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9. ABSTRACT

Because the two Seed Processing Centers constructed in Honduras in 1967 had not achieved maximum operational capacity or efficiency, assistance was requested in 1974. When the Seed Centers were opened, the seed produced was of poor quality; attempts to market it were not very successful; and when seed was processed, the cost was prohibitive; the quality was usually low, and thus demand was low. In addition, it was found that 1) Poor quality seed was received by the Centers, making it difficult to produce high quality seed; 2) seed producers could not get paid promptly; 3) There was poor marketing and distribution; and 4) Production and marketing of the seed was not effective. On top of these, a recent hurricane and drought had made the situation even worse. THe laon agreement to aid the Seed Centers contains provisions for a revolving fund to pay competitive prices to contract seed producers immediately upon receipt of their seed. Provisions were made also for the establishment of a very close working relationship (agreement) between the MAG and the BNF (Banco Nacional de Fomento). Specific recommendations for and comments upon the two Seed Centers are detailed in this report.

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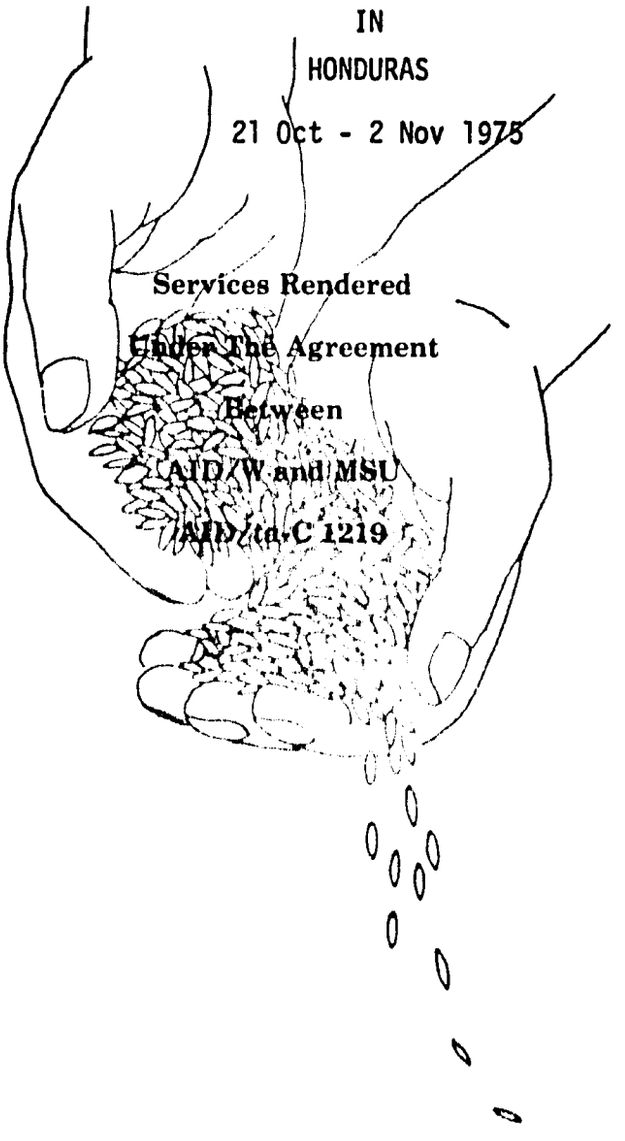

Services Rendered
Under The Agreement
Between
AID/W and MSU
AID/ta-C 1219

SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

REPORT TO AID/W, USAID/HONDURAS AND GOH

ON

SEED PROCESSING CENTER EVALUATION IN HONDURAS

Services Rendered
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SEED TECHNOLOGY LABORATORY
Mississippi State University
Mississippi State, Mississippi

December, 1975

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REPORT SUMMARY

TITLE: Seed Processing Center Evaluation

NUMBER: TA 75-19

CONSULTANT: C. Hunter Andrews, Associate Agronomist

PERIOD: October 21 - November 3, 1975

CONTRACT: MSU - AID/ta-C-1219

CONTRACTOR: Mississippi State University

Summary

The loan agreement of 1974 between AID/GOH included a section on Seed Program development for the purpose of increasing agricultural production through the production and utilization of improved seed. In implementing the "step-wise" phases of this agreement, the GOH is requesting technical assistance from MSU through the USAID/Honduras.

The assistance provided during this consultation period consisted of thoroughly reviewing the operational aspects of the Seed Processing Centers in Tegucigalpa and San Pedro Sula. The period of consultation was quite timely in that both Seed Centers were actively receiving and processing seed. In addition to confirming the need for supplemental equipment listed for purchase in MSU Report TA 75-04, recommendations for production and operation are made.

RECOMMENDATIONS

Tegucigalpa

1. Schedule the production of bean seed during the dry season to eliminate the necessity of hand-picking the weathered seed from wet-season crops.
2. Reduce the number of bean seed contract producers by securing larger production from the more efficient producers.
3. Coordinate and consolidate bean seed production to reduce the excessive small "bag-lot" contracts.
4. Modify record-keeping so that "clean-out" (grain and inert matter) components can be tabulated by variety rather than by separate lots.
5. Eliminate the aspirators from the processing line when cleaning beans. Germination and quality tests should be performed to evaluate the "hand-picked" component.
6. Improve logistical support by providing adequate sacks on a timely schedule and by maintaining vehicles for rapid transport of seed.
7. Continue the "Revolving Fund" with the BNF for timely payment for contract seed and for purchase of supplies and repairs.
8. Extend operational time, probably to a 24 hour schedule, during time of peak seed production.
9. Remove the air and screen machine (NW 342) from the processing plant to allow more flexibility of movement. NOTE: This machine could be sent to San Pedro Sula to facilitate rice processing.
10. Emphasize strict cleanliness with exterior of jute sacks where rice seed adheres to exterior surface. This will minimize varietal contamination.
11. Additional equipment must be acquired immediately. Rapid approval and procurement of all equipment recommended in MSU report, TA 75-04 (March, 1975) is urgent.

12. Continue to stress repair and maintenance of all equipment as necessary.
13. Remove the mass of empty potato boxes from the drying shed in order to provide adequate storage space for incoming seed.

San Pedro Sula

1. Repair and maintain on-site equipment, especially air conditioners and dehumidifiers, until replacements are secured.
2. Replace the thermostat on the heater-fan unit for the corn drier. If this fails to remedy the problem, further repair from the local maintenance shop will be necessary.
3. Install the dust-house for the air and screen machine according to personal instructions with the staff.
4. Budget funds for necessary repair of the genetic-stock cold room, even if supplemental air conditioners and dehumidifiers are necessary.
5. Replace the corn sheller according to detailed specifications in recommendation 6.
6. Re-design the cob collecting system by elevating a dust collecting system so that trucks can pass beneath to collect the cobs.
7. Logistical support from the top administration must be improved to provide adequate vehicle repair and expendable supplies such as sacks and minor equipment repair parts.
8. Additional equipment recommended in MSU report TA 75-04 must be approved and ordered immediately.

