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February 1970

*Marketing and Warehousing of
Cereals and Dry Edible Beans in
Piaui and Paraiba, Brazil*



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SUMMARY STATEMENT

The AID Mission in Recife, Brazil received requests from the Secretaries of Agriculture of the States of Piaui, and Paraiba for technical assistance in regard to drying, warehousing, and marketing of cereals and dry edible beans in these States. In addition the Deputy Administrator of the Public Law 480, Food for Development Program, requested the consultant investigate and make recommendations with regard to storing of food products under this program.

Farms in the two states are very small with many farmers producing on a bare subsistence level. There is no real organized marketing system. The government price support program is of limited effectiveness due to the lack of adequate warehouses where crop loans can be made. There is no bulk storage in either state and warehouses storing bagged grain are plagued by rodents and insects. There is no market information available to farmers.

There is a serious imbalance in this areas' agricultural economy. To improve his farm technology a farmer in northeast Brazil must buy inputs exemplified price wise by a \$3000 Volkswagon but his production must be purchased to a large extent by consumers whose income is comparable to an \$8 per month schoolteacher. Hence machinery, fertilizers, pesticides and herbicides are priced out of reach of most farmers.

Recommendations in this report are directed primarily toward increased knowledge of proper storage and marketing procedures. The licensing and bonding of warehouses is also strongly recommended.

The Food for Development Program is experiencing losses due to rodents and insects in warehouses. Losses were particularly bad in warehouses of the voluntary agencies. It was recommended that: (1) all products given by the U.S. to distributing agencies, be stored in the same warehouse wherever possible, and (2) that any agency not controlling insects and rodents in their warehouses should be served notice that their portion of the program would be terminated.

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TABLE OF CONTENTS

Summary
Acknowledgement
Table of Contents

Introduction	1
I. The Situation	1
A. Price Stabilization	1
B. Government Agencies	2
C. Farmers Markets and the Marketing System	2
D. Market Information and Crop Reporting Service.....	3
E. Transportation	4
F. Credit	4
G. Farm Storage	4
H. Bulk Storage	4
I. Warehouse - Licensing and Bonding	5
J. Classification	5
K. Drying, Cleaning, Grading	5
L. Quality Control of Farm Supplies	6
M. Farm Cooperatives	6
N. Extension Service (ANCAR)	6
O. Personnel	7
II. Recommendations	7
A. Price Stabilization	7
B. Government Agencies	8
C. Farmers Markets and the Marketing System	8
D. Market Information	10
E. Transportation	11
F. Credit	12
G. Farm Storage	12
H. Bulk Storage	13
I. Warehouses - Licensing and Bonding	14
J. Classifications	20
K. Drying	21
L. Quantity Control of Farm Supplies	21
M. Farm Cooperatives	22
N. Extension Service (ANCAR)	22
O. Personnel	23

Appendix A

Tentative Outline - Grain Storage and Marketing Short Course

Appendix B

Prototype Bulk Storage

Appendix C

Situation, Recommendations

Cereal and Dry Edible Bean Marketing and
Warehousing in the States of Piaui and Paraiba, Brazil

INTRODUCTION

In this report under Roman Numeral I, a brief description is made of the various sectors in the field of cereal and bean warehousing and marketing in the States of Paraiba and Piaui. In some instances, the sector is described merely as a situation that exists with no particular recommendation, or suggestions, presented for changes to be made.

Under Roman Numeral II, the corresponding alphabetically headed paragraphs present comments, suggestions or recommendations with regard to the sector being given consideration.

It will be noted that some comments are very brief due either to the fact that changes are not possible or are not necessary while others are quite long and descriptive. The transportation problem is an example of the former. The personnel training and educational program is an example of the latter.

I. The Situation

A. Price Stabilization

The need of a price stabilization program for farm products in Brazil is recognized and is being met in part by a loan program. Rice, cereal, and dry edible beans are the primary products considered here. A loan, determined by the estimated cost of production, is made by the Bank of Brazil on products placed in a warehouse provided by a Federal Warehousing Corporation, CIBRZEM. Warehouse receipts are not used and the corn and beans are not classified except by visual inspection.

After three months, if the beans are not redeemed by the producers, title passes to the government. The loan period for corn is six months.

Losses in 1967 to the Bank of Brazil on beans were considerable, probably due to the high moisture content of the beans and the storage conditions.

B. Government Agencies

There are six Federal Agencies involved in the price stabilization program.

1. The Minister of Agriculture determines the cost of production which determines the loan.
2. The Bank of Brazil makes the loan.
3. CIBRAZEM - A Federal warehousing corporation stores the products.
4. The Department of Classification determines the grade of the product.
5. If the farmer does not redeem his product, title passes to CFP, the Minimum Price Commission.
6. COBAL a government corporation, whose primary interest is to protect the consumer interest, sells the products out of storage.

The State of Piauı owns farm supply stores that could develop improved management and are building two new warehouses that presumably will be leased to CIBRAZEM.

The State of Paraıba owns a number of warehouses which are leased to CIBRAZEM. These are considered to be collection centers and are used to support the price stabilization program, not for the purpose of buying farmers production.

The legislature of Paraıba has provided for two new corporations. COPABA will buy the farmers products. COPAP will sell supplies to the farmers. It is hoped to place these businesses in 157 locations.

C. Farmers Markets and the Marketing System

As noted in paragraph A, the Bank of Brazil attempts to assure farmers their cost of production by providing them a loan on cereals and beans stored in CIBRAZEM warehouses. If the loan is not repayed, the product is surrendered

to the Minimum Price Commission (CFP) a government corporation. But COBAL, another government corporation sells the products with the prices largely determined by another government corporation SUNAB, whose responsibility is to protect the consumers interest.

Many small farmers are too hard pressed for cash or are too remotely located to take advantage of the loan. Often itinerent truck merchants or local merchants take advantage of this situation. The small farmer has very little market information to support his bargaining position. There is a surprising number of small farmers who produce only on a subsistence level and their production is not a factor in the marketing economy of the two States.

Within the range permitted by the loan of the Bank of Brazil and the selling level set by COBAL, and outside the areas of influence of these agencies, the trading is done on a day to day bargaining basis with no market organization and no proper intermarket relationship.

D. Market Information and Crop Reporting Service

As far as a farmer is concerned, the market information available to him is limited to what he can learn in the local market place and to what little he can learn on the radio. Therefore, he is badly handicapped in bargaining with local traders and itinerant truck merchants. The local merchants get information from newspapers and reports carried to them by truckers. The larger traders get their information from the same source plus a limited amount by telephone.

Although prices are largely controlled by State and Federal Agencies, there is still a need for an orderly development of market information.

The Extension Service and the office of the Secretary of Agriculture cooperate in preparing information for the Office of the Minister of

Agriculture where the information is compiled and returned to the States. This information combined with estimates of the cost of production are used to determine the loan levels for the price stabilization program by the Minister of Agriculture.

