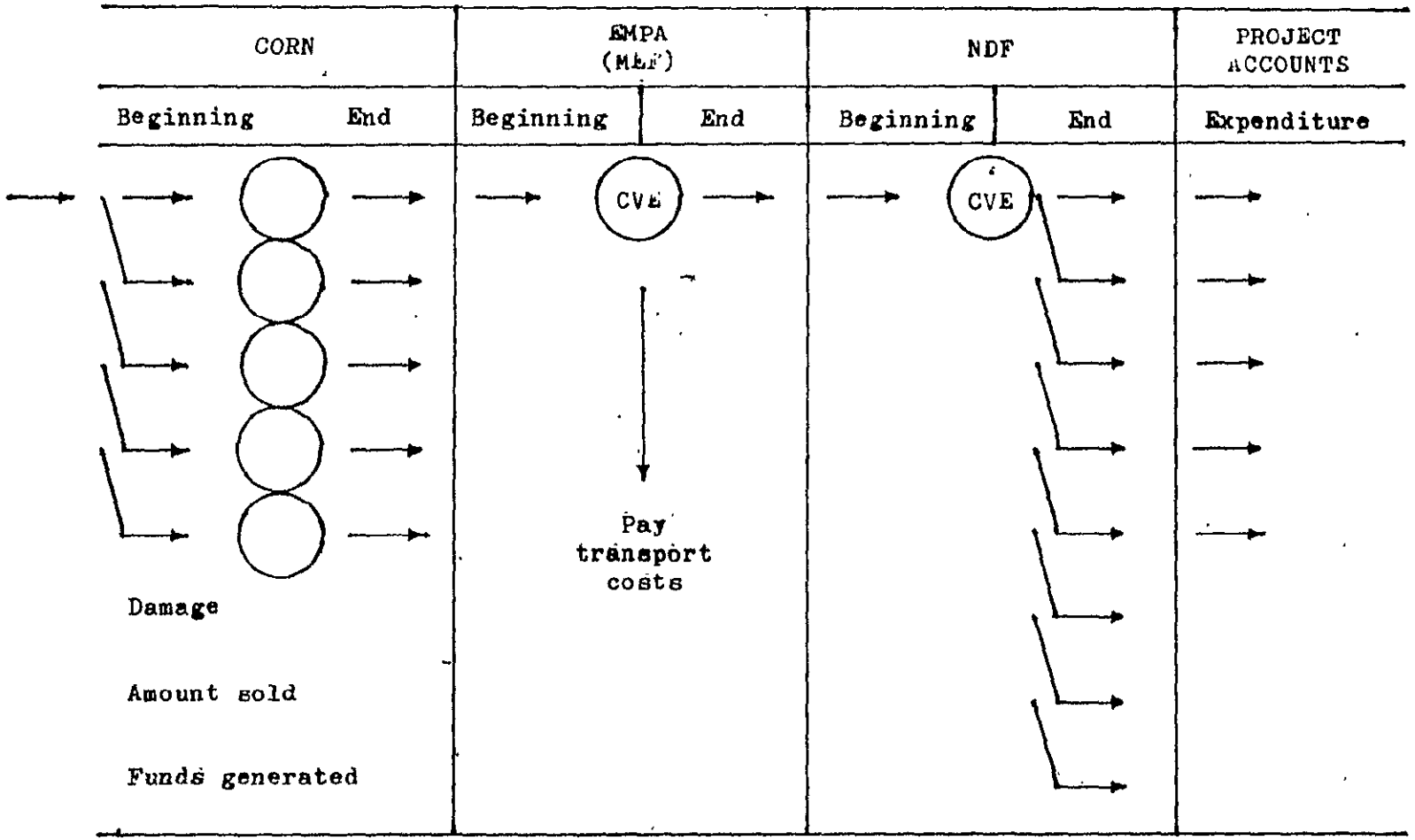
Balance beginning of quarter	Gross receipts from sale of corn	Transport and distribution costs paid	Disbursements to NDF	Balance end of quarter

C. NATIONAL DEVELOPMENT FUND ACCOUNT

Balance beginning of quarter	Disbursements from MEF	Disbursements to sub-projects	Balance end of quarter

D. SUB-PROJECT ACCOUNTS

Disbursements from NDF during quarter	
1. 2. 3. 4. 5. 6. 7.	


CORN
EMPA
(MEF)
NDF
PROJECT
ACCOUNTS
Beginning
End
Beginning
End
Beginning
End
Expenditure
CVE
CVE
Pay
transport
costs
Damage
Amount sold
Funds generated

QUARTERLY FINANCIAL REPORT

ON PL-480

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Date ..... Ship .... MT

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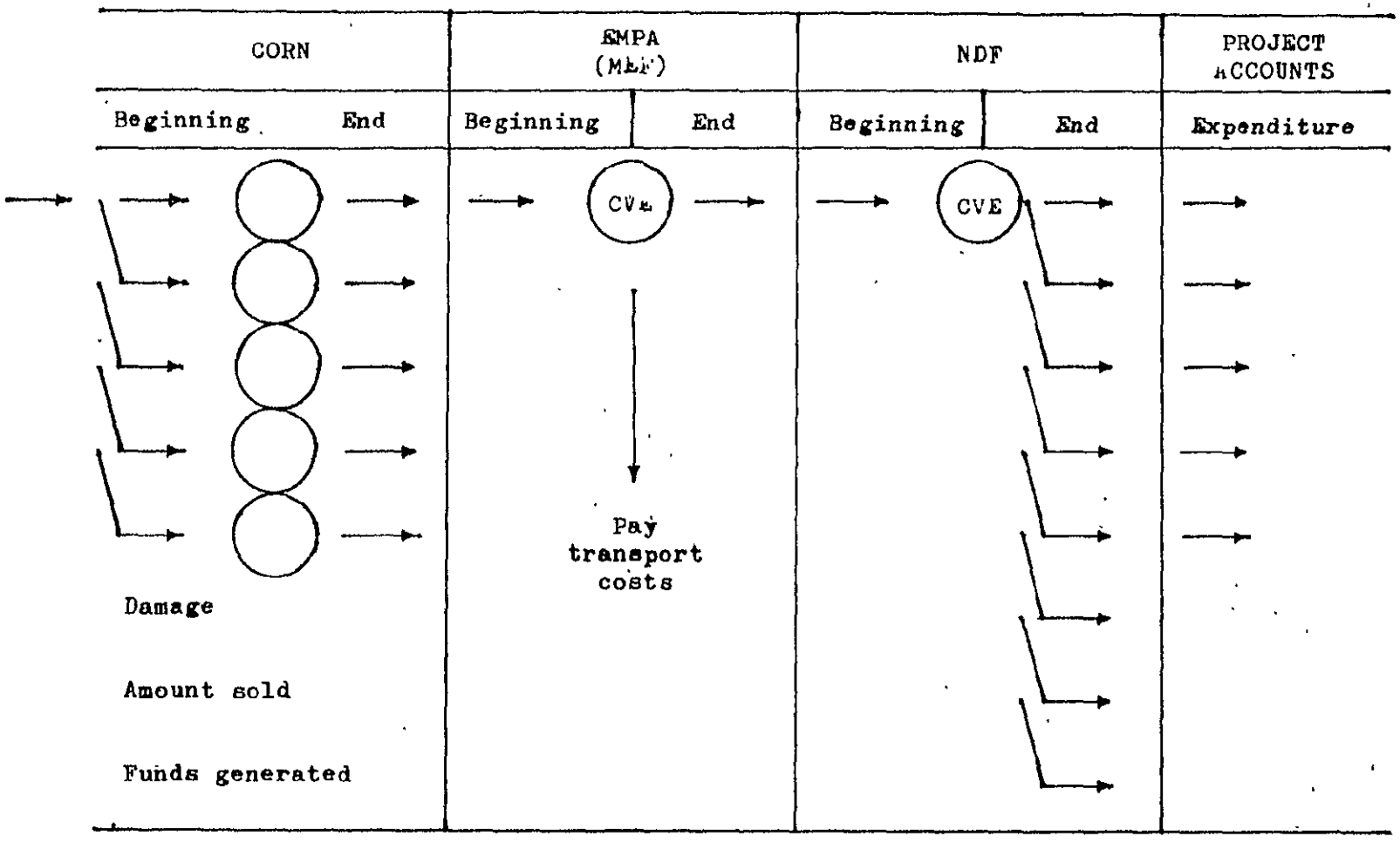
Balance beginning of quarter	Disbursements from MEF	Disbursements to sub-projects	Balance end of quarter