Both Seed Centers are showing marked improvement in operational efficiency. However, as a result of increased emphasis on seed production within the last year, modifications in existing facilities and acquisitions of additional equipment will be necessary in order to maintain and support the desired development and implementation of all phases of the Seed Program.

ACKNOWLEDGEMENTS

Sincere appreciation is extended to Mr. James Bleidner, USAID/Honduras, for his warm reception and especially for the detailed explanation and analysis of the loan agreement with reference to the seed program.

Special thanks are extended to Ing. Francisco Lupiac for the valuable logistical support provided during the consulting period and for his assistance and advise. In addition, Rafael Diaz and Jose Torres are due recognition for their valuable assistance as they devoted many hours to discussions and provided helpful information concerning the Seed Centers at Tegucigalpa and San Pedro Sula. Oscar Aleman was of considerable help as he provided a clear insight into the various problems at the San Pedro Sula Seed Center.

Assistance of many other technicians in Honduras who were extremely helpful and friendly during this assignment is greatfully acknowledged.

INTRODUCTION

With assistance through USAID/Honduras and technical assistance from Mississippi State University, Seed Processing Centers were constructed at Tegucigalpa and San Pedro Sula in 1967. Although both Seed Centers were up-to-date and adequate facilities at that time, from the beginning neither achieved optimum operational capacity or efficiency. This in part has hindered the desired expansion and development of an improved seed production and utilization program in Honduras.

In a determined attempt to correct this weakness and to re-direct emphasis in seed production and utilization, the new sector loan agreement between AID/GOH in 1974 included provisions for strengthening and up-grading the seed program in Honduras. Timely consultations with MSU technicians was considered desirable, and the Seed Processing Centers, as major integral components of the total seed program in Honduras, were logical starting points for analysis and emphasis.

Thus, USAID/Honduras requested technical services through the MSU-AID/ta-C-1219 contract, and C.H. Andrews, MSU Contract Staff, was nominated for the assignment. The consultant arrived in Tegucigalpa, Honduras on October 21 and departed on November 3.

In addition this specific assignment in Honduras, USAID/Guatemala requested a 3-day stop-over by the consultant for the purpose of reviewing their Seed Program. Contacts were established with ICTA, DIGESA and RF personnel involved with seed program development in Guatemala.

BACKGROUND

Seed Processing Centers, complete with drying, processing and storage components were constructed at Tegucigalpa and San Pedro Sula, Honduras in 1967. From the very beginning and continuing to date, neither of the Seed Centers have achieved their de-

signed operational capacity or efficiency. Numerous reports and analyses have pointed to obvious deficiencies, and it is well worth reviewing some at this time.

Briefly, consideration should be given to the conditions existing when initial steps were taken to establish a seed program in Honduras. At that time the authority for producing, processing and marketing seed in Honduras resided with the GOH Agency, DESARRURAL. For various reasons "seed" produced by this organization was of poor quality. Logically, therefore, attempts to market poor seed was less than successful, and the Seed Centers were heavily criticized and actually became quite unproductive and stagnant. When these Seed Centers did process seed, the cost was prohibitive, the quality was questionable (usually poor), and the farmer-consumer demand was low. This is substantiated in previous reports, MSU TA 74-05 and a report by French Co-operator, Ing. Abrant, in which problems and deficiencies were outlined in detail.

Contributing to these initial weaknesses in the Seed Processing Centers, and thus to the total seed program in Honduras, were numerous factors, some of which are pointed out as follows:

1. Poor seed producers or contractors - "Seed" received by the Processing Centers was high in moisture, contained excessive inert matter, and was generally low in quality due to either improper harvesting or delay in transit to the Seed Center. Thus, poor quality seed was received which made it difficult to turn out high quality seed.
2. Seed producers (contractors) could not get paid promptly - those contractors choosing to produce seed often experienced long delays in receiving payment, many times as long as 3-4 months. This practice, no doubt, helped to eliminate the better producers from the program.
3. Poor marketing and distribution - previous surveys have shown that rigid administrative procedures often delayed seed distribution to consumer areas beyond optimum planting time.

4. The DESARRURAL agency was just not organized in a manner to promote effective production and marketing of seed. This may have been due to the fact that DESARRURAL was organized country-wide rather than specific production areas.

Thus, the seed program, which had its beginning centered around the two strategic Seed Processing Centers, struggled from the start, and the relatively simple mechanics of having these Centers by no means proved to be the only development needed for a successful seed program. In fact it is absolutely essential to have an effective organization for administering the program. As late as 1974 the farmer-consumer in Honduras had little confidence in Government seed as was evident by quantities of seed from previous year's production still in the Seed Center storage facilities at Tegucigalpa and San Pedro Sula. Farmers were willing to save their own seed, the bank loan programs were not extremely effective because good seed from the Government were not available and the seed program was experiencing difficulties.

CURRENT SITUATION

The "seed situation" in Honduras has changed drastically during the last year. That is seed supplies have become very scarce or non-existent. Farmers, who traditionally saved seed or maybe exchanged or bought them from the local market, are now searching for seed. A logical source is from the government program. This dramatic change in the past 12 months can be linked to two natural disasters which created seed shortages:

1. First, the hurricane of September, 1974 completely demolished crops in many areas of Honduras. Even the small quantities of farmer-saved seed was lost.
2. Secondly, a severe drought throughout Honduras from January through July, 1975 further reduced crop production. Instances were pointed out where fields were planted two or more times and lost due to lack of water. Thus, seed supplies were consumed.

At this time it is well to point out that USAID/Honduras, in conjunction with the GOH, completed a new sector analysis (in 1974) which fortunately included a section on Seed Program Development. Briefly, such loan agreements provide for the USAID to furnish needed financial and technical assistance as the GOH shows evidence of positive and progressive actions in development.

Significant sections in this new loan agreement which have brightened the outlook of the Government Seed Program and stimulated dramatic interest in seed are as follows:

1. Provisions for a "Revolving Fund" to be established with the Banco Nacional de Fomento (BNF). This fund has been designated for use in paying competitive prices to contract seed producers, immediately upon receipt of their seed. This, of course, has enabled the seed program to secure firm contracts for seed production by very reliable and good contract seed producers. NOTE: I might also say at this time that in reading excerpts from the loan agreement concerning the "Revolving Fund", it appears that logistical support in the way of bags, vehicle repairs and spare parts can be financed from this fund. However, there remains some differences in interpretation which hopefully can be clarified in favor of such utilization of funds in the very near future. Additionally, the GOH personnel must be reminded that the revolving fund must not be depleted through such expenditures so as to prevent timely payment for contract seed. This should be no problem since monies from all seed sales is to revert to the "Revolving Fund" and considerable sales have been made to date.
2. A second significant point in the new sector loan agreement has been the provisions for the establishment of a very close working relationship (agreement) between the MAG and the BNF. Prior to this there did exist a BNF loan program to farmers which enjoyed limited success. It

now appears that with this renewed program, the BNF loans stipulate the use of proper cultural practices, including the purchase of good seed from the Government Program.