E. Transportation

The farmers are generally handicapped by unbelievably poor farm to market roads. Delivery is generally by cart or on the back of donkeys over winding roads that could be shortened to a great extent. The roads between towns are generally very poor and crooked. Part of the primary road system is good and part is being built or repaired at the present time. The bulk of the commerce of these States is being moved by truck hence the road system is of great importance.

F. Credit

Credit for the farmer is difficult and the interest rates are high. The Bank of Brazil makes loans direct to farmers and to some extent through Cooperatives. Cooperatives themselves are hard pressed for capital and to date have not bought and sold farm products primarily due to the lack of credit.

G. Farm Storage

The only farm storage for grain, so far as was determinable was small capacity units wherein rice, grains and beans were stored for home use. There is what appears to be a very successful program providing steel containers, 8 to 16 bushel capacity, to farmers that can be payed for over a 3 year period. The farm units are small averaging about three hectares with some as low as 1/2 hectare and a few over 30 hectares.

H. Bulk Storage

Although bulk handling and storage of cereals is much cheaper and more efficient than bag handling and storage, there is not an elevator in either Pariaba or Piaui.

I. Warehouses - Licensing and Bonding

Generally speaking the CIBRAZEM warehouses showed evidence of good housekeeping. The bags were on pallets, well spaced and the insects and rodents appeared to be under control. Losses of quantity and quality for products stored with CIBRAZEM were absorbed by the Bank of Brazil.

Within a few kilometers of CIBRAZEM warehouses, were other warehouses wherein rodents and insects were doing extensive damage due to lack of good housekeeping and control measures.

There is no licensing and bonding system used in Paraiba or Piaui.

J. Classification

Uniform numerical grades have been established in Brazil for rice, beans, cereals and many other products. However, the grades in Paraiba and Piaui are made largely by visual examination. There are no moisture testers, separation sieves, scales for test weight and no count is made for kernel damage in the State of Paraiba. With no real system of grading, the producer of a good dry product is receiving no reward for his extra zeal.

In Piaui, an effort is being made to follow the grain standards. However they are short of equipment and the grading is done only for loan purposes.

K. Drying, Cleaning, Grading

Drying of rice, grain and beans, except as farmers dry it in the sun, is non existent in Paraiba and Piaui. One commercial dryer has been installed in Paraiba but it has never been used. It is installed in a new warehouse but the design is poor and the capacity is low. In these States the farm units are small and the quality delivered to market is often low. The low quality, particularly moisture in beans, and small quantities per farmer will make drying, cleaning and conditioning difficult for warehousemen until they learn to grade the products and commingle them by grade so that bulk conditioning is possible.

It could not be determined that there is a cleaner or a bean grader in either the State of Paraiba or Piauí.

L. Quality Control of Farm Supplies

There is no system whereby the labeling on supplies being sold to farmers is checked for accuracy. Farmers must buy seeds not knowing whether the germination, purity or variety is correctly labeled. The same is true of fertilizers. Farmers have no guarantee chemical content is as the label shows when he buys fertilizer. Very little fertilizer is now used but a great increase is sure to come. Formula feeds are offered on a small scale with no guarantee they are correctly labeled. With farmers being encouraged to use these products there are, no doubt, some instances where farmers are discouraged by the products being inferior to that which is shown on the label.

M. Farm Cooperatives

There are 66 farmers supply cooperatives in the State of Paraiba. None of these are buying farm production and less than half are considered as being successfully operated.

In the State of Piauí, there are 39 cooperative organizations. Only ten are actually operating. Aside from selling supplies one is buying the production of farmers, another hopes to within a year.

Some of these cooperatives are loaning Bank of Brazil money to farmers for production purposes. Although they are payed for providing this service they are guaranteeing the repayment of the loans to the Bank of Brazil. This appears to be a handicap.

N. Extension Service (ANCAR)

The Extension Service in Paraiba and Piauí is financed jointly by the States and Federal Government. It suffers for the want of additional financing and trained personnel.

In past years, the high percent of illiterate farmers has made the operation of Extension educational programs very difficult. However the advent of the cheap transistor radio has vastly expanded the field of education among farmers for the Extension Service. A very small start has been made in providing market information for farmers. The information available to the Extension Service that has been proven applicable to local areas is very limited.

O. Personnel

There is a shortage of technically trained personnel who can grade grains and beans, operate a dryer, manage a warehouse, advise regarding the control of insects and rodents, keep the records for an operating business such as a cooperative, etc.

The technicians presently employed appear to be educated in a narrow field.

II. Recommendations, Suggestions and Comments

A. Price Stabilization

This program is only partly effective due to the large areas where there are no CIBRAZEM warehouses or representatives of the Bank of Brazil. The percentage of farmers that have access to the loan is too small. One might reason that any amount of production taken off the market at harvest time would reduce the supply that tends to force the market down. This is not entirely true. The market is not fluid and there is not what might be considered a normal market relationships between areas of production. Large areas where there are no loans available develop badly depressed markets at harvest time.

The price stabilization program could be made much more effective by two changes:

1. Initiate a licensing and bonding system with the use of warehouse receipts. This is discussed in more detail under II-I.
2. The Bank of Brazil should authorize other banks to act as their agent in making loans to farmers with the warehouse receipt held as collateral.

B. Government Agencies

It seems to this observer that there is a proliferation of State and Federal agencies attempting to assist the farmers with their marketing and price stabilization programs. However, there is some private enterprise doing business particularly in the milling of rice.

A licensing and bonding system would bring some rice millers into the operation of public warehouses and the same is probably true of some grain and bean merchants.

As private enterprise develops to the point that competition prevails, State corporations should yield to private enterprise. The trucking industry is an example of what private enterprise and competition can do in Brazil.

In the State of Paraiba, the two State corporations, COPASA and COPAP, should serve jointly in a chosen community. Wherever possible they should develop a working agreement with an existing cooperative or conceivably with a newly formed cooperative.

Greater efficiency would result from reduced fixed capital investments, less inventory and less labor costs than would be the case if each organization operated independently. It would seem desirable that this program start at no more than four locations and expand to other locations as trained personnel and finances become available. It is highly improbable that preferred stock in these corporations can be sold as proposed by the legislation. This and the lack of trained personnel makes a small start on this program seem advisable.

C. Farmers Markets and the Marketing System

Help can be given to the overall marketing system as shown under II-D "Market Information" and II-I "Warehouses".