D. SUB-PROJECT ACCOUNTS

Disbursements from NDF during quarter	
1.	
2.	
3.	
4.	
5.	
6.	
7.	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EMPA
(MEF)
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Beginning
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QUARTERLY FINANCIAL REPORT

ON PL-480

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Date ..... Ship .... MT

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	Beginning of quarter (MT)	End of quarter (MT)
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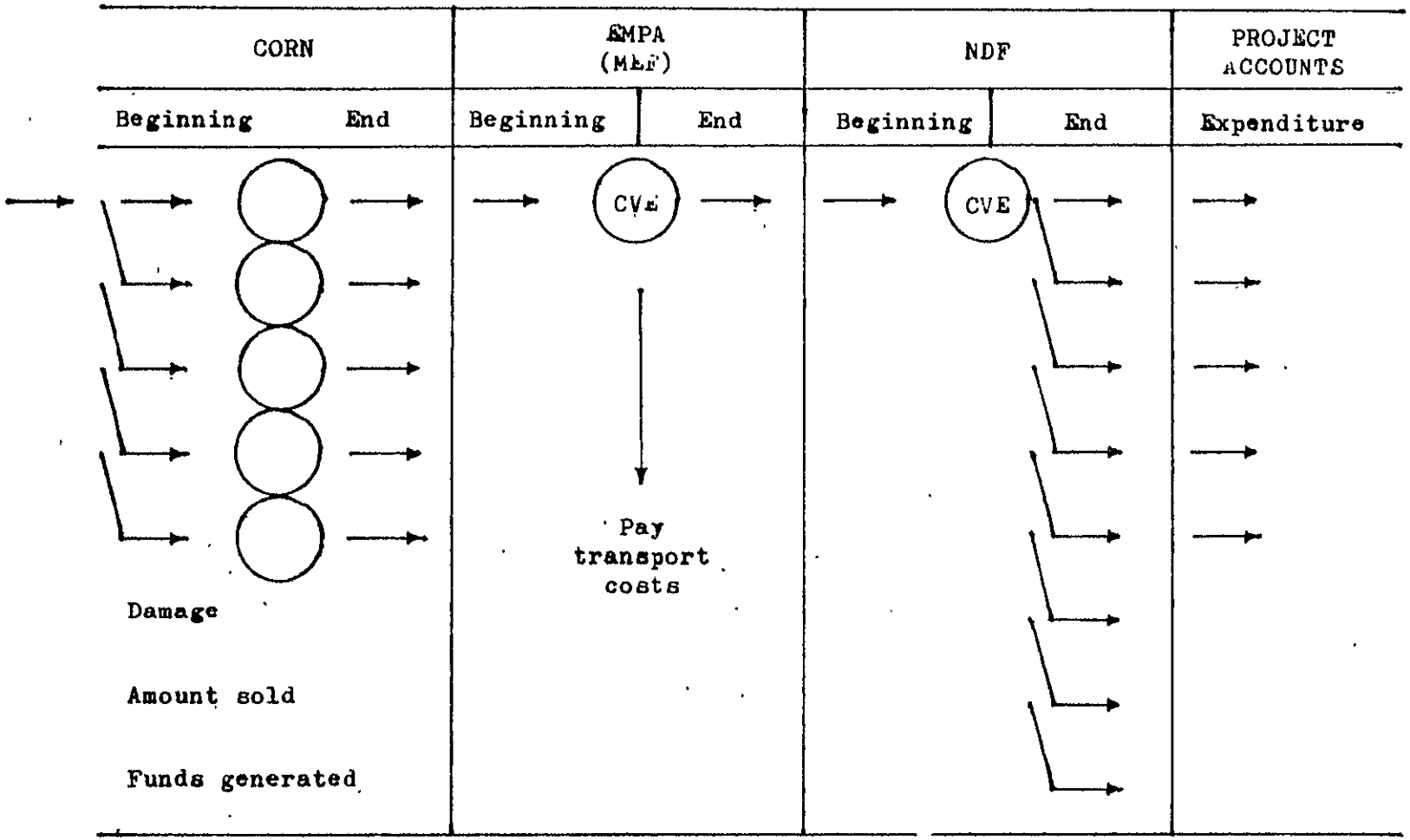
C. NATIONAL DEVELOPMENT FUND ACCOUNT

Balance beginning of quarter	Disbursements from MEF	Disbursements to sub-projects	Balance end of quarter

D. SUB-PROJECT ACCOUNTS

Disbursements from NDF during quarter	
1. 2. 3. 4. 5. 6. 7.	


CORN
EMPA (MEF)
NDF
PROJECT ACCOUNTS
Beginning
End
Beginning
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Beginning
End
Expenditure
CVE
CVE
Pay transport costs
Damage
Amount sold
Funds generated

QUARTERLY FINANCIAL REPORT

ON PL-480

A. CORN STOCKS

1. Shipments Received

Date ..... Ship .... MT

2. Stocks at EMPA Warehouses

	Distribution TO	Sales FROM
	Beginning of quarter (MT)	End of quarter (MT)
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Santa Cruz		

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Balance beginning of quarter	Disbursements from MEF	Disbursements to sub-projects	Balance end of quarter

D. SUB-PROJECT ACCOUNTS

Disbursements from NDF during quarter	
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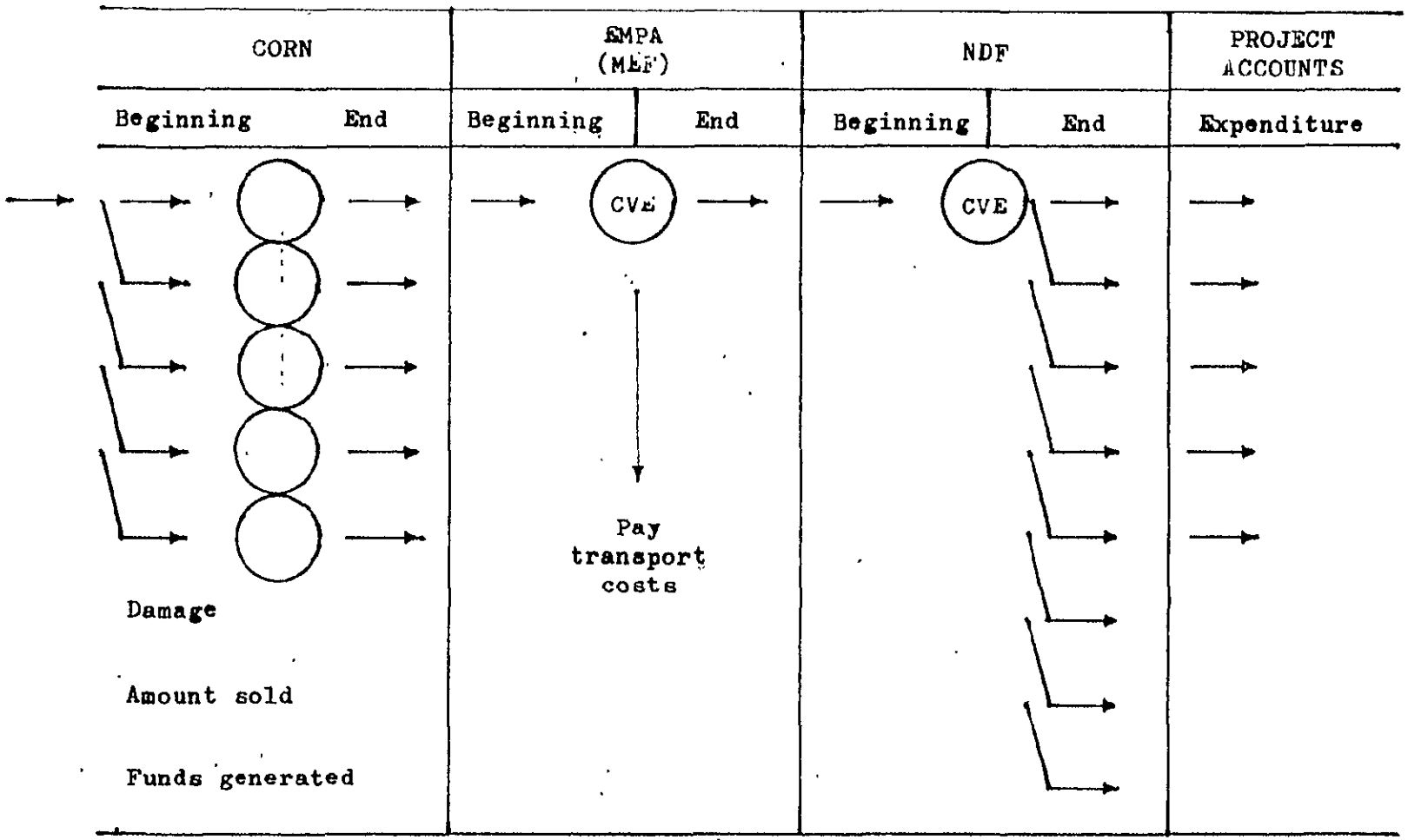
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End
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Expenditure
CVE
CVE
Pay transport costs
Damage
Amount sold
Funds generated