Thus, under the Government Seed Program of the late sixties and early seventies (1967 - 1973), DESARRURAL was responsible for seed production and distribution. Their seed program encountered many difficulties, such as receiving and distributing limited quantities of poor "seed". An interim agency, DESAGROH, functioned temporarily, however, the new and current GOH re-organization enables seed to be distributed under the marketing outlets of the new agency, "Recursos Naturales" which appears to be functioning quite well. This system divides the country into specific production areas which seems to facilitate administrative and organizational efficiency. Of significant importance is the fact that of considerable quantities of seed distributed to date, there have been very few if any farmer-consumer complaints. Hopefully, the earlier philosophy shared by many farmer-consumers, that of DESARRURAL and poor seed, is a thing of the past.

With this brief background concerning the early stages of seed program development, and the completely new outlook as viewed in the current situation, it becomes rather logical to re-consider the status of the Seed Processing Centers and to analyze and determine their capabilities, efficiency and effectiveness in the re-surging Seed Program. I wish to emphasize again that at this time in Honduras, there is tremendous interest and demand for planting seed, and the Seed Centers at Tegucigalpa and San Pedro Sula are suddenly faced with production, processing, drying and storage problems which are unusual for them. Large numbers of seed contracts have been signed and considerable quantities of seed of basic food crops are being received at each plant daily. Thus, greater demands are being placed upon each Seed Center to increase capacity and efficiency, something which has not been stressed in past years. Frustrations among the staff are quite evident for various reasons which will be pointed out later.

This consulting assignment is concerned primarily with a detailed analysis of the Seed Center activities including recommendations for improving operational procedures which will lead to increased seed handling capacity and operational efficiency.

TEGUCIGALPA SEED CENTER

The total operational efficiency of the Tegucigalpa Seed Center has improved considerably within the last year. The staff has been strengthened and definite responsibilities have been delegated, buildings and facilities have been repaired, the facilities are clean and well kept, equipment is maintained adequately except for a few items which will be noted later, and seed are selling for a good price. However, the Center must find means of increasing capacity and become more efficient if they expect to handle the quantities of seed projected for production for the coming year.

The Seed Center at Tegucigalpa has the primary responsibility for handling beans produced in Danli, rice from Choleteca, and a relatively small quantity of sorghum seed. It is anticipated that wheat may be handled in the near future. At the present time and under the operational system and sequence utilized, seed capacities are as follows:

Beans - 100qq/8 hour day (20 bu./hr.) if hand picking is necessary to remove the weathered and damaged seed.
200qq/8 hour day (40 bu./hr.) if hand picking is not necessary.

Rice - 300qq/8 hour day (83 bu./hr.)

Sorghum-300qq/8 hour day (83 bu./hr.)

From this it is quite evident that capacity turn-out is considerably lower than the rated capacity of the installation, which, under fairly optimum conditions, should be about 150 bu./hr. Although it is anticipated that efficiency should improve as staff and labor gain experience as more seed moves through the Center, cer-

tain circumstances justify in part the rather low capacities:

1. Seed Production

A large number of contractors are necessary in order to obtain the production goals, particularly for beans. For example, in the second season of 1974, 2249 qq of bean seed were produced by 32 contract growers. However, rather than 32 different seed lots (averaging 60 qq or 24 bags per lot), there were 52 different seed lots for just two bean varieties, Desarrural and Porrillo. These 52 different lots were received in as few as 4 bag lots to as many as 76 bag lots. For example, one contractor, Romulo Salgado, produced only the Desarrural variety, but his 479.56 qq were received in 216 bags representing 6 different lots as follows:

Contractor	Date Harvest	Date Received	qq	No. Bags	Lot No.
Romulo Salgado	1-2-75	1-3-75	22.76	10	RS-I-74 B
	*1-13-75	1-15-75	155.21	70	RS-II-74 B
	*1-13-75	1-17-75	24.45	10	RS-3-74 B
	1-21-75	1-22-75	171.62	76	RS-4-74 B
	**2-10-75	2-13-75	53.81	25	RS-5-74 B
	**2-10-75	2-13-75	53.71	25	RS-6-74 B

*Harvested same day but received different days
**Harvested same day, received same day, BUT processed separately

Thus, bean seed contractors may send just one lot of a few to many bags or several lots of varying quantities depending upon number of production fields, date of harvest and date when seed are collected for transport to Tegucigalpa.

For the 1975 production (second crop) there have already been

firm contracts signed with at least 80 contractors for 720 MZ, and it is anticipated that more may be required in order to attain the bean seed production goal of 11,000 qq.

The situation with rice seed production is somewhat better in that fewer contractors produce larger bag-lot quantities. And a considerable amount of rice is produced at the LaLujosa Experimental Station and can be handled more efficiently and on a timely schedule.

2. Seed Center Operation

The analysis and discussion of the seed production system is included to show its influence upon the Seed Center operations - their capacity and efficiency. During the harvesting season, truck loads of bean seed may be received daily, or there may be 2-3 days between shipments. On occassion a truck may have seed from just one contractor; however, it is not unusual for a truck to carry seed from 4, 6, or 8 contractors, representing as many different lots.

Herein lies one of the major problems for the Seed Center. Each contractor's seed must be handled separately; that is, it must be weighed, sampled for moisture determination (contractors are paid on the basis of 14% moisture), and processed separately. Each seed lot is processed into three components, good seed, grain and inert matter, and all of these components must be weighed for each seed lot, the 4-bag lots as well as the 76-bag lots. There is no plant clean-up between lots of the same variety; however, often times different varieties do arrive at the same time which necessitates stopping all operations for complete plant clean-up.

3. Quality of Seed Received

Problems in this area appear to be more related to bean seed. Bean seed can be produced in both the wet and dry seasons; however, wet

season production results in poorer quality seed. This is evident as weathered, damaged or off-color seed. To overcome this the Seed Center Manager has resorted to hand-picking all of the bean seed lots produced in the wet season. Two to three persons pick out the bad seed as they discharge from the air and screen machine and another group pick additional faulty seed as they pass through the aspirating systems. This technique is extremely time consuming, but must be continued until such time that all of the bean seed can be produced in the dry season. Note: Production procedures are being contemplated so that all bean seed may be produced during the dry season.

4. Seed Quality Standards

As opposed to the philosophy of years past, the current emphasis is upon turning out high quality seed, maybe even too much emphasis at this time. By this I mean that the Center is taking quite a high loss in "clean-out", particularly the grain component. They are striving for germination in the 90's which is accomplished by hand picking and aspiration, both of which greatly reduce capacity. On the other hand, they must guard against low quality seed, and at present this slower technique is viewed as the means of doing so.