1. In the community markets the Municipalities should exercise adequate control to force a general clean up. Merchandisers of cereals and cereal products should be forced, perhaps by a permit system, to use measures to control rodents and insects.
2. More warehouses are needed near the areas of production. If cooperatives or private enterprise will not provide them, the States should assume the obligation. It was learned that, in some instances, in this area farmers were buying beans for both food and seed at three times the price they had received at harvest.
3. In the State of Piaui, there are several locations that are strategic for the storing of farm products, but no single location appeared to have the capability to serve as a base warehousing and marketing point to which outlying points could be related as discussed below for Paraiba.
4. In Paraiba, Campina Grande, showed evidence that it could be a principal warehousing center and a primary marketing point. It is the State's number one city. It is a focal point for highways and the location is reasonably close to the State's center of production. Although more secondary warehouses are needed in the State to prevent the movement of products away from, and later back to, areas of production,

Campina Grande could be developed as Paraiba's primary market. Price-wise it would tend to relate to other major markets, such as Recife, for example. But lesser markets of Paraiba would tend to relate to Campina Grande. Areas deficient in a product, beans or corn as an example, would tend to develop a price equal to the Campina Grande price plus trucking and local handling. Areas with a surplus of a product would tend to develop a price equal to Campina Grande minus trucking and local handling.

In order to be developed as a primary market Campina Grande should be developed into a major storage point. It would be a good place to start bulk handling of grains. It should provide the services of grain dryers, cleaners, etc. There is a CIBRAZEM warehouse (3500 tons) at this location now. With the Government being able to influence the market at a base point such as Campina Grande, the outlying smaller markets should respond to changes in this market to some extent. The use of radio for market information would tend to bring this about although the intermarket relationships could not be constant and would never be absolute.

D. Market Information

The farmer receives practically no market information.

The local merchant receives some market information from itinerant truck merchants and some from the wholesale merchants.

The wholesale merchants get information from one another, the truck merchant and through the newspapers, to some extent. The farmer never knows it, but at times he might be in a bargaining position.

The Extension Service (ANCAR) of Paraiba has made some radio market broadcasts. Piaui has made none. Most farmers now have transistor radios hence, there is an opportunity to help farmers and others with market information.

This idea has been checked with extension agents who agree it will be helpful.

A system should be developed about as shown here. Each Monday each Extension agent would report to the State officer the prices the farmers received for basic products the previous market day. The state officer would compile this information and furnish it back to all agents along with any other pertinent market information such as crop outlook information. Those agents who have access to a radio broadcasting station would give out the information at regularly scheduled days and hours. In no instance should the information be more than 6 days old.

E. Transportation

The farm to market roads are unbelievably poor and unbelievably crooked. With some help from Municipal authorities these roads could surely be straightened and improved somewhat.

Although some of the major highways are in terrible shape it is presumed that the repair work is being done as fast as possible. The number of trucks broken down on the highways must indirectly mean higher costs to the consumers or lower costs to the producer, or both.

F. Credit

The Bank of Brazil makes some production credit available to farmers. However, a relatively small percentage have access to Bank of Brazil funds. In many instances the landlord is the only source of credit for tenant farmers and his credit is very expensive.

There is no credit in Brazil for the purchase of land by farmers except in special project developments.

Some loans of Bank of Brazil funds are made to farmers through cooperatives. This is very limited. The cooperative is forced to guarantee the repayment of the loan hence the cooperative is ultra conservative in making the loan.

1. The Bank of Brazil should provide the backing for a system of agricultural credit somewhat similar to the Farm Credit System of the U.S.
2. The use of warehouse receipts in a licensing and bonding system would make some credit available through banks other than the Bank of Brazil. This could be of help to farmers to a limited extent. It would also keep local merchants and wholesale merchants actively engaged in buying if they could store part of their purchases and post warehouse receipts as collateral for loans. Presumably, in some instances, they run out of money and are forced to withdraw from the market when they otherwise would like to keep buying.

G. Farm Storage

The small steel containers provided by the Secretary of Agriculture of Paraiba and Piaui for the holding of grain, rice and beans on the farm is a great improvement over methods previously used by farmers. Thirty-

five thousand have been distributed in Paraiba and a less number in Piaui.

1. This program should be expanded in everyway possible with any savings due to mass production passed on to the farmers.
2. The openings in the top and at the bottom side of these containers should be enlarged so that a man could insert his hand to scrape out any caked material that might stick to the sides. The openings in the Piaui containers are only 1 1/2 inches in diameter. The Paraiba containers have three inch openings.
3. The office of the Secretary should contact the distributors of Phostoxin to determine whether Phostoxin tablets could be provided in aluminum foil sealed sheets so that each tablet could be clipped from the sheet and remain sealed until the farmer could drop it in his container. This would go far toward solving the farmers problem with insects. Many grains, rice included, have internal infestation when placed in the tanks and should be fumigated with a material such as Phostoxin.

H. Bulk Storage

Grain can be more efficiently handled, stored, treated and cleaned when stored in bulk.

Bulk storage must be developed in the States of Piaui and Paraiba eventually preferably, it should be started in a small way as soon as the classification of grains, rice and beans is established.

1. In establishing Campina Grande as a base marketing and warehousing point, bulk storage should be initiated. It is estimated that daily temperature ranges may be as much as 60°F at times, therefore, it is doubtful that expansionable bolted steel tanks should be used due to moisture condensation.

As a start it would seem desirable to build a twenty thousand bushel elevator against one end of a large warehouse. Sack off bins could be inside the warehouse and a portable grain dryer could be used just outside. There should be about ten bins which would gravity back to the leg with four bins provided with flexible spouts that would permit sacking. The dump, where grain is deposited, would gravity to the leg for elevation, which would be provided by a belt with cups. The grain would be elevated to a distributor that would take the grain where it was wanted. All bins should be hoppers so they would empty easily and the hopping along with the dump and pit should be of concrete. The top portion of the elevator could be of steel reinforced concrete or of wood with walls held by steel tie rods. Sketches of another simple prototype bulk storage layout are provided in Appendix B.

2. Piaui is now building two new 3500 ton warehouses. The suggestions described above were given to the Secretary of Agriculture who thought the idea merited consideration.
3. The bulk storage proposed here is very modest in contrast to the bulk storage that was provided in Pernambuco and several other Brazilian states but it would serve as a start and would be about as economical as possible.

I. Warehouses - Licensing & Bonding

1. The best managed warehouses visited were those of CIBRAZEM. However, the CIBRAZEM warehouses are needlessly inefficient.

- a. They represent a large capital investment.
- b. They are presently storing a very limited quantity of products.
- c. They employ two to four men the year around.

2. Licensing and Bonding

Contrast a CIBRAZEM warehouse with a licensed rice mill warehouse or, as an example, a large warehouse owned by the Catholic Church in OIEIRAS, Piaui. Along side this warehouse is a rice mill and a corn mill. Some farm supplies are sold also. If this warehouse were licensed and bonded:-

- a. The same capital investment would serve several purposes.
- b. The same labor & management could be used to operate the business and serve the warehouse.
- c. The same floor space could be used for public owned products or company owned stock.
- d. The price stabilization program could be activated where now the closest warehouse for loan purposes is one hundred kilometers away.