H

PL-480 TITLE II - SECTION 206 PROGRAM REVIEW
TRANSFER AUTHORIZATION No. 659-XXX-000-2606
RESUME OF SALES (TONNAGE) AND DEPOSITS 1/

Vessel (Arrival Date) Sale Reported by Quarterly Report	Report No.	CY - 1982 1st Quarter	CY - 1982 2nd Quarter	CY - 1982 3rd Quarter	CY - 1982 4th Quarter	CY - 1983 2/ 1st Quarter	CY - 1983 2/ 2nd Quarter	CY - 1983 2/ 3rd Quarter	CY - 1983 2/ 4th Quarter	CY - 1984 3/ 1st Quarter	CY - 1984 3/ 2nd Quarter	CY - 1984 3/ 3rd Quarter
Del Sol (12/81)												
Sale No. 1	6/82	-0-										
Metric Tons			2,939.3									
Deposits			16,753,816									
Sale No. 2	12/82											
Metric Tons				2,039.3								
Deposits				11,581,430								
Glory (5/82)												
Sale No. 1	7/82											
Metric Tons			1,101.9									
Deposits			6,281,351									
Sale No. 2	10/82											
Metric Tons				4,746.5								
Deposits				27,055,125								
Sale No. 3	1/83											
Metric Tons					4,085.4							
Deposits					23,279,316							
Sale No. 4	4/83											
Metric Tons						7.6						
Deposits						26,728						
Del Valle (3/83)												
Sale No. 1	9/83											
Metric Tons							6,296.9					
Deposits							42,189,459					
Sale No. 2 (Estimated)												
Metric Tons								3,644.7				
Deposits								24,419,423				
Sunset (5/83)												
Sale No. 1	10/83											
Metric Tons							1,681.0					
Deposits							11,262,905					
Sale No. 2 (Estimated)												
Metric Tons								3,308.4				
Deposits								22,166,079				
Del Sol (Est. 10/83)												
Sales (Estimated) Metric Tons									[illegible]	4,000	[illegible]	
Deposits									[illegible]	[illegible]	[illegible]	
Unknown (Est. 1/84)											5,000	[illegible]
(Estimated) Metric Tons											30,600,000	20,400,000
Deposits												
Totals												
Metric Tons			4,041.3	6,785.8	4,085.4	7.6	7,977.9	6,953.1	4,000	4,000	5,000	2,000
Deposits			23,035.167	38,636,555	23,272,316	26,728	53,452,364	46,585,502	26,800,000	40,800,000	51,000,000	20,400,000

1/ Deposits to the FDD Fund account shown in CV escudos

2/ Sales during 3rd and 4th Quarters of CY-83 estimated and calculated using 9 escudos per kilogram

3/ Sales during CY-84 estimated and calculated using 12.5 escudos per kilogram

BEST AVAILABLE

PL-480 TITLE II - SECTION 206 PROGRAM REVIEW
TRANSFER AUTHORIZATION No. 659-XXX-000-2606
RESUME OF COMMODITY SHIPMENTS

	Vessel	[illegible]	FY-82 (Year 1)	FY-83 (Year 2)	FY-84 (Year 3)	Shipment Costs (US$) Commodity	Shipment Costs (US$) Ocean Freight
A. Approved Program							
TA-2606 (Metric Tons)	-	-	5,000	- 1/	-	-	-
Amendment No. 1			10,000	15,000	15,000 1/	-	-
Sub-Totals			15,000	15,000	15,000		
B. Program Costs (US$)	-	-					
Value (Estimated)			2,190,000	2,199,000	2,190,000	-	-
Ocean Freight (Estimated)			2,415,000	2,415,000	2,415,000		
Sub-Totals			4,605,000	4,605,000	4,605,000		
Value (Actual) 2/			2,261,935	2,050,241	2,175,000		
Ocean Freight 2/			1,715,929	1,531,958	1,710,000		
Sub-Totals			3,917,833	3,582,199	3,885,000		
C. Deliveries							
Shipment No. 1	[illegible]	-					
Bill of Lading			5,0[illegible]8.0 MT			813,275.	572,052.
Discharged			[illegible] MT				
Received (EMPA)			[illegible] MT				
Shipment No. 2	[illegible]						
Bill of Lading			[illegible] MT			1,303,660.	1,143,870.
Discharged (Survey)			[illegible] MT				
Received (EMPA)			[illegible] MT				
Shipment No. 3	[illegible]						
Bill of Lading				[illegible]		[illegible]	1,140,004.
Discharged (Survey N/A)				[illegible]			
Received (EMPA)				[illegible]			
Shipment No. 4							
Bill of Lading							
Discharged							
Received							
Shipment No. 5							
Bill of Lading							
Discharged							
Received							
Sub-Total							
Bill of Lading							
Discharged							
Received							

1/ TA-2606 Amendment No. 1 approves up to 15,000 MT for FY-82, and indicates that 15,000 MT will be made available each year for FY-83 and FY-84.

2/ Actual costs for FY-82 and FY-83 taken from shipping documents; FY-84 costs are estimated by using $145./MT cost and $114./MT for ocean freight.

BEST AVAILABLE

APPENDIX IV

Assessment of Equipment, Training and Infrastructure Needs for Grain Storage in Cape Verde and an Initial Environmental Examination

ASSESSMENT OF EQUIPMENT, TRAINING AND INFRASTRUCTURE NEEDS FOR GRAIN STORAGE IN CAPE VERDE AND AN INITIAL ENVIRONMENTAL EXAMINATION

John R. Pedersen
Food and Feed Grain Institute
Kansas State University
Manhattan, Kansas 66506 USA

I. INTRODUCTION

A. PURPOSE. Kansas State University was requested through AID/Washington to prepare a delayed Initial Environmental Examination (IEE) in conjunction with the PL-480, Title II, Section 206 Cape Verde Food for Development Project and to assess the equipment, training and infrastructure needs for grain storage in Cape Verde.