5. Bag System of Handling Seed

Harvested seed are received at the Center in 2.5qq (250 lb.) jute bags. When trucks arrive with 200-300 bags, the labor force usually interrupts their operational routine to unload these heavy bags and place 256 of them on the bag-drier. After turning the bags periodically for optimum drying, 10-15 hours depending upon initial seed moisture, the labor force must then transport these heavy bags, 2 or 3 at a time on bag trucks, to the receiving elevator. Usually one lot is handled at a time, and the bags must be poured individually into the small receiving hopper of the bucket

elevator until the surge bin over the air and screen machine is filled. Thereafter, the processing sequence begins. It is difficult to obtain desired efficiency from such a technique and labor force, particularly at the present wage standards.

6. Staffing Positions and Responsibilities

To perform the essential tasks at the Tegucigalpa Seed Center a fairly stable staff has been assigned. There are 20 persons available for various tasks directly associated with daily operations and 2 night guards. Six fairly definite staff positions were identified, and the other 14 were general utility laborers:

1. Rafael Diaz - agronomo - Chief of all Seed Center operations including contract production.
2. Jorge Fortin - agronomo - Assistant primarily in charge of receiving and drying seed.
3. Angel Reanos - Seed analyst and maintains storage records, lot indentification and upkeep of dehumidifiers and air conditioners in storage rooms.
4. Anna Avendano - Secretary
5. David Landa - Plant operator or supervisor and equipment mechanic.
6. Ricardo Carrilo - Training position
7. Fourteen utility laborers - to handle sacks, hand pick seed, sweep and clean the areas and perform other odd jobs as necessary.

The necessity for such a large labor force is due to the vast amount of hand labor associated with loading and unloading trucks of seed, loading and unloading the drier, handling numerous small seed lots separately, hand-picking damaged beans from weathered lots and clean-up when changing varieties.

7. Physical Plant Facilities

The Seed Center facilities at Tegucigalpa were constructed in 1967, and shortly thereafter, the recommended equipment was installed. Within a few years the buildings and equipment began to deteriorate rather rapidly; however, recommendations of recent MSU reports have been implemented to the extent that notable improvements are evident at this time.

(A) Drying Component

The bag-drier system is operating satisfactorily within the design limits. Improvements in the drying system consisted primarily of remodling of the drying floor to prevent loss of the drying air. The heater and fan unit operates adequately most of the time; however, problems have occurred where the control mechanism (the electrodes) needs periodic adjustment and cleaning.

(B) Processing Plant Component

The processing equipment and the general area designed for the processing plant shows marked improvements in cleanliness and overall orderly arrangement and maintenance. With the exception of frequent breakdowns with the M100 seed treater and the need of a complete set of brushes for the Crippen NW 342, no major deficiencies were noted in this area. The items of equipment which are specified in MSU report TA 75-04, March 1975, by Dr. A.H. Boyd are urgently needed in order to supplement the existing operational system and to up-grade the current seed program for this area.

(C) Seed Storage

The seed storage rooms are showing considerable improvement in that they are clean and seed are maintained orderly according

to lot designation and varietal identity. The primary problems which continue to plague this aspect are the malfunctioning dehumidifiers and air conditioners. These deficiencies have been stressed in prior reports; however, the problem continues to exist.

In addition the center room which is still used for miscellaneous supplies should be conditioned for seed storage.

(D) Seed Testing and Analysis

The seed testing facilities at the Tegucigalpa Center are extremely inadequate, particularly in view of the renewed emphasis on production and quality control. The Stults Model J-12 germinator will require a major repair and even then it is doubtful if it would function. The laboratory staff should be commended for constructing 12 sand germinating boxes which allows fairly accurate germination tests on all seed.

(E) Administrative and Records

Considerable emphasis has been placed upon records of receipt and disbursement of seeds (Examples in Appendix). Although accountability is important, the present approach of detailed "bag-lot" record identity is very laborous and time consuming.

In summary, the primary deficiencies or problem areas observed at the Tegucigalpa Seed Center are as follows:

(1) Bean seed production during the "wet-season" results in weathered and/or damaged seed which require hand-picking. This reduces efficiency and capacity considerably.

(2) The large number of contract seed producers creates problems in receiving and handling the many separate seed lots.

(3) The seed treater malfunctions frequently due primarily to age and normal wear. In fact, one motor had to be replaced during this consulting period.

(4) The two dehumidifiers, Remington D-20, are still inoperable. They have not been successful in securing any source of repair.

(5) The use of the pneumatic separators continue to restrict capacity turn-out. Additional testing must be done to ascertain the benefits from this procedure, particularly for beans.

RECOMMENDATIONS - TEGUCIGALPA

1. Schedule the production of bean seed during the dry season if at all possible. This will eliminate the necessity for hand-picking which is now utilized for practically all wet-season bean seed production.
2. The number of bean seed contract growers should be either reduced, or production from each grower should be consolidated so as to reduce the large number of separate seed lots. This will mean more ridgid coordination between the collecting system in the Danli area and the transporting system to the seed center.
3. Urgent and immediate attempts should be made in the system of weighing the "clean-out components (grain and inert) from each lot. Although this is helpful in determining and selecting good contract producers, it is very time consuming. An alternative could be to consider "clean-out" by variety rather than by individual lot.
4. Careful consideration should be given to the actual necessity of utilizing the aspirators in the bean seed processing line. Preliminary quality tests with Tetrazalium indicated that those seed which were being removed by hand were quite healthy even though their appearance was less than desirable. If, on the other hand, the relatively small quantity which is being picked

by hand were allowed to blend throughout the seed lot, quality standards would probably not be affected.

5. The equipment recommendations are considered to be the same as those made in MSU report, Ta 75-04 (March, 1975 - Dr. A.H. Boyd). At this time, however, it should be pointed out that the timely acquisition of this recommended equipment is very urgent. As a matter of fact, the administrative procedures which have delayed equipment purchase and repairs to date, will probably continue to delay purchase and repair for maybe an additional 6 - 12 months. The projected seed contracts currently in effect cannot wait for this time interval.
6. Logistical support must be improved. Seeds cannot wait in the field because there are no sacks available or because transportation is not available. The administration must find a way to provide funds for expendible items such as sacks and for vehicle repairs so that seed will be moved from the production area to the Seed Center on a timely schedule.
7. The "revolving fund" with the BNF has probably been the greatest boost to increased production thus far. This fund can wisely be used for the necessary logistical support; however, caution must be observed so as not to deplete the fund and jeopardize payment to contract producers.
8. Within the seed processing plant the un-used air and screen machine must be removed from behind the NW 342 in order to allow for more flexibility of movement and operation.
9. The exterior of the jute bags in which seed arrive at the seed center should be cleaned of all external seed which adhere to their surface in order to prevent varietal mixing. This is particularly true for rice seed.
10. The operational hours should be extended, probably to a 24 hour schedule, in rder to handle the quantities of seed arriving at the seed center.