3. Other advantages of a Licensing & Bonding System

- a. It would bring into operation more warehouses owned by mills merchants and cooperatives.
- b. It would make the price support program more effective.
- c. It would provide periodic inspection and reduce losses due to insects, rodents, moisture spoilage, etc. Any loss would be the responsibility of the warehousemen.
- d. It would guarantee the depositor against any loss in quantity or quality.
- e. It would provide for the use of negotiable warehouse receipts thus expanding credit beyond that of the Bank of Brazil.

4. A warehousing law providing for the licensing and bonding of warehouses should be administered by a division of the Office of the Secretary of Agriculture.
5. A copy of the warehousing law for the State of Kansas has been left in the Recife AID Office. This is considered one of the best state laws in the U.S.
6. What a Warehouse Licensing and Bonding Law provides:
 - a. For the Warehouseman
 - (1) It provides that property (grain, beans, rice) entrusted with a Public Warehouse will be kept in a condition of quality equal to that accepted by the warehouse.
 - (2) It provides that the warehousemen will deliver a quantity equal to that which he accepted.
 - (3) It provides that the warehouseman will deliver to the depositor a negotiable warehouse receipt showing the grade and the quantity of the product which he received.
 - (4) It provides that the warehouseman will post a bond with the Warehousing Division of the State Secretary of Agriculture's Office guaranteeing that he will meet his obligations as listed here.
 - b. The following are some of the functions of the Warehousing Division of the Office of the Secretary of Agriculture:
 - (1) The Warehousing Division upon receipt of an application for a license has an inspector examine the property.
 - (2) The Warehouse Division requests a financial statement.
 - (3) The Warehouse Division determines that the party who is requesting the license is a capable operator of a warehouse.

- (4) The Warehouse Division determines the amount of the bond that must be deposited. This is determined after examination of the financial statement.
- (5) The Warehouse Division provides inspectors who make unannounced checks of the warehouse stocks.
 - (a) The inspector determines that all stocks represented by warehouse receipts plus any stock that the warehouseman's records shows he owns, are actually on hand.
 - (b) The inspector determines that the quality of the products are as the warehouse receipts indicate.
 - (c) The inspector reports any shortages or any loss in quality, such as rodent and insect damage, to the Warehousing Division, who in turn demand that the warehouseman make the necessary corrections or lose his license.

c. The obligation of the bonding company

- (1) The bonding company is obligated to pay the holders of warehouse receipts the market value of the products delivered to the warehouse providing the warehouseman is unable to or refuses to deliver the products in such quantity and quality as shown by the warehouse receipt.
 - (a) Before the bonding company will pay however, they generally force the warehouseman into receivership. Under receivership the warehouseman's assets are liquidated and the bonding company generally pays only the deficiency.

(b) This provision of the law permits a much lower bond requirement and permits the insurance company to charge a much lower rate than would otherwise be charged.

(c) Warehousemen license and bond their warehouses in order to perform a service for a fair rate of payment. Depositors are willing to pay at a fair rate to be protected by a bond and to have in hand a negotiable warehouse receipt.

A bonding company is never called upon to make payment for an honestly and capably managed warehouse.

7. Location of warehouses.

Considerably study and research should be made before choosing the location for a number of warehouses. Factors to be studied are:

- a. The volume of production within a given area.
- b. The normal marketing pattern. Farmers normally sell all their production at the nearest market where the price is satisfactory; but the most convenient market doesn't always provide a satisfactory market.
- c. The roads or highways that serve a market are extremely important. Without studying the roads, one could easily mislocate a warehouse. Mountains or rivers could present the delivery of products to a warehouse that might be erected if only a map and production figures were used as a guide.
- d. The importance of new warehouses in making the price stabilization program affective should be considered. Many areas of the State are not benefiting from the Government program.

- e. Adequate warehouses should be provided to prevent the farmer's production from learning the area entirely when it will be needed either for food or seed in the area where produced at a later date.
- f. Production that is in excess of the needs within an area should be stored near points of heavy consumption such as Campina Grande.

8. Types of Warehouses

The warehouse operated by CIBRAZEM in Jao Passoa appeared to be of a much better type than the prefabricated warehouse at the Jao Passoa fairground. The steel warehouse was loosely constructed and the doors wouldn't open. The tile and concrete warehouses are much cooler for the workmen and presumably cheaper to build than a steel warehouse.

The only advantage of the steel warehouses is they can be dismantled and moved in the event they were erected in a wrong location.

9. Warehouse Equipment

Each warehouse should be provided with equipment that will allow safe storage of the grain and efficient handling.

Grading equipment including triers, scales, sieves and moisture testers should be provided and managers trained in how to use them.

A truck scale and a small platform scale are necessary. A truck scale will not change readings readily enough to weigh a few bags at a time

Two or more hand trucks for movement of bagged grain are essential.

Pallets should be provided so that grain may be stored off the warehouse floor.

Each warehouse should have large plastic covers for fumigation. One should be large enough to cover the largest piles of grain. Another smaller one should be provided so that smaller piles of bags can be fumigated without unrolling the large plastic "Sand snakes" (bags of about 3 feet long and 3 to 4 inches in diameter) should be provided to seal fumigation plastic to the floor during fumigation.

An applicator for either malathion dust or liquid should be on hand.

A portable grain dryer is very desirable but cannot be used economically unless enough grain of a single grade is available to fill the dryer.

J. Classifications

Although Piauí is using moisture testers to determine moisture and scales to determine specific gravity they do not have sieves to make separations. Grading is only done for loan purposes.

The State of Paraíba makes only a visual examination for determining grades and again this is only for loan purposes.

1. Moisture testers, sieves, scales, triers and probes should be secured for the use of graders in both States.
2. The use of grades should be greatly expanded at all levels.
3. Advantages of a numerical grading system.
 - a. It permits the payment of a premium for a good, well handled product. Quality should be rewarded.
 - b. It permits commingling, or mixing, of different lots of the same grade, for bulk storage.
 - c. It permits the mixing of small lots for the purpose of drying.
 - d. It permits the use of warehouse receipts whereupon the quantity and quality is accurately described.

k. Drying

1. Accurate grading must precede the mixing of small quantities for drying purposes.
2. The possible use of small portable batch dryers, perhaps as small as 250 bushels, should be considered by warehouses.
3. The State of Paraiba should force the manufacturer of the dryer now installed near Campina Grande to activate the dryer when it is needed.
4. The possibility of a program to help farmers provide concrete drying floors for farm use should be investigated by the Secretary of Agriculture. Perhaps the supplying of plastic sheets or tarpaulins might be the answer.

L. Quantity Control of Farm Supplies

A division under the authority of the Secretary of Agriculture should be provided to guarantee the farmers that the products which they buy are what they are labeled to be. As a start only seeds, fertilizers and formula feeds should be considered. The Extension Services could cooperate with employees of the Office of Agriculture in taking periodic samples from the stocks of businesses where products are sold.