B. SCOPE OF WORK. The stated scope of work was to include, but not be limited to:

1. Assessment of Empresa Pública de Abastecimentos of Cape Verde (EMPA), personnel qualifications and requirements for training;

2. Determination of needs for ancillary application and safety equipment in the use of pesticides;

3. Comparison of specifications for all pesticides now in use by EMPA with USEPA specifications;

4. Assessment of other donor technical assistance related to grain storage;

5. Determination of the adequacy of the existing storage infrastructure, and

6. Preparation of an IEE, including the risk/benefit analysis and recommendations for additional actions as appropriate.

C. DURATION OF TDY. Travel was requested as soon as possible for a two-week visit (maximum) by a Kansas State University representative. The visit was accomplished during the period October 2 through 12, 1983 and coincided with that of a PL-480 Food for Development (Title II, Section 206) evaluation team.

II. BACKGROUND

A. SITUATION. The Cape Verde Food for Development Program (PL-480, Title II. Section 206) prepared by AID/AFR/DR October 10, 1981 (Revised April 10, 1982) represents a significant conceptual change. Rather than seeking justification for chronic or annual emergency food requirements, this proposal acknowledges Cape Verde's structural deficit in food production.

The program authorizes the use of revenues from the sale of food commodities for multi year planning of selected agricultural and rural development activities to improve the production, protection and utilization of food resources. A small portion of the revenues, decreasing over time, are to be used to increase the effectiveness of food distribution and its availability.

B. GEOGRAPHY AND CLIMATE OF CAPE VERDE.

TOPOGRAPHY. The Cape Verde Islands are a group of nine islands (and several islets) located in the Atlantic Ocean about 360 miles (600 km) west of mainland Africa between 15 and 16 degrees north latitude. The archipelago is of volcanic origin and includes one island (Fogo) with an active volcano. Collectively, the rocky barren islands include 4000 square kilometers of land area, spread over a square section of ocean roughly 240 km on a side. The islands are traditionally divided into two groups: the northern Ilhas de Barlavento (windward islands: Santo Antão, São Vicente, São Nicolau, Sal and Boa Vista), and the southern Ilhas de Sotavento (leeward islands: Brava, Fogo, Santiago and Maio). See Figure 1.

RAINFALL. Cape Verde has an arid climate and is located at the western edge of the large arid, semi-arid belt which crosses North Africa. Both the regularity and amount of rainfall at particular locations on the islands depend strongly on elevation. Rainfall variability is relatively high everywhere (35-60 percent), with the greatest variability in the lowest most arid regions. There are no permanent lakes or streams on the islands.

Most rain falls from July to October, when South Atlantic monsoon winds bring rainstorms from the west or southwest. During this period, half the year's rain may occur in a single erratic torrential storm. During the remainder of the year, the islands are exposed to the generally drying effects of the northern tradewinds and the occasional hot and dry Harmattan winds from the east. The northeast tradewinds are humid, however, and condense to form mists from 400 to 1300 meters on the more mountainous islands.

TEMPERATURES. Temperatures are moderate throughout the islands and, like the rains, influenced by elevation. At Praia (elevation 27 meters), monthly mean temperatures range from 22°C in February to 27° in September (See Figure 2). Temperatures at higher elevations are cooler by 5.5°C per 1000 meters and less variable. At intermediate elevations

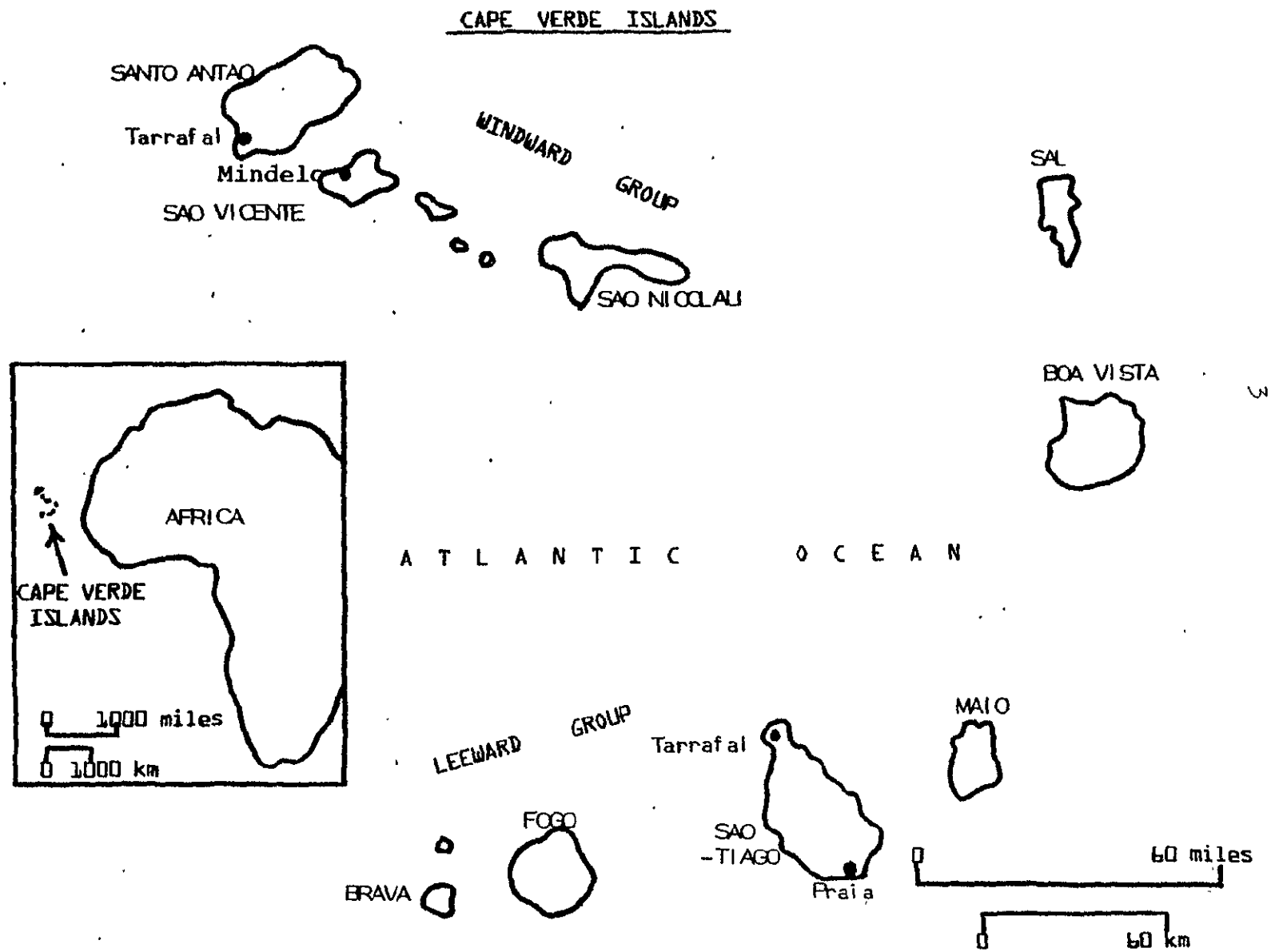
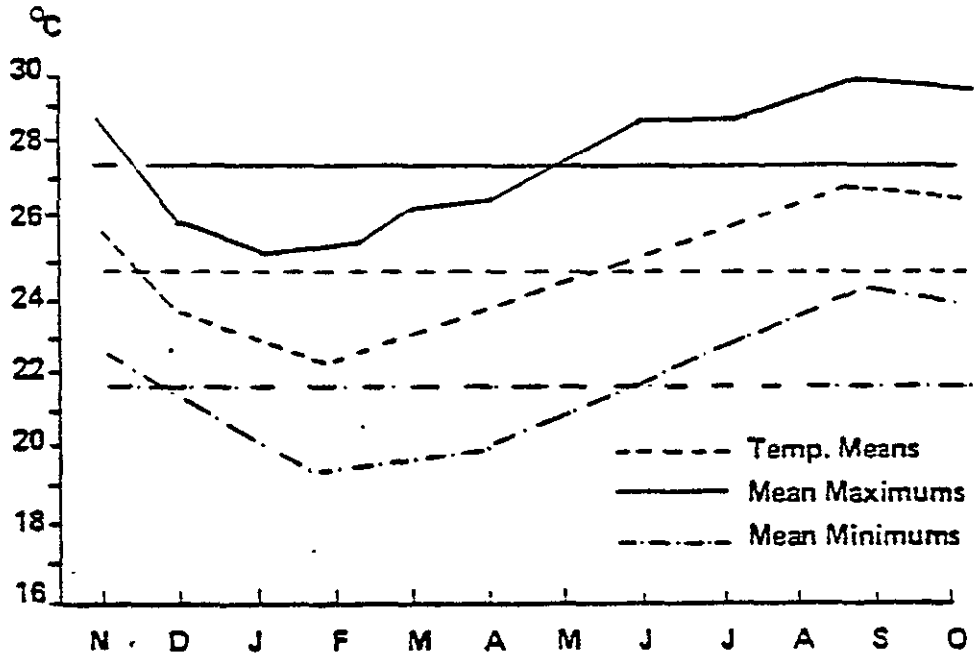