11. Finally, this consultant wishes to commend the Tegucigalpa Seed Center staff for their exceptional performance as they encounter a very critical and extremely difficult task of handling quantities of seed in excess of originally anticipated goals and at untimely arrival schedules.

SAN PEDRO SULA SEED CENTER

Improvements in the San Pedro Sula Seed Center have been made during the past year. The corn drying system shows marked improvement in that the air tunnel ceiling has been completely replaced with excellent lighting in both the tunnel and in each drying bin. In addition all of the air inlet sliding doors have been replaced to eliminate air leakage, and the wooden bottoms in each bin have been replaced with lighter frames covered with fine wire coverings. The roof over the corn drying building has been repaired with rain gutters to remove run-off water. In addition, the roof was extended over the corn sheller which provides adequate shelter during adverse weather.

The rice drying system, as a result of previous recommendations, has been increased to accommodate 48 additional sacks by incorporating the previously unused center section of the drier. Additionally, the plenum walls have been replaced to eliminate air leakage, and adequate lighting has been added.

Improvements in the processing plant include complete painting of all interior and exterior walls, all holding bins and supporting frames. Repairs to the lighting system has greatly improved the internal visibility.

Even though considerable improvements in physical facilities and operational efficiency are evident, this Seed Center is still unable to handle the quantities of seed currently under contract. Improvements can be made in this respect through some changes in present operational procedures, and especially through timely acquisition of additional and/or replacement equipment.

In evaluating the Seed Center at San Pedro Sula and making subsequent recommendations, it is desirable to consider their current program and future plans.

The Seed Center at San Pedro Sula is primarily engaged in securing the production of corn and rice seed and in drying, processing, and storing these seed until they are marketed. Within the operational schedule and sequence currently utilized at the Seed Center, capacity turn-out for each crop is as follows:

Rice - 300 qq per 8 hour day (83 bu./hr.)

Corn - 240-320 qq per 8 hour day (50-70 bu./hr.)

Thus, the situation at the San Pedro Sula Seed Center is somewhat similar to that at Tegucigalpa in that the capacity turn-out is approximately one-half of the minimum designed operational capacity - approximately 150 bushels per hour for both rice and corn.

A review of the existing circumstances which in part justify this low capacity are as follows:

1. Seed Production - unlike the Tegucigalpa Seed Center where numerous contract growers are necessary for volume production, there are fewer contract producers for both rice and corn. Consequently, lot size is more stable and larger. However, a major problem at this facility exists due to the fact that both rice and corn are received at the same time. Untimely receipt of a truck load of rice may necessitate interruption of corn processing long enough to unload the rice and place it in the drier.
2. Seed Center Operation

   The seed production and transporting system influences the operational procedure at the Seed Center to a great extent. In view of the fact that both rice and corn arrive at the

Center simultaneously, labor utilization poses a serious problem. For example, one drying bin of corn is dry and ready for shelling, cleaning and bagging; however, when the truck load of rice arrives, some of the labor must be removed from the corn processing in order to unload the rice and place it on the rice drier. Furthermore, the corn processing may be interrupted (particularly if drying is not complete on some bins) in order to process the dry rice seed. These frequent and untimely shifts between receiving and cleaning both rice and corn create major problems in efficiency and capacity.

In addition, rice seed are handled in jute bag lots which must be transported by hand labor (about 100 ft.) and stacked in a congested area of the seed processing building near the receiving elevator. These bags are subsequently emptied into the elevator until the holding bin over the H 454 is filled, another time consuming task. Also, complete plant clean-up is necessary between each shift from rice to corn.

A very major and limiting problem associated with the corn processing scheme is the collection and disposal of the cobs. The metal bin into which the cobs are blown from the corn sheller usually holds cobs from one drying bin, although more frequently than not the cobs spill out of the bin onto the area grounds creating a very unsightly condition and a difficult clean-up situation. Additionally, excessive corn seed are blown from the sheller into the cob bin which necessitates hand screening the entire cob mass to recover the corn seed. Estimates (fairly accurate) are that 800 pounds of corn seed

can be recovered from shelling 300qq of corn, about 2.7% shelling loss (normally shelling loss is about 1%).

This hand screening operation coupled with filling re-usable jute bags with the disposable cobs by hand, and stacking these cob-filled bags in and around the area grounds truly poses one of the most time consuming sequences of the entire system operations.

3. Quality of Seed Received

Fortunately, problems are minimal with regard to the quality and condition of the seed when they are received. Purchase and sale of seed is as follows:

Corn - formula for purchase: 80% seed, 20% cob, 20% moisture

Example: $10{,}000 \text{ lbs.} \times \frac{100-22}{100-20} \times .80 = \text{Seed for Payment}$

Purchase Price: L. $19/qq

Selling Price: Flats - L. $35/qq
Rounds - L. $30/qq

Rice - formula for purchase: 12% moisture

Example: $10{,}000 \text{ lbs.} \times \frac{100-22}{100-12} = \text{Seed for Payment}$

Purchase Price: L. $25/qq

Selling Price: L. $35/qq

Note: "Grain" clean-out is returned to the BNF.

4. Seed Quality Standards

With a new staff and organization at this facility, greater emphasis is being placed upon good quality, improved seed. Thus, their "grain and clean-out" component may be greater than necessary. However, in an attempt to eliminate the previous poor farmer-acceptance concept which was so firmly ingrained with their

earlier DESARRUAL (Desagroh) program, strict cleaning techniques are certainly plausable at this time. There seems to be no serious time element involved at this Center with maintaining high quality seed standards as was the case with the weathered bean seed at Tegucigalpa.

5. Bag System of Handling Seed

The rice seed are received in 2.5qq bags and dried on the sack drier. Here again, it is emphasized that the mere system of unloading the sacks, loading the drier, turning the sacks during drying and finally carrying them across the area grounds from the drier to the processing unit utilizes considerable time and reduces efficiency.

The corn is received on the cob (ear) in bulk trucks, and therefore less time is lost in unloading and handling corn. However, efficiency definitely could be improved during the unloading sequence from the trucks.

6. Staffing Positions and Responsibilities

Staff stability, changes and reorganization appear to have significantly strengthened the operational aspects of the Seed Center. There are 8 rather stable staff (positions) with 30 laborers available for utility work. The drastic increase in seed production has necessitated a 24 hour operational schedule; thus, there are three 8 hour shifts consisting of 10 laborers per shift, one of which is an appointed supervisor who has sufficient knowledge and skill to trouble-shoot minor problems and perform routine maintenance.

1. Jose Torres - agronomo - chief of all Seed Center Operations and contract production.
2. Oscar Aleman - Plant Foreman in charge of receiving, drying, and processing all seed.

3. Victor Sanchez - Assistant Plant Manager for all operations.
4. Supervisor - for one 8 hour shift.
5. Supervisor - for one 8 hour shift.
6. Supervisor - for one 8 hour shift.

NOTE: At present one of the supervisors (4,5,or 6) is responsible for the seed testing laboratory. Future plans are for this responsibility to become a full-time position.