The samples would be mailed to the laboratory provided by the Secretary of Agriculture for a germination and purity test on seeds and simple chemical analyses on fertilizers and feeds. If the products fail to match the labels a "stop sale" order should be placed on the product until such time as it is properly labeled. A seed improvement program is being started in these States and should be greatly expanded. The large scale use of fertilizer is sure to develop in this area although there is much resistance at the present time.

Farmers must not be permitted to buy grossly mislabeled products of the kind mentioned here or it will become more difficult to convince them of the merit of new improved practices.

M. Farm Cooperatives

The BNCC (National Cooperative Credit Bank) has made some loans to farm cooperatives in this area, but they all appear to be under financed. None have adequate capital to buy and merchandise farmers production. Many of the farmers fail to understand just what their local cooperative is all about. They certainly don't understand what the potential benefits might be as a result of having a functioning cooperative.

Some of the cooperatives in these two States are only on paper.

1. The Extension Service and the Office of the Secretary should give all the help possible to cooperatives in the field of education.
2. Additional financing should be provided some of the best cooperatives to permit them to build new warehouses and to merchandise the farmers' production.

Cooperatives, if licensed and bonded, could be more efficient storers of products than CIBRAZEM for the reasons shown under II-I-2.

N. Extension Services (ANCAR)

The inexpensive transistor radio has provided a greatly expanded field of opportunity for the Extension Services to engage in adult education for farmers, particularly illiterate farmers. They can give assistance in the field of marketing as follows:

1. They can assemble market price information and relay it by radio to farmers as described in II-D.

2. They can hold meetings in cooperation with the Office of the Secretary wherein educational and informational material can be developed for warehousemen, marketing officials and the classifiers of farm products. Emphasis should be given to rodent and insect control.
3. They can assist the Control Division of the Office of the Agricultural Secretary in case such a division is established.
4. They can serve as a liaison between the various Government Agencies in disseminating helpful information which one might have that was not available to others.
5. They could help the municipalities reorganize and clean up their local community markets.
6. It was observed that more than twenty varieties of beans were for sale in one community market. It is known that there is a wide range of protein content between varieties. No doubt there is a great range in yield potential between these varieties also. It would benefit the consumers, the producers and the government graders if the Extension Service, in cooperation with the Office of the Secretary of Agriculture, could determine the most desirable varieties from a protein and yield standpoint. An intense educational and promotional campaign should be conducted to limit the farmers production to four or five varieties.

0. Personnel

1. A Marketing and Warehouse Specialist.

Either the Office of the Secretary of Agriculture or the Extension Service, or a combination of the two, should employ a Marketing and Warehouse Specialist. This would seem desirable in each of the SUDENE States.

This man should have a college education and all the other qualification listed below for key personnel. His training should include as much as possible of that listed below plus whatever training is available to him in other States of Brazil. It should be understood this man would be active throughout the State and would spend a limited amount of time at a desk.

His responsibilities should be as follows:

1. Holding educational meetings for warehouse personnel, marketing officials, classifiers and others who might be interested in the marketing and warehousing of farm products.
2. Act as a liaison man between various State and Federal Agencies, cooperatives and private enterprise. The activity of this man could prevent situations that were observed wherein a poorly managed warehouse was suffering serious losses due to insect and rodent damage but was within an hour drive of an expertly managed warehouse where the insects and rodents were under good control.
3. He could keep informed concerning improved management and marketing practices that were adopted in other States and see that they were practiced in his State.
4. He could provide publicity and assist in informing members of the legislature of the advantages of a warehouse licensing and bonding law. He could also help promote a law that would provide control of the quality of seeds, fertilizers and formula feeds that farmers buy.
5. He could assist in providing for and expanding a market information service.

1. General Personnel

There is no doubt that the personnel needed to manage warehouses, cooperatives, farm supply stores and to serve as technicians in cereal and bean marketing in the area considered by this report must be greatly increased and given sufficient training to perform their duties.

In considering the personnel, thought must be given as to how they will be chosen and how they will be trained.

In order to competently serve as a manager or as key personnel in an expanding warehousing and marketing system employees should be chosen with certain qualities. Insofar as possible, key personnel should be hired with the thought in mind that each is of such caliber that he could be promoted to the number one position in his field. This is necessary in a program of continuing education. It is also necessary in preparing personnel for the positions that will need to be filled in the building of new warehouses and stores and in the providing of new services in a marketing and warehousing system that is being developed.

a. Qualification for personnel.

- (1) They must be thoroughly honest.
- (2) They should have a high school education or its equivalent.
- (3) They should have the capability of being a leader in their communities.
- (4) They should be capable of developing the confidence of farmers and should understand their problems.
- (5) They should be capable of mixing well with the employees and be sympathetic to their interests.
- (6) They should be capable of training other employees.
- (7) They should be capable of delegating responsibilities and seeing that they are fulfilled.

a. Training

- (1) Managers and key personnel should be trained and provided knowledge as follows:
 - (a) They should have thorough knowledge of the goals for the improved market procedure to be developed in the marketing and warehousing of commodities.
 - (b) They should understand the system of bookkeeping to be used
 - (c) They should have basic knowledge of grain and bean classification and all equipment used therewith.
 - (d) They should have adequate knowledge of insect identification, recognition of insect damage and insect control. This should include the use of both grain fumigants and grain protectants in bulk stored as well as bag stored grain.
 - (e) They should know how to control rodents.
 - (f) They should have basic knowledge concerning the operation of all machinery used in the handling and processing of grain. This includes grain drying.
 - (g) They should have general knowledge of equipment and building maintenance.
 - (h) They should be able to analyze an operating statement and understand a profit and loss statement.
- (2) As can readily be seen, this is a proposal for a much wider range of education and training than was thought to be necessary in this area of Brazil in the past. The following methods of providing this training are possible and it would seem desirable that (a) and (c) or (b) and (c) would prove the most beneficial for the trainees.

- (a) Tours are conducted, with a Technical Leader, of several States in the U.S. by the International Agricultural Development Service, Washington, D.C. wherein several carefully chosen participants are observants of the entire grain marketing and warehousing system of the U.S. Lectures are presented at one or more agricultural universities. Laboratories are visited at both State and Federal Agencies as well as universities wherein grain and bean grading and quality control of farmers supplies are explained. All government agencies that have to do with price stabilization and agricultural credit are visited and their operation is explained in detail.

When the details of grain insect and rodent control cannot be shown by visits to elevators the universities provide visual aids along with classroom lectures.

To the extent possible many of the benefits from the short course described in Appendix A are provided with the tour. There are many ancillary benefits from these two and one half month tours that cannot be described in detail here. These tours are often provided by AID but have at different times been financed by the Government whose participants are receiving the training.

- (b) See Appendix A. This is a three week short course that Kansas State University will provide in the event an adequate number of trainees are available to justify the activation of the course.