CAPE VERDE ISLANDS
SANTO ANTAO
Tarrafal
Mindelo
SAO VICENTE
WINDWARD GROUP
SAO NICOLAU
SAL
BOA VISTA
AFRICA
CAPE VERDE ISLANDS
0 1000 miles
0 1000 km
A T L A N T I C O C E A N
LEEWARD GROUP
FOGO
BRAVA
Tarrafal
SAO -TIAGO
Praia
MAIO
0 60 miles
0 60 km

FIGURE 1

FIGURE 2

Mean monthly temperatures, Praia



the annual range in monthly means is 3°C. Temperatures throughout the islands rarely exceed 30°C or fall below 13°C. The average maximum is 24.6° and the minimum 16°C.

WINDS AND HUMIDITY. Strong winds and high humidity are climatic constants on all of the islands. At Praia, north or northeast winds blow 78 percent of the time with calms only 7 percent of the time. On Santiago island humidity is constantly high. In ten years of observation at Praia, relative humidity rarely fell below 55 percent (See Table 1) (Source: FREEMAN, 1978).

Table 1
RELATIVE HUMIDITY (PERCENT), PRAIA, 1951-1960

Month	10:00 am	2:00 am	10:00 pm
January	61.2	60.9	72.0
February	56.1	56.4	69.5
March	53.3	53.3	67.1
April	56.2	56.2	70.4
May	57.5	58.5	71.7
June	59.6	58.7	72.9
July	67.1	67.3	77.4
August	68.7	68.9	78.7
September	70.7	71.0	81.2
October	68.2	68.6	80.3
November	63.8	64.0	75.0
December	63.1	62.6	73.1

C. DEMAND FOR CEREAL GRAINS AND LEGUMES

The Government of Cape Verde estimated a total demand for cereal grains and legumes at 73,000 MT for 1982. It seems reasonable to assume that the requirement for 1983 and subsequent years may be slightly higher based on expected population increases.

CEREAL GRAINS. Referring to data supplied to FAO by EMPA and based on EMPA's 1981 food distribution data and to FAO's calculations based on World Food Programme (WFP) standards, it appears that 65,000 to 66,000 MT of cereal grains (corn, rice and wheat) are required to feed the Cape Verdean population, estimated in 1980 at approximately 300,000. Tables 2 and 3 reflect the GOCV and FAO estimates respectively.

Even though the GOCV and FAO do not agree on the annual requirements for rice or wheat, the requirements for rice or wheat, the requirement for corn, and the total of all grains required do agree closely. See Tables 2 and 3.

Table 2
CAPE VERDE FOOD REQUIREMENTS*

Corn	45,000 MT	=	150	kg/capita**
Wheat	12,000	=	40	"
Rice	8,000	=	27	"
Total	65,000***	=	216.6	"

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* Based on EMPA's 1981 food distribution data
** Based on estimated 300,000 population
*** 8,000 MT beans not included

Table 3
FAO ESTIMATED CAPE VERDE FOOD REQUIREMENT FOR 1982

Food	Urban and semi-urban (population (=110,000)		Rural population (= 190,000)		Total
	REQUIREMENTS				
	kg/capita	MT / year	kg/capita	MT / year	MT/year
Corn	73.0	8,030.0	155.125	29,473	37,503.75 (45,004.5)*
Rice	54.75	0,022.5	-	-	6,022.5
Wheat (flour)	54.75	6,022.5	27.375	5,201.25	11,223.75 (14,965.0)**
Total (cereals),	182.5	20,075.0	182.5	34,675.0	54,750.0 (65,992.0)***
Peas / Beans	16.425	1,806.75	32.85	6.241.5	8,048.25

PEAS AND/OR BEANS. The Government 1982 estimates for food include 8,000 MT of beans in addition to that indicated in Table 1. This estimate is very close to that estimated by FAO and shown in Table 3.

D. PRODUCTION OF CEREAL GRAINS AND LEGUMES

Since 1964, drought periods in Cape Verde have severely affected the country's agricultural productivity. The effects of the drought have led to a situation of chronic food deficit. The Cape Verde Food for Development Program proposal indicated that Cape Verde would always experience a deficit in cereal grain production. It indicated that domestic needs for corn were in the range of 48,000 MT and that production at maximum would only supply 20 percent of the current needs. During the dry crop year of 1981/82 production amounted to only 3,000 MT or approximately 6.7 per cent of the current requirement.

Only 500 MT of the projected need of 8000 MT or 6.3 percent of beans required were produced in 1981/82.

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* 20 % added for diversion to animal feed from cachupa
** Wheat grain equivalent
*** Total adjusted for * and ** .

E. IMPORTS AND FOOD AID

It is obvious that Cape Verde will, of necessity continue to import cereal grains to satisfy the food needs of the population, whether through purchases or donations in the form of food aid. Figure 3 (adapted from Annex 3 of the Cape Verde Food for Development Program proposal) indicates the relationship between the estimated needs, national production, donations and imports for corn and beans for the years 1977 through 1982. On the average between 25,000 and 40,000 MT of corn have been imported during this six year period.

III. GRAIN STORAGE IN CAPE VERDE

A. EMPRESA PÚBLICA DE ABASTECIMENTOS (EMPA).

EMPA is the Government of Cape Verde organization charged with the responsibility for importation, storage, wholesaling and some retailing of staple food commodities. Of these food commodities, corn comprises the greatest volume.

In addition to the above stated functions, EMPA is also involved in recommending wholesale and retail prices for commodities through the Minister of Commerce. Prices are ultimately determined by a Council of Ministers. Four types of corn (listed below) are commonly found in the market.

Type	Price/kg (1980)	Source
Domestic	13-23 Escudos	Local production
Nº 1	9.5	Argentina (purchase)
Nº 2	6.5	US PL-480 (grant)
Nº 3	3.4	European (grant)

It should be noted that the price for Nº 1 corn is approximately equal to the world price and that Nº 3 corn is used primarily for animal feed.

B. EMPA STORAGE CAPACITY.

As of 27 July 1983, EMPA's warehouse type and silo locations and capacities were reported as in Table 4. With the completion of the 10,000 MT silo in Praia scheduled for October 1983, EMPA should have enough covered storage for virtually the country's annual requirements for corn. Whether or not the location of warehouses is commensurate with the amounts of commodities to be distributed was not determined as a part of this investigation.