7. Warehouse Supervisor - In charge of seed stocks, records, equipment upkeep.
8. Hector Munoz - In charge of contract production program and advises contractors on recommended cultural practices for good seed production.

Thus, a large labor force is desirable in view of the vast amount of hand labor involved with loading and unloading seed, drying techniques and screening corn cob bin to recover seed.

7. Physical Plant Facilities

The Seed Center facilities were constructed in 1967 and equipped within a relatively short time. After an interim of operation under the previous DESARRUAL (Desagroh) program, equipment and buildings suffered considerable deterioration and malfunction. Previous MSU reports have repeatedly pointed out existing problems, and recent recommendations have been implemented to the extent that noticeable improvements are evident:

Drying Component

Rice: The heater-fan unit and the sack drier system

is operating satisfactorily within its design limitations. Improvements in the sack-drier include complete replacement of the plenum walls to minimize air leakage and repair of complete lighting system. A major improvement consists of the addition of 48 openings for sacks, (an increase from the original 128 to a total of 176) in the previously unused center section.

Corn: Improvements in the corn drying system include the complete replacement of the air tunnel ceiling and air inlet sliding doors together with excellent lighting systems in both the tunnel and each drying bin. Additionally, the initially heavy, bulky slatted drying floors in each bin have been completely replaced with much lighter wooden frames of improved design. Wire mesh screen has been installed over each drying floor to minimize seed loss through the floor. This also reduces clean-up time. The exterior appearance of the bin-drying system has been improved by painting, and the roof has been repaired with the addition of rain gutters and down-spouts. Even the corn sheller has been protected as the roof has been extended to cover the sheller and shelling system.

Major problems, however, do exist with the heater

fan unit and with the sheller-cob collecting system. First, a malfunction in the heater-fan unit prevents the burner from cutting off automatically. Thus, drying temperatures often reach 140° F instead of the desired maximum of 105° F. At present one man must attend the drying unit at all times so as to manually release the burner control switch (the burner does ignite automatically at the lower limit of 100° F).

NOTE: MSU has contacted the manufacturer about this problem and the initial suggestion is to replace the thermostat. This information has been relayed by telephone to Honduras.

A second major problem and very time consuming technique is one associated with the corn sheller and cob collecting system. The Triumph sheller, after some years of operation, blows a considerable amount of shelled corn (about 2.7%) into the cob collecting bin. Thus, it has become a standard practice to literally hand-screen each full bin of cobs in order to recover this seed (about 800 pounds for every 300qq of corn shelled). Considerable time and effort is expended in this procedure.

Another problem of great magnitude is that of collecting and disposing of the cobs. The cob-collecting bin (a metal bin mounted on a firm cement base) usually is filled beyond capacity during the shelling

operation from one drying bin. The over-flow cobs spill onto the area grounds creating an unsightly and difficult condition. After hand screening the cob mass to reclaim the seeds, the cobs are often placed into jute bags which totally occupy much needed working and access areas. Until trucks are available, which often may be days because they are utilized in transporting seeds, this material remains as a major nuisance to efficiency in routine operations.

Processing Plant Component

Considerable improvements in physical facilities were noticeable in the overall processing plant.

In addition to a total emphasis on cleanliness and orderly arrangement, the entire building inside and out has been painted. Also the metal bins and support frames have been painted, and the lighting system has been improved so that visibility is quite good. Frequent breakdowns with the M 100 seed treater cause untimely delays, and the H 454 needs a complete set of new brushes. Otherwise, no serious faults were noticed with the other seed processing equipment.

<u>The items of equipment which are specified in the MSU report TA 75-04, March, 1975, are urgently needed in order to supplement and strengthen the current operational system and to up-grade the seed program for this area</u>.

Seed Storage Component

The seed storage rooms show marked improvement in that they are clean and seed are stored in an orderly system according to lot designation and varietal identity. The primary problem, and one that continues to exist in this area, is the malfunctioning dehumidifier and air conditioners. Although a service contract is in effect for the air conditioners, it seems as though they are operational only part time. Repair on the dehumidifiers which has been strongly recommended in earlier reports, has not been successful.

The original storage component consisted of 4 rooms which has been adequate in past years for storage of all seed. However, the research department has converted one of these rooms for their use, and they will probably continue to utilize it even though the originally designed genetic-stock (research storage room) room becomes functional in the future.

Thus, to alleviate the anticipated problem in storing seed, the warehouse currently being utilized for general supply storage must be converted to seed storage use (see MSU report TA 75-04 for details).

Seed Testing and Analysis

The seed testing facilities are barely adequate, especially in view of the anticipated emphasis on production and quality control. One major problem exists with the Stults germinator in that it will only function fairly accurately at the constant low temperature setting. Even

then it operates at about 80° F. This appears to be a problem with the Partlow temperature control mechanism.

NOTE: A replacement Partlow unit costs about $100 U.S. F.O.B.

Another problem of considerable magnitude is the expansion of administrative requirements (desks, office space, etc.) into the seed testing area. If effective and efficient, seed analysis and testing work is to be accomplished at this Seed Center, additional work area will be necessary.

Administrative and Records

The administrative aspects of this Seed Center appear to be functioning as well as possible considering the difficult conditions as outlined. As usual, records are maintained quite well. As a better understanding is established with chief administrators, it is anticipated that detailed accountability of "clean-out loss", "moisture loss", and other acceptable losses associated with seed operations will become routine.

In summary, the primary deficiencies or problem areas observed at the San Pedro Sula Seed Center are as follows:

1. The heater-fan unit for the corn drier fails to operate automatically. Thus, drying temperatures rise to 140° F., which necessitates manual operation of the unit. NOTE: Contact with the manufacturer indicated that the thermostat was a probable source for this malfunction. This information has been relayed by telephone to Honduras.

2. The corn Triumph shelling unit is blowing excess seed into the cob collecting system. Since previous attempts to remedy this problem have failed, it appears that a new sheller will be required.
3. The corn cob collecting and disposal system is totally inadequate. First of all, the present system does not hold all the cobs from one shelling which means that the overflow cobs spill onto the area grounds creating a problem in clean-up and general appearance. Secondly, the cobs are scooped by hand into jute bags which is time consuming and also creates an interim storage problem with the sacks. In addition, the entire cob bin is screened by hand to recover the shelled seed.
4. The inoperative air conditioners and dehumidifiers continue to be a serious problem. Without these units seed storage is seriously limited and quite ineffective. Considering the apparent inability to implement recommendations which pointed out the necessity for repairing these units, it appears that new units must be purchased.

   The genetic seed storage room is still inoperative;however, since the research unit has taken over one of the storage rooms, it appears that repair of this room will continue to be delayed. This type repair seems to pose problems which cannot be overcome by the current organization in view of the fact that this room has been inoperative for a number of years.

RECOMMENDATIONS - SAN PEDRO SULA

The Seed Center can significantly improve and strengthen their effec ness in the seed program through <u>immediate</u> improvements to existing facilities

as well as by acquiring additional equipment to up-grade their overall performance.