(c) This program would provide a number of seminars to be held in each of the nine States of N.E. Brazil. Kansas State University should be asked to provide someone from their staff, or under their contract, to present material with visual aids to as great an extent as possible.

All the subject matter covered in Appendix A could not be covered in the series of seminars but at least the basic points and all factors pertinent to Northeast Brazil could be covered. It seems desirable that these seminars be held annually for three years. Each series of seminars would probably take nine weeks.

Should it be decided that the finances are not available, or the time is not propitious, to activate (a) or (b) a solid effort should be made to initiate this program without benefit of (a) and (b).

APPENDIX A

Tentative Outline

Grain Storage and Marketing Short Course

APPENDIX A

Tentative Outline

Grain Storage and Marketing Short Course

- I. Introduction to Course
 - A. Importance of Proper Grain Storage and Marketing
 - 1. Prevent Loss of Food and Feed Grains
 - 2. Provide Stable Prices for Food and Feed Grains
 - B. Purpose and Scope of the Course
 - 1. Provide Basic Fundamentals of Grain Drying, Storage, Handling, Marketing and Transportation
 - 2. Provide Practical Knowledge and Techniques Needed in Grain Storage and Marketing
- II. Review of Grain Production and Utilization (In Participant's Country)
 - A. Production
 - 1. Grains Produced
 - 2. Production Areas
 - 3. Quantities Produced
 - B. Utilization
 - 1. Consumption - Food and Feed
 - 2. Export
 - 3. Import
 - C. Basic Information
 - 1. Population
 - 2. Climate and Topography
 - 3. Transportation
- III. Fundamentals of Grain in Storage
 - A. Structure of Cereal Grain Kernels
 - B. Moisture and its Measurement
 - C. Chemical, Physical and Nutritive Changes in Grain During Storage
- IV. Grain Inspection
 - A. Grain Standards
 - B. Grain Sampling
 - C. Grain Grading
 - 1. Grading Factors
 - 2. Methods

V. Grain Handling

- A. Movement of Grain
 - 1. Hand Methods
 - 2. Mechanical Methods
- B. Methods and Facilities for Conditioning Grain
 - 1. Cleaning Equipment
 - 2. Temperature Monitoring Systems
- C. Aeration
 - 1. Air Properties
 - 2. Air-Grain Temperature Relationships
- D. Grain Drying
 - 1. Principles of Grain Drying
 - a. Temperature - Moisture Relationships
 - b. Effect of Drying on Quality
 - 2. Types of Drying
 - a. Natural Drying
 - b. Unheated Air Drying (Aeration)
 - c. Heated Air Drying
 - 3. Types of Driers
 - a. Bagged Grain
 - b. Batch System
 - c. Continuous Flow
 - 4. Drier Operation
 - a. Heat Source
 - b. Air Flow Rates
 - c. Air-Grain Temperature Relationships
 - d. Weight Loss in Moisture Removal
- E. Equipment Maintenance

VI. Storage

- A. Type of Structures
 - 1. Farm Storage
 - 2. Warehouse Storage
 - 3. Elevators
- B. Structural Maintenance
- C. Storage Methods and Procedures
 - 1. Warehousing
 - 2. Elevators
 - a. Binning
 - b. Blending

VII. Sanitation Program

A. Housekeeping

1. Warehouse and Elevator Perimeters
2. Warehouse and Elevator Interior
3. Warehouse and Elevator Equipment

B. Insect Control

1. Biology and Identification of Insects and Their Importance
 - a. Biology of Major Pest Insects
 - b. Identification of Stored Grain Insects
 - c. Insects in Relation to:
 - (1) Grain Temperature and Moisture Content
 - (2) Fumigants
 - (3) Grain Condition
2. Control Methods
 - a. Housekeeping
 - b. Residual Sprays
 - c. Protectants
 - (1) Bags
 - (2) Grain
 - d. Fumigation
 - (1) Warehouse
 - (2) Elevator
 - e. Inspection
3. Pesticide Safety

C. Rodent and Bird Control

1. Biology and Identification
 - a. Rodents
 - b. Birds
2. Importance of Rodents and Birds in Relation to Grain
3. Control Methods
 - a. Structural Condition
 - b. Traps
 - c. Baits and Poisons

D. Microbial Control

1. Importance of Micro-organisms in Grain
 - a. Development of Micro-organisms on Damp Grain
 - (1) Molds (Fungi)
 - (2) Yeasts
 - (3) Bacteria
 - b. Mycotoxins
 - (1) Production
 - (2) Effect on Man and Animals
2. Control Methods
 - a. Drying
 - b. Cooling
 - c. Proper Management

VIII. Economics of Marketing Management and Operations

- A. Principles of Management**
 - 1. Organization Within Firm
 - a. Assignment of Responsibility
 - b. Training of Personnel
 - 2. Organization to Provide Customer Service
 - a. Importance of Consumer
 - b. Educational Services
- B. Principles of Operation**
 - 1. Exchange
 - a. Buying
 - b. Selling
 - 2. Economics of Physical Handling
 - a. Storage
 - (1) Cost of Alternatives
 - (2) Location
 - (3) Type
 - b. Transportation
 - (1) Local
 - (2) National
 - (3) Export
 - c. Processing
 - 3. Facilitating Operations
 - a. Financing and Risk Taking
 - b. Information
 - (1) Price and Demand
 - (2) Crop Production
 - (3) Supplier
 - (4) Procedures for Informing Public
 - c. Standardization
 - (1) Establishing Grades
 - (2) Licensing Procedures
 - (3) Arbitration
 - 4. Bookkeeping, Accounting, Inventory Control
- C. Government and Grain Marketing**
 - 1. Commercial Regulations
 - 2. Legal Environment
 - 3. Action Programs
 - a. Farm
 - b. Non-farm
 - 4. International Programs and Policies
- D. Form of Business Organization**
 - 1. Individual Proprietor
 - 2. Partnership
 - 3. Corporation
 - 4. Cooperative
 - 5. Government