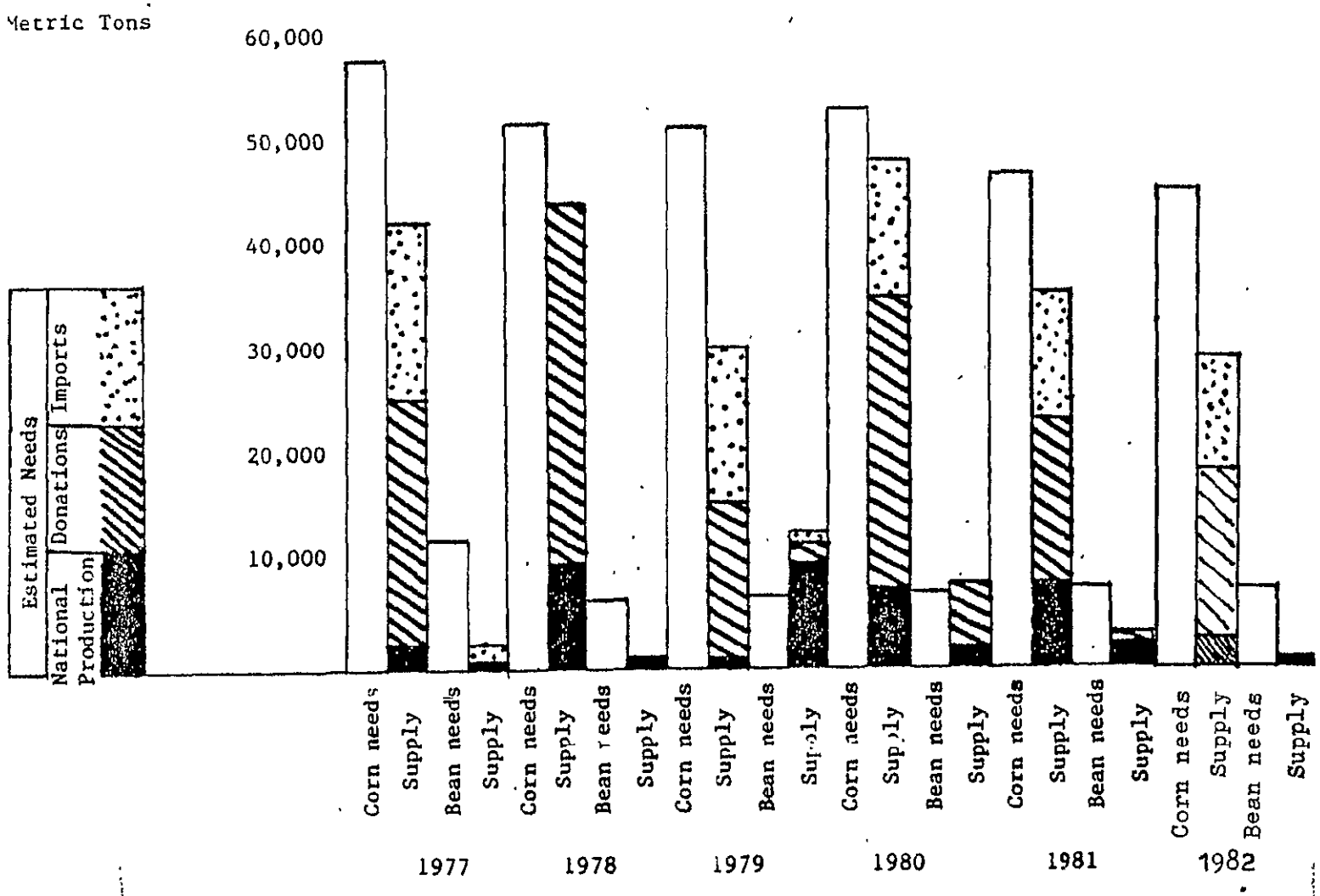

FIGURE 3. Supply data for corn and beans; needs, production, donations and imports 1977-1981

C. TYPES AND CONDITION OF STORAGE FACILITIES.

Because of the relatively short duration of the visit to Cape Verde it was not possible to visit all of the individual warehouses nor each of the various types. Observations on construction and conditions of type A, type B+B, an old warehouse and the new port silo at Praia were made and are briefly described.

1. WAREHOUSE FACILITIES FOR BAG STORAGE

a. TYPE A WAREHOUSE. Two type A warehouse were examined at Vila Tarrafal on Santiago Island. In general the warehouses were of hand construction. Walls and floors were smooth on the interior and the roofs were sound. Windows along the wall-roof juncture were unbroken and closed. Ventilators near the floor level were covered with fine mesh screen which in most cases was rusted and broken out. This can be remedied by using heavier gauge screen with openings about 1/4 inch. This type warehouse was also noted at Pedra Badejo but the two units there were not inspected. Each of the type A warehouse has an estimated storage capacity of 250 MT. This type warehouse can provide adequate storage for protection of food grain commodities. This general type warehouse is reported on Boa Vista, Maio, Sal, Brava and São Nicolau Islands, but they were not observed.

b. TYPE B WAREHOUSE. No type B warehouses were observed during this visit. They are said to have a capacity of 800 MT each.

c. TYPE B+B WAREHOUSE. Four of this type warehouse exist at Praia (Santiago Island) and are said to have a storage capacity of 2,500 MT each. Two of this type warehouse were examined and found to have smooth walls and relatively smooth concrete floors. A few windows along the wall roof juncture were broken but most were intact and closed. Ventilators near the floor level were protected by heavy mesh screen (1/4 inch square openings) and removable ventilator covers. The doors. 2 at each end of the warehouse in most cases had opening at the center bottom which could admit small rodents. This type warehouse can provide adequate storage protection for food grain commodities.

Type A, B, B+B and newly constructed warehouses at Mindelo (São Vicente) and Porto Novo (Santo Antão) account for approximately 52.4 per cent of EMPA's reported covered storage capacity.

d. ASSORTED OTHER WAREHOUSES. Warehouses in this category were generally referred to by EMPA technical personnel as older warehouses. One warehouse in this category was examined at Calheta (Santiago). This warehouse was reported as having 500 MT storage capacity. The structure had one doorway which entered a central section which was used for sacked corn storage with additional sections at each end of the central area. One section was used for storage of vegetable oils, rice and other food items. The other section was very disorganized and didn't appear to be used for food commodity storage. The entry door

Table 4
EMPRESA PÚBLICA DE ABASTECIMENTOS (EMPA) STORAGE CAPACITY AND LOCATION

Location	Standard warehouses			Assorted other whses	Open storage	Port silos	Total covered storage	All storage
	Nº	Type	Capacity (MT)	(MT)	(MT)	(MT)	(MT)	(MT)
SANTIAGO								
PRAIA								
Ach. Grande	4	B+B	10,000	2,020	6,000		12,020	18,020
Z.Cais Velho				1,000	2,000	10,000	11,000	13,000
SANTA CATA-RINA								
Assomada				2,400			2,400	2,400
SANTA CRUZ								
Pedra Badejo	2	A	500	125			625	625
TARRAFAL								
Vila Tarra-fal	2	A	500	400			900	900
Calheta				500			500	500
BOA VISTA								
Sal-Rei	1	A	250	100			350	350
MAIO								
Porto Inglês	1	A	250	150			400	400
SAL								
Palmeira	2	A	500		150		500	650
Espargos				250			250	
FOGO								
S.Filipe	2	B	1,600		380		1,600	1,980
Mosteiros				100			100	100
BRAVA (Nova Sintra)	1	A	250	80	220		330	550
SUB-TOTAL			13,850	7,125	8,750	10.000	30.975	39,475
SÃO VICENTE								
MINDELO								
Italcabe		New	4,300				4,300	4,300
CC-2		*	1,000				1,000	1,000
CC-2					ca3,500			3,500
Alfândega			400		1.000		400	1,400
Z. Cais						4,200	4,200	4,200
SANTO ANTÃO								
Porto Novo	1	New	3,000				3,000	3,000
Paul			300				300	300
Pta do Sol				300	250		300	550
Janela				100			100	100
S.NICOLAU								
Va Ra Brava	1	A	250				250	250
Tarrafal	1	B	800		400		800	1.200
SUB-TOTAL			10.050	400	5,150	4,200	14.650	19,800
GRAND TOTAL			23,900	7,525	13,900	14,200	45,625	59.275

* Compartimented.