1. Continued efforts must be made to secure repair and maintenance for the air conditioners and dehumidifiers on hand. Even though attempts have been unsuccessful to date, this appears to be the only solution for providing adequate storage conditions until replacement units can be obtained.
2. Replace the thermostat on the heater-fan unit on the corn drier. This will eliminate the necessity for manual operation and will certainly stabilize the drying temperature.
3. Fabricate and install the dust-house system as outlined in MSU report TA 75-04 and according to personal instructions to Agronomo Torres.
4. Although it appears to be a most difficult task in view of the fact that previous attempts have been unproductive, work should be designed to complete repair on the genetic - stock cold room. Even though the research unit has taken one of the storage rooms it is very desirable to utilize this cold room for additional storage.
5. The equipment recommendations are considered to be the same as those made in MSU report, TA 75-04 (March, 1975 - Dr. A.H. Boyd). Timely acquisition of this equipment is very urgent.
6. A replacement corn sheller is urgently needed to eliminate excessive shelling loss. Specifications for a replacement sheller are as follows:

   One Corn Husker - Sheller

   Capacity - up to 400 bu. per hour

   Specifications and dimensions

Power Required	10-15 H.P.
Cylinder Speed	1000-1100 RPM
Dia. of Cylinder Shaft	1 7/16"
Diameter of Cob Pipe	8"
Maximum Length of Cob Pipe (total)	100'
Maximum Vertical Cob Pipe	45'
Height to Top of Ear Corn Hopper (without base)	2' - 8¼"
Overall Height	4' - 0"
Overall Width	3' - 2"
Overall Length	6' - 3"
Domestic Shipping Weight	640 lbs.
Lubrication	Sealed Ball Bearings

Order Spare Parts as Follows:

	Approximate Cost U.S. $
1-Pair Shelling Plates	$ 166.45
2-Each Camp Rings @ $11.70	23.40
2-Each Comb Bars @ $45.15	90.30
1-Corn Trough	87.50
1-Blower Housing Band	76.50

NOTE: Model 3-C Triumph Corn Husker-Sheller, or equivalent is recommended.

Approximate Cost - U.S. $2,900.00

Address: C.E. Ehrsam Company
300 N. Cedar
Abilene, Kansas 67410

7. The Cob-Collecting system must be re-modeled to eliminate time consuming hand labor currently used. Ideally, an elevated system such as a commercial cyclone dust collector or merely a large

dust house system as previously designed for the air and screen machine would greatly improve the cob collecting and disposal operation. Elevating this unit on support frames will enable trucks or trailers to drive beneath the system for loading access which would eliminate filling the jute bags with the cobs.

NOTE: A new sheller with adequate cob pipes will enable the cobs to be blown 100 ft. into stationary trailers (trucks) for disposal.

8. Logistical support must be improved. Vehicles (trucks) must be available to move seeds from contract producers to the Seed Center on a timely schedule. Thus, repair and maintenance of vehicles must be emphasized, and expendable supplies such as jute bags must be available as needed.

SUMMARY

The urgent emphasis on production and distribution of improved seed in Honduras as a result of the recent depletion of seed reserves (due to the 1974 hurricane and the 1975 drought), has created serious problems for the Seed Centers at Tegucigalpa and San Pedro Sula. These facilities were initially designed (1967) to handle projected seed production at quantities considerably lower than those now envisioned. This increased production is creating severe strains upon facilities and equipment which must be either adequately repaired and maintained or expanded to meet the current program output.

Some of the equipment has become seriously limited in efficiency through normal wear and tear and/or through lack of adequate repair and maintenance. Facilities are simply not adequate for handling increased quantities of seed according to the production schedule, ie., large quantities of seed of corn

and rice or beans and rice are being produced at the same time. It should be pointed out that these two Seed Centers were designed for moderate scale seed production, ie., somewhat similar to a Foundation Seed program. However, they are now faced with handling seed supplies on a relatively large scale for planting throughout Honduras.

In considering the current needs based upon the anticipated increase in seed production of the MAG, serious consideration should be given to the following points:

1. Is the existing situation of increased seed production simply unique this year due to the total loss of seed sources, or is it expected to exist yearly (or frequently)? Once the farmer-consumer re-supplies his seed source from the MAG program, will he in fact purchase yearly or will he revert to the traditional system of saving his own seed? This may be difficult to accurately determine; however, experience shows about a 20% yearly re-supply. Additionally, the BNF loan program may stimulate some yearly re-supply.
2. Secondly, it is extremely important for the GOH (MAG) to decide just what direction the Seed Program will take, that is, what will be its organization, responsibility and administrative support.

If the Program continues on its present course, that is, one where the GOH-MAG will produce and distribute seeds throughout Honduras to all consumers, then drastic and rapid measures are necessary to expand and up-date the current facilities. Additional equipment must purchased immediately and logistical support (sacks, repairs, vehicle maintenance) must become readily available. Otherwise, untimely harvesting, transportation, drying, processing, and storage will result in poor quality seed. Past experience of the Desarrural program bears out this fact.

A number of alternatives are suitable to overcome the immediate problems, and the decision must be made by the Seed Program personnel, supported of course at the administrative level of the MAG.

1. Repair, maintain and modify the existing equipment and facilities.
   (a) air conditioners, dehumidifiers, storage rooms, dust houses, germinators, drying units.
   (b) provide logistical support such as sacks and vehicle repair.
2. Expedite purchase of additional equipment to up-date operational efficiency - see MSU Report TA 75-04.
3. Modify drying systems to accommodate bulk rice or expand original sack-type unit.
4. Add a separate rice processing system at San Pedro Sula.

Any one of these alternatives requires immediate action. Already, production is exceeding daily operational out-put, and from experience we know that acquisition of new equipment requires 12 months or longer. Therefore, immediate on-site modifications are urgently needed as an interim measure to minimize problems created by increased production.