IX. Tours of Local Facilities to Point Out and Demonstrate Course Material

X. Laboratories to Compliment Lectures

A. Grain Inspection Methods

B. Tours, in Part, to Observe Handling Equipment

C. Models of Driers and/or Demonstration of Effects of Improper Drying

D. Inventory Control for Warehouses and Elevators - Bookkeeping, Etc.

E. Insect Identification

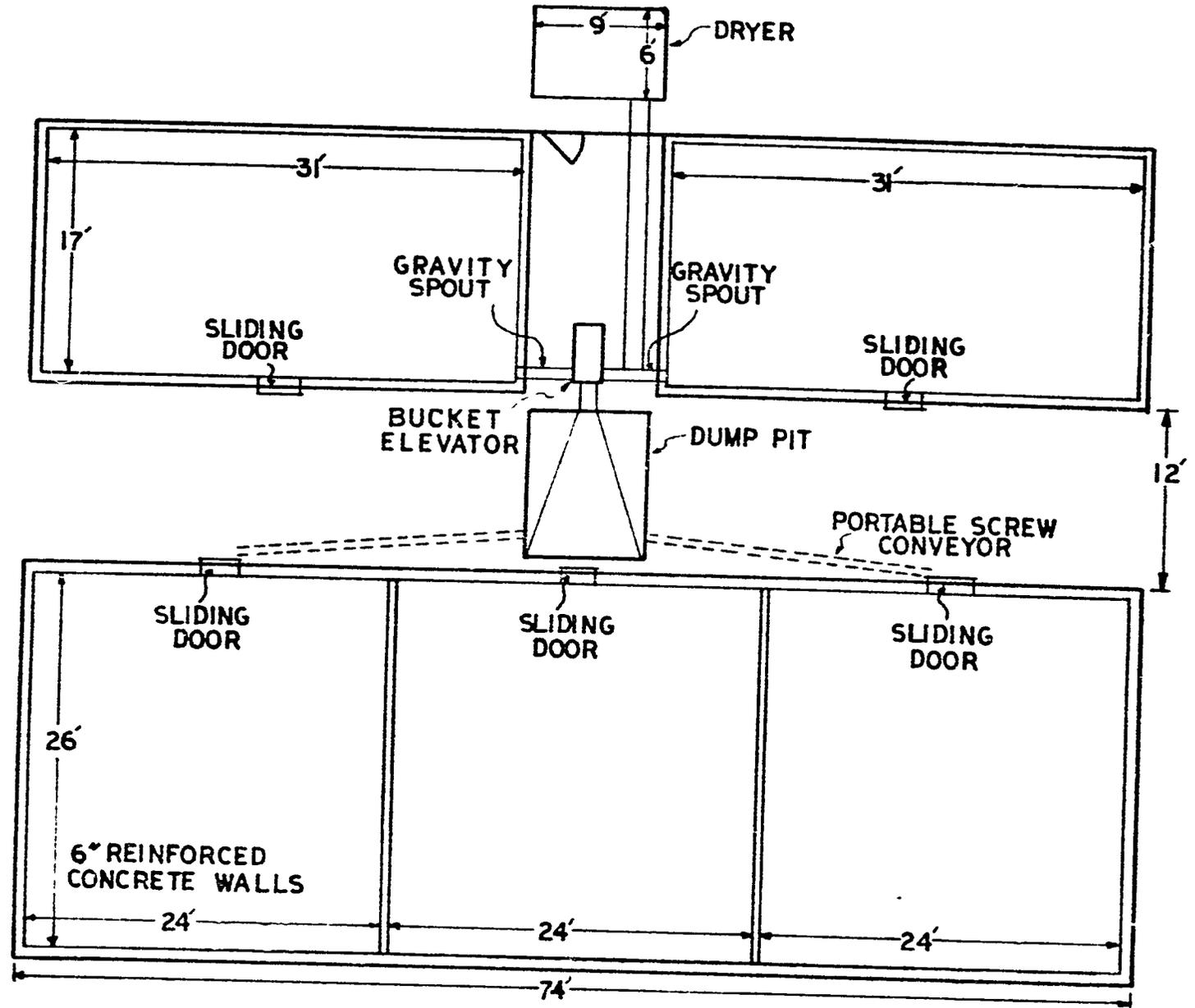
F. Demonstration of Pest Control Methods