SOURCE: Adapted from letter - Secretaria de Estado da Cooperação e Planeamento. 27 July 85

did not fit tightly enough to exclude small rodents and was at below ground level. Round openings along the upper part of the wall for ventilation had bars on them but were not protected to exclude birds or rain. The conditions of this warehouse would not generally be considered adequate for proper protection of food grain commodities. Facilities in this category comprise about 16.5 per cent of EMPA's reported covered storage capacity.

e. OPEN STORAGE. Hard surfaced areas are generally considered to be included in this category of storage. Storage of this type should only be considered for emergency use since no protection from pests or climatic conditions is provided. EMPA reported open storage space for 13,900 MT and in all cases this type space was at locations where covered storage was also available.

2. PORT AND OTHER SILOS

a. PRAIA PORT SILO. The new port silo at Praia is scheduled for completion in late October 1983. The total cost of the project is reported to be $3,050,250 under an FAO project with services of experts and consultants, contract for construction, provision of non-consumable equipment and training provided by the Netherlands.

The storage capacity is stated as 10,000 MT (bulk) with a receiving capacity of 120 MT per hour and discharge capacity of 60 MT per hour. Two sack filling scales are rated at 9 MT per hour each.

Aluminum phosphide fumigant applicators are provided on each of the silo filling conveyors and each silo is equipped with thermo couple cables to read grain temperatures in storage. Each silo can be ventilated by pulling air up through the grain from four ventilators in the hopper bottom and exhausted from one of two fan systems located on the bin top level.

A shipment of 6,000 MT of US PL-480 corn is to be discharged in bulk at the Praia port silo in November.

b. MINDELO PORT SILO. Time did not permit a visit to the silo located at Mindelo, São Vicente. It is said to be similar in construction to that being completed in Praia but of lesser capacity (4,200 MT). A shipment of 3,600 MT of PL-480 corn is to be discharged bulk at the Mindelo silo in November. This will be first U.S. corn delivered in bulk to Cape Verde under the PL-480 Food for Development Program.

c. MOAVE FLOUR MILL SILO (MINDELO). MOAVE is a flour milling parastatal with a reported 2,000 MT bulk storage capacity. This facility was not visited.

d. SEED STORAGE SILOS. The Government received the components for constructing metal silos at S. Filipe, Fogo in late 1981. These silos were to serve as storage of corn and bean seed in order to help farmers who do not have enough seed to sow their fields

when the rains start. The Ministry of Rural Development (MDR) intends to subsequently build silos on every island for this purpose.

D. STORAGE PRACTICES

1. EMPA WAREHOUSES.

a.STANDARD WAREHOUSES. Visits were made to warehouses classified in Table 4 as "standard" warehouses in Tarrafal and Praia, Santiago. In general, bagged corn and other sacked commodities were neatly stored on pallets off the floor and away from the walls. In most instances, there was only minor spillage of grain in the stacks of bags and on the floors. This is consistent with observations reported by the AID project assistant on a visit to the new warehouse in Porto Novo, Santo Antão in August 1983.

There was an exception to the general cleanliness of the warehouses in one of the B+B units at Achada Grande, Praia. A resacking operation appeared to be taking place and even though the warehouse was nearly empty many open sacks of corn and piles of corn were noted throughout the warehouse.

b. ASSORTED OTHER WAREHOUSES. The only warehouse of this category was visited at Calheta, Santiago. Storage conditions at this warehouse were much more congested. While some of the sacked grains were neatly stored on pallets away from the walls there was one stack of bags which had fallen against the wall and some bags were stacked directly on the floor and against the wall. There was considerably more spillage of grain in the stacks and on the floor of this warehouse when compared to the standard warehouses. This was, in part, due to rodent damaged sacks of corn.

2. EMPA SILOS

The new silo at Praia is just being completed and will be test run on October 20 in preparation for receipt of the first bulk shipment in November. Grain will be off loaded from the ship at the harbor quay using two clam-shell units each with m3 capacity. Grain will be placed in trucks and delivered to the silo receiving hopper (approximately 300-400 yards from the ship). Grain will be elevated at the rate of 120 MT per hour and can be treated with aluminum phosphide pellets at the time of unloading or by turning the grain if it is determined that fumigation is necessary during storage. Grains can be turned at the rate of 60 MT per hour.

Each of the 15 silo units (670 MT capacity each) is equipped with a thermo couple cable which can be monitored in the central control room on a FOSS MINI SCAN unit. It is recommended that temperatures of grain in the silos be monitored weekly. Any increases in temperature in localized or isolated parts of the grain should be a signal that a problem exists and that steps should be taken immediately to determine the cause of the temperature increase,i.e. insects or molds developing in the grain.

Two sacking scales are provided for disposition of grain in sacks to warehouses. Each scale has a capacity of 9 MT per hour. A warehouse is provided as a part of the silo structure to facilitate accumulating truck load quantities of bagged grains.

The operation and storage practices of the silo at Mindelo are not known. Although no U.S. corn has previously been received at Mindelo in bulk, Argentine corn has been reported received in bulk.

IV. PESTS, CONTROL PRACTICES AND PESTICIDES

A. PESTS

1. INSECTS.

Of the warehouses visited during the time in Cape Verde the most serious pest was Ephestia and related moth species in all warehouses. Large numbers of adult moths were seen on the warehouse walls and on sacks of grain in storage in Praia and Tarrafal.

In one of the B+B warehouses located at Achada Grande, Praia a large stack of corn from France was under fumigation with aluminum phosphide. Adjacent to this stack were several open sacks of the same corn with the grain heavily webbed by moth larval. During a return visit a few days later, the fumigated corn had been uncovered and was subject to reinfestation from the infested sacks which remained in their same position.

In the small warehouse at Calheta, the moth infestation was lighter but there was an indication that the AID corn had been infested with Sitaplulus spp. The corn probably had been fumigated since no live Sitaplulus weevils were noted on the bags. A list of insect pests reported in various stored commodities was prepared in 1978 by the Direction de la Production et Protection des Vegetaux. The list indicated the source of infestation, the degree of infestation and the insect species involved. The list is attached as Annex I of this report.

2. RODENTS

No gross evidency of rodent activity was noted in the standard warehouses at Tarrafal or Praia. At the small warehouse in Calheta rodent chewed bags were noted at a few locations in the stack of AID corn which had resulted in some spillage. Rodent chewed kernels of corn and mouse droppings were also noted in the stack of corn.

3. MOLDS

No evidence of molded grains were noted in any of the storage observed. An unloading report for AID corn delivered to Mindelo in March 1983, indicated evidence of minor sweating in three holds and later reported 58 sacks slightly stamed but contents not altered.

Although the corn delivered under PL-480 Title II is nº 2 Yellow

Corn (which indicates a possible 15.5 per cent moisture contents) AID personnel indicate this corn is delivered at 13.5 per cent. When the corn is stored in sacks under the generally dry arid conditions in Cape Verde moisture is generally lost from the grain. EMPA personnel indicated corn moisture contents in storage of 11.0 to 11.5 per cent.

Storage of corn in bulk may alter the customary drying of corn in storage. In bulk, the corn is less likely to lose moisture to the atmosphere. If corn is delivered at moisture contents marginal for safe storage, i.e. 14.0 to 15.5 per cent, molding of the grain could occur under the temperature conditions predominant.

1 Provision is made to pull air up through the grain in the new silo constructed at Praia but the rated air flow is not known. It is possible that marginal moisture corn could be dried in the silos.

Moisture contents of bulk stored corn is an item which should be monitored carefully until experience with bulk storage in Cape Verde is developed.

B. PEST CONTROL PRACTICES, MATERIALS AND EQUIPMENT

1. CONTROL PRACTICES.

a. INSECTICIDE APPLICATION. In the past, insecticides have been applied as emulsifiable concentrate dilutions on warehouse floors, walls, ceilings and as surface treatment of stacks of bags of stored grain. Insecticide dust has been used between layers of bags of grain as the stacks are formed. Smoke generated aerosol treatments have been used to control flying insects in warehouses.

b. FUMIGANT APPLICATION. The solid tablet form of fumigant has been used for fumigation of stacks of bags of grain under gas tight tarpaulins sealed to warehouse floors by sand snakes.

2. PEST CONTROL MATERIALS

a. INSECTICIDES. GTZ under its project on post-harvest problems in Cape Verde, has recommended the insecticide Folithion® fenitrothion) for use as an insecticide spray treatment for warehouse floors, walls, over head areas and external treatment of stacks of bags of stored grain. A one per cent concentration of spray solution was reported as being used.

A one percent Folithion dust was recommended for between layer treatment of sacks in stacks at initial storage of grain.

A five percent solution of Folithion in oil has been used as a surface generated aerosol for flying insect control in warehouses.

"Mafu " = dichlarvas has also been used for this purpose but it was indicated that GTZ recinded their recommendations for use of "Mafu".

Fenitrothion is not currently registered by USEPA eitheir as a general use pesticide or a restricted use pesticide for the treatments described. Dichlarvas is registered as a restricted use pesticide for ULD treatment of storage facilities.

GTZ is providing these insecticides as assistance to EMPA.

b. FUMIGANTS. GTZ has recommended the use of grain. Aluminum phosphide, on exposure to moisture in the air, generates hydrogen phosphidic gas (=phosphine), an effective and widely used fumigant for stored product insect control. USEPA has registered aluminum phosphide under several trade names (including Phostoxin, Gastoxin, Detra EX-B, etc.) as a restricted use pesticide.

2 3. APPLICATIONS AND SAFETY EQUIPMENT

GTZ has provided, as a part of their 1981 project on post-harvest problems, insecticide and fumigant applications equipment as well as safety equipment.

a. APPLICATION EQUIPMENT. GTZ supplied compression sprayers, motorized sprayers and dusters and Swingfog aerosol applicators for insecticide treatments. They also supplied aluminum phosphide pellet applicators for Praia and Mindelo silos as well as gas tight tarpaulins to the EMPA "standard" warehouses.

b. SAFETY EQUIPMENT. Draeger or Duer full face gas masks with chin-type canisters were supplied by GTZ. The specificity of the canisters were not confirmed, however, EMPA personnel indicated they were for phosphine use.

c. EQUIPMENT NEEDS. All of the types of equipment needed for the applications of pesticides used in the current program were available. It was impossible to determine whether there were sufficient quantities of equipment and supplies without conducting an inventory at all locations. EMPA personnel did indicate that additional tarpaulins could be used because they now have to transport them from island to island occasionally. Sands snakes appeared to be of local fabrication and should not pose a problem.

Expendable items such as gas mask canisters could be in need, however, the canisters and masks must be matched by manufacturer to assure proper safety in use. In the U.S. larger canisters than the chin-type are generally preferred for fumigation use. It should be determined whether the German suppliers of Auer and Draeger supply masks with chest-type canisters.

V. REQUIREMENTS FOR TRAINING AND QUALIFICATIONS OF EMPA PERSONNEL

A. REQUIREMENTS FOR TRAINING

1. GTZ TRAINING PROGRAM

Discussion with the Director of the Integrated Pest Management Program in Cape Verde, Ms. Maria Luísa Lobo, confirmed that GTZ planned to conduct a training session for warehouse personnel. GTZ had indicated such an activity for October or November of 1983 at the GASGA meeting at Cairo in June. There was no formal program prepared and available at the time of this visit, however, Ms. Lobo provided a copy of the program for a Seminar held in April 1981 (Annex II). Ms. Lobo also indicated that training had been provided at each of the islands in September of 1981.

Since it appears that GTZ will again be providing a training course in Cape Verde it seems inappropriate to suggest a parallel type of training on the part of the Food and Feed Grain Institute.

3 KANSAS STATE UNIVERSITY

Dr. A. Laborious of GTZ will be contacted through Kansas State University's GASGA association to determine the type and extent of training to be provided and to explore the possibility of a future joint effort on training and recommendation of pesticides.

2. KANSAS STATE UNIVERSITY TRAINING

In view of the GTZ apparent planned training, it is suggested that USAID/Praia should consider sending two participants to the annual AID Grain Storage and Marketing Short Course held each year at Kansas State University from mid-June until the last of July. Specific information regarding the Short Course will be sent to USAID/Praia for consideration and action.

In general the Short Course covers the basic fundamentals involved in storage of grains (kernel structure, moisture-humidity relationships, changes in storage. grain inspection, grading, etc.); identification and biology of pests (insects, molds, rodents, birds); engineering aspects of storage (storage, hendling, drying, aeration, structures, maintenance, etc.); pest control (inspection, housekeeping, physical mechanical methods, chemicals-insecticides fumigants, rodenticides); economic aspects of grain storage (marketing, distributio, transportation, price policy, planning, feasibility analysis, etc.). Instruction is provided by means of lectures, laboratories, problem solving, demonstration and field trips.

It is suggested that one person from the EMPA Gabinete Técnico would be a logical candidate and that an individual from the Minitry of Rural Development (MDR) engaged in pest control research at the São Jorge Center for Agrarian Studies (CAS) be sent to the short course. The person from CAS could later serve as technical backup person on pesticide usage.

Before a KSU in-country training effort is proposed the content and outcome of the GTZ training needs to be assessed. The possibility of a joint GTZ/KSU training effort should also be considered.

3. QUALIFICATIONS OF EMPA PERSONNEL

In my opinion, the EMPA personnel would benefit from additional technical expertise. The Gabinete Técnico at EMPA seem to be quite knowledgeable in discussion of grain storage procedures for preserving quality, however, some of the conditions observed in the Praia warehouses tend to indicate a lack of application of the knowledge. The reasons for this were not fully apparent during this visit.

Warehousemen at the various storage locations, in general. seem to know the basic stacking and orderlines of commodity storage but would probably benefit from additional knowledge regarding pest control.

VI. OTHER DONOR TECHNICAL ASSISTANCE.

A. FAO Silo Construction at Praia - 10,000 MT capacity.

The Netherlands has provided the services of experts and consultants, contracted for construction of the silos and provision of non-expendable equipment. According to the general contracting supervisor J.J. Ferrandis training has been provided in Portugal for mechanical and electrical personnel at the silos. The head of the Gabinete Técnico - EMPA indicated one person from his group would be given responsibility for pest control in the silos.

This project was started in 1982 with funds provided and disbursed in 1982 of $1,768,725. Total funds for the project scheduled for completion in October 1983, were $3,050,250.

The silo facility is described in greater detail on earlier part of this report II.C.2.a Praia port silo.

B. GTZ PROJECT ON POST-HARVEST PROBLEMS.

The GTZ efforts on pesticide and equipment supply and warehouse personnel training have mentioned repeatedly in this report. However, no formal technical assistance document was reviewed or seen. This assistance will be further classified by means of correspondence directly with Dr. A. Laborius, GTZ.

VII. INITIAL ENVIRONMENTAL EXAMINATION - CAPE VERDE PL-480, TITLE II, SECTION 206 FOOD FOR DEVELOPMENT PROGRAM

On the basis of observations and information gathered during this visit to Cape Verde, an Initial Environmental Examination was prepared and is discussed in item II A of the evaluation document.

The preparation of this document is somewhat complicated in that the pesticides used are being supplied and recommended by another donor GTZ (Federal Republic of Germany) and not by USAID. The warehouses where the pesticides are used function as storage facilities for not only PL-480 Food for Development commodities but also for commodities from other donors.

The resolution of this problem should be discussed with the parties concerned - USAID, GTZ and the Government of Cape Verde.