G. Business Procedures and Market Analysis Methods

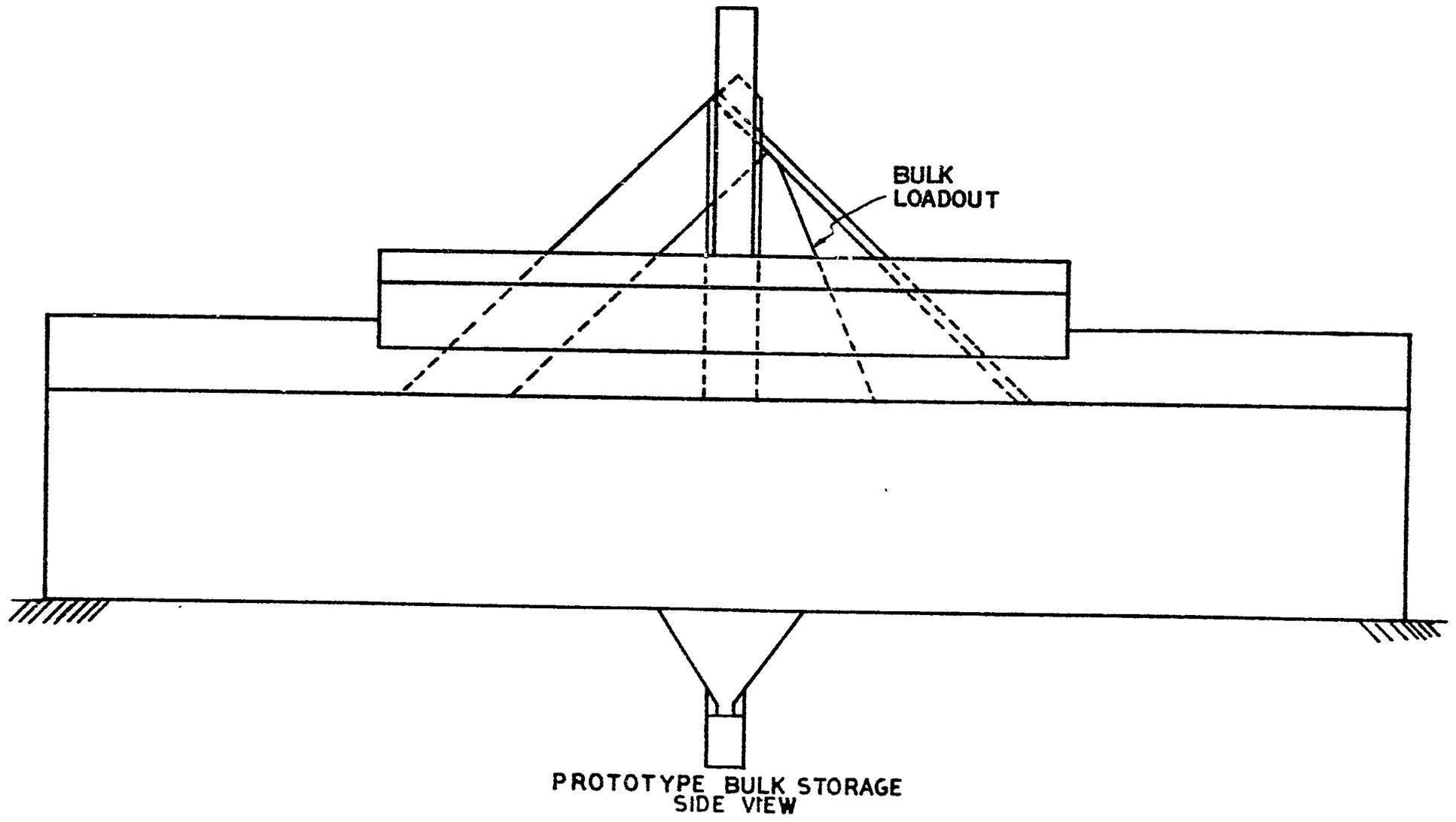
APPENDIX B

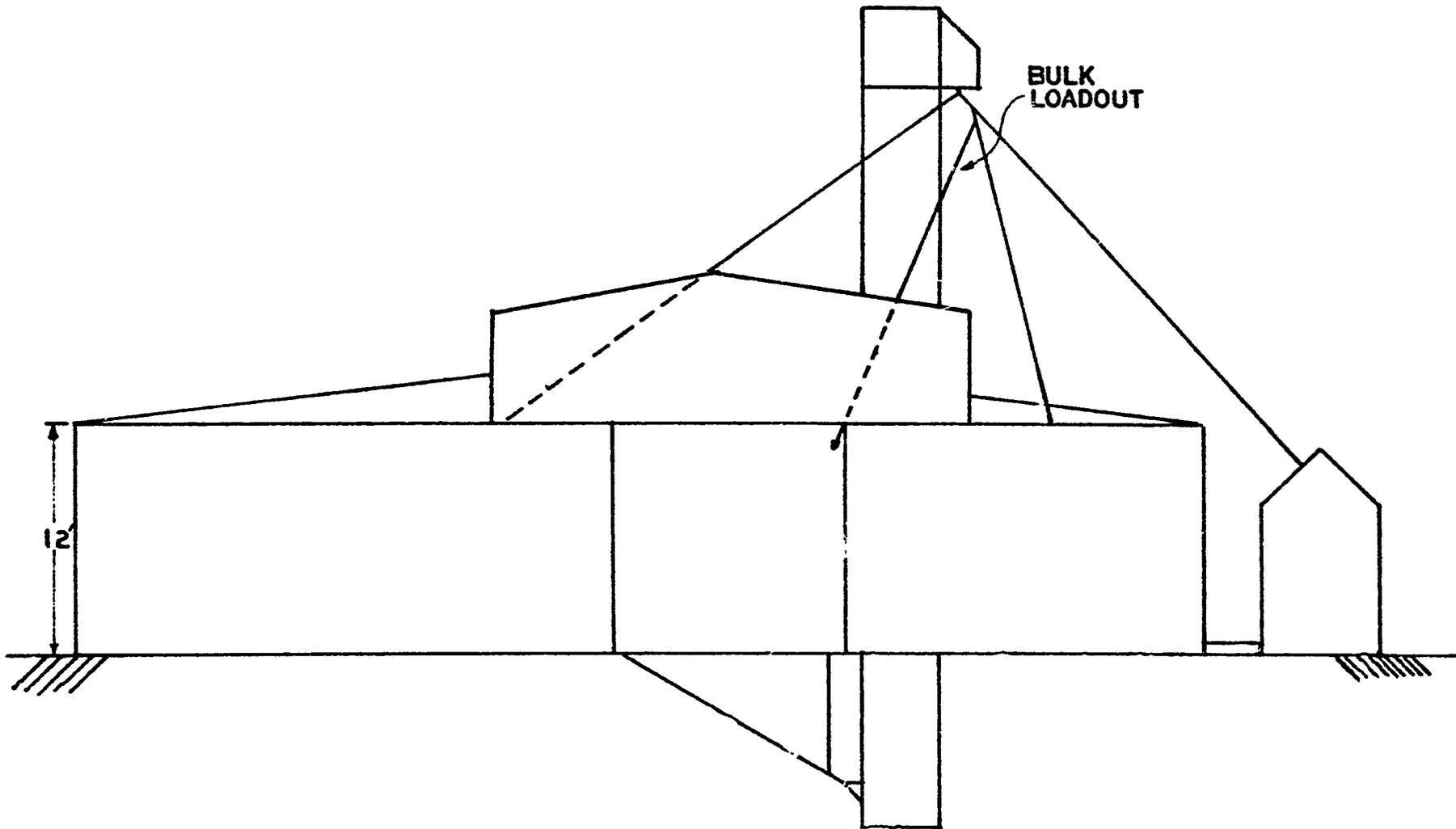
Prototype Bulk Storage

PROTOTYPE BULK STORAGE
20,000 Bu. Capacity



PROTOTYPE BULK STORAGE
PLAN VIEW





PROTOTYPE BULK STORAGE
END VIEW

APPENDIX C

Situation, Recommendations

Appendix C

I. The Situation

The Food for Development Program in Brazil is confronted with a number of problems.

1. Many of the warehouses storing food for the three PL 480 Title II Food for Development programs, Child Feeding, Voluntary Agency and Work Fronts, are infested with rodents and insects. Not only are there losses in the primary storage locations but the food carries the infestation to interior storage points where other food is infested. Or, in some instances, the product is kept clean at the primary storage point but is contaminated at the interior points.
2. Another problem has to do with the scheduling of the various Food for Development products in a balanced supply from the U.S. and, in turn, to the interior storage points. Stocks that are forced to stay in storage for a long period of time are quite susceptible to spoilage. Not only are problems created by rodents and insects but in areas of high humidity, molds and fungi create an additional problem.
3. The impassivity, or the reluctance to take action, or the lack of motivation in solving the loss in storage problems is permitting needless losses of stored products. Rodents and insects can be controlled and steps should be taken at the first sign of their activity.
4. The warehousemen, in many instances, are willing to accept a degree of filth in food, which others will eat, that should not be tolerated.

Some of the filth being tolerated is: rodent feces, rodent urine, rodent hair, whole insects, ground insects, insect excreta, the larvae of insects and the skins that are shed by the maturing larvae.

II. Recommendations

1. At the primary storage points, such as Recife, the food for the three programs should be stored in the same warehouse. At secondary storage points, such as Teresina, the same recommendation would apply where two or more of the programs are in effect.
2. The simplicity of insect control by using plastic covers with Phostoxin and the effective control of rodents that is possible with baits and poison water justifies serving notice on the agencies receiving the food products free of charge from the U.S., that they maintain good house-keeping at all points of storage with insects and rodents kept under control or the grants of food would be terminated.

3. The wheat and corn equivalent of the wheat and corn products being provided to Brazil under this program in processed commodities could be furnished under PL 480 Title I or Title II allowing the Brazilian mills to do the processing.
 - a. This would save the U.S. cost of milling.
 - b. Bulk grain rather than milled sacked food would save on both land freight in the U.S. and ocean freight.
 - c. It would minimize the problem of scheduling mentioned in I-2.
 - d. It would reduce the storage and resultant problems in Brazil.
 - e. The milling by-products could be used in Brazil in a growing formula feed business.