APPENDICES

APPENDIX I

ITINERARY AND CONTACTS
HONDURAS
OCTOBER 21 - NOVEMBER 3, 1975

Oct. 21 -	PM	Arrive Tegucigalpa
Oct. 22 -	AM	Visit MAG For Briefing Visit USAID/Honduras For Briefing
Oct. 22 -	PM	Tegucigalpa Seed Center - Review Complete Operation
Oct. 23 -	AM	Tegucigalpa Seed Center - Drying, Storage, Processing
	PM	Tegucigalpa Seed Center - Review Equipment Status and Equipment Recommendations
Oct. 24 -	AM	Choluteca - Rice Contract Production
	PM	La Lujosa Experiment Station - Research and Equipment
Oct. 25 -		Free - Report Analysis
Oct. 26 -		Free
Oct. 27 -	AM	San Pedro Sula - Travel
	PM	San Pedro Sula Seed Center - Review Complete Operation
Oct. 28 -	AM	San Pedro Sula Seed Center - Review Equipment Status
	PM	San Pedro Sula Seed Center - Review Equipment Recommendations
Oct. 29 -	AM	Guaymas Research Station - Rice and Corn Production
	PM	San Pedro Sula Seed Center - Review Operational Procedures and Equipment Status
Oct. 30 -	AM	Tegucigalpa - Travel
	PM	Tegucigalpa Seed Center - Review Operational Procedures and Equipment Status
Oct. 31 -	AM	Tegucigalpa Seed Center - Review Complete Analyses of Seed Production, Processing, Storage, and Distribution In Honduras
	PM	Tegucigalpa Seed Center - Review MAG/BNF Agreement and Seed Legislation
Nov. 1 -	AM	Escuela Agricola Pan Americana - Discuss Proposed Seed Technology Training Course
	PM	Escuela Agricola Pan Americana Program
Nov. 2 -		Free
Nov. 3 -		Depart For Guatemala Assignment

APPENDIX II

CONTACTS IN HONDURAS

Mr. James O. Bleidner, RDO
USAID/Honduras

Ing. Francisco Lupiac
Coordinator General de Servicios Agricolas

Ing. Otoniel Viera
Director Regional
Choluteca

Ing. Marco Tulio Castro
Jefe Division Desarrollo Agricola
Banco Nacional de Fomento

Agr. Rafael Diaz
Jefe Programa Semillas
Region

Ing. Jose Torres
Jefe Programa Semillas
Region Nor-Occidental

Agr. Oscar Aleman
Jefe Planta de Semillas
San Pedro Sula

Mr. Kermit Adams, Director
Escuela Agricola Pan Americana
El Zamorano

Agr. Victor Munoz
Acting Head - Agronomy Department
Escuela Agricola Pan Americana
El Zamorano

Mr. Joseph Courand, Administrator
Escuela Agricola Pan Americana
El Zamorano

APPENDIX III

PROCESSING RECORDS FOR BEANS - 2nd HARVEST - DANLI, 1974 (TEGUCIGALPA SEED CENTER)

Contractor	Variety	Date Harvested	Date Received	No. Sacks	Lot No.	QQ Received	% Moisture*	Date Processed
1. V. Palma	Desarrural	13-1-75	18-1-75	14	VP-1-74 B	28.95	16	13-5-75
2. R. Reyes	Desarrural	19-12-74	24-12-74	18	RR-I-74 B	41.08	15	7-7-75
	"	14-1-75	18-1-75	13	RR-II-74 B	29.93	16	13-5-75
3. O. Lanza	Desarrural	15-1-75	17-1-75	10	OL-1-74 B	21.18	16	27-1-75
	"	6-2-75	13-2-75	8	OL-2-74 B	15.42	17	17-5-75
4. R. Torres	Desarrural	10-2-75	13-2-75	7	RT-1-74 B	12.90	17	16-6-75
5. G. Blandon	Desarrural	4-2-75	17-2-75	21	GB-1-74 B	45.76	16	13-6-75
6. S. Mejia	Desarrural	5-2-75	17-2-75	13	IM-1-74 B	28.07	16	7-5-75
	"	19-2-75	27-2-75	14	SIM-2-74 B	30.87	18	---
7. S. Merlo	Desarrural	17-2-75	17-2-75	12	SM-1-74 B	26.86	16	7-5-75
8. S. Licona	Porrillo	14-2-75	17-2-75	5	SL-1-74 B	10.70	15	6-3-75
9. B. Alfaro	Porrillo	26-2-75	26-2-75	76	BA-1-74 B	168.87	18	3-3-75
	"	27-2-75	27-2-75	48	BA-2-74 B	106.18	18	7-3-75
10. G. Morsa	Desarrural	27-2-75	27-2-75	21	GM-1-74 B	38.09	18	16-5-75
	"	28-2-75	7-3-75	17	GM-2-74 B	35.10	17	14-5-75
11. L. Rodriquez	Desarrural	18-12-74	24-12-74	18	LR-1-74 B	42.72	16	4-6-75
	"	31-12-74	3-1-75	10	LR-2-74 B	23.57	18	9-1-75
12. A. Vinolel	Desarrural	19-12-74	24-12-74	20	AV-1-74 B	46.45	15	3-7-75
	"	3-1-75	8-1-75	19	AV-2-74 B	41.64	18	22-1-75
	"	7-1-75	11-1-75	30	AV-3-74 B	66.97	18	15-1-75
13. J. Avila	Desarrural	30-12-74	3-1-75	25	JCA-1-74-B	57.62	18	8-1-75
14. B. Zavola	Desarrural	30-12-74	3-1-75	8	BZ-1-74 B	18.86	18	13-1-75

APPENDIX III (cont.)

Contractor	Variety	Date Harvested	Date Received	No. Sacks	Lot No.	QQ Received	% Moisture*	Date Processed
15. O. Castellanos	Desarrural	20-12-74	24-12-74	7	OC-1-74 B	13.86	16	10-7-75
	"	31-12-74	3-1-75	11	OC-2-74 B	21.83	18	10-1-75
16. P. Zavala	Desarrural	4-1-75	7-1-75	52	PZ-1-74 B	117.22	19	1-4-75
17. J. Merlo	Desarrural	6-1-75	7-1-75	14	JM-1-74 B	28.41	19	16-5-75
18. S. Castellanos	Desarrural	27-12-74	8-1-75	10	SC-1-74 B	20.52	18	22-1-75
19. M. Zavala	Desarrural	2-1-75	8-1-75	6	MZ-1-74-B	14.41	18	23-1-75
20. N. Valerio	Desarrural	8-1-75	9-1-75	13	NV-1-74 B	27.58	18	11-6-75
21. M. Merlo	Desarrural	8-1-75	9-1-75	17	MM-1-74 B	42.53	18	11-2-75
22. O. Merlo	Desarrural	8-1-75	9-1-75	18	OM-1-74 B	49.20	18	12-5-75
23. F. Merlo	Desarrural	8-1-75	9-1-75	9	FM-1-74 B	19.00	18	16-5-75
24. E. Sosa	Desarrural	7-1-75	11-1-75	42	ES-1-74 B	96.74	18	15-1-75
25. R. Salgodo	Desarrural	2-1-75	13-1-75	10	RS-1-74 B	22.76	18	10-1-75
	"	13-1-75	15-1-75	70	RS-II-74 B	155.21	14	20-1-75
	"	13-1-75	17-1-75	10	RS-3-74 B	22.45	16	23-1-75
	"	21-1-75	22-1-75	76	RS-4-74 B	171.62	16	29-1-75
	"	10-2-75	13-2-75	25	RS-5-74 B	53.81	17	8-5-75
	"	10-2-75	13-2-75	25	RS-6-75 B	53.71	17	14-5-75
26. F. Ardon	Desarrural	23-12-74	24-12-74	7	FA-1-74 B	16.16	21	8-7-75
	"	14-1-75	17-1-75	4	FA-3-74 B	7.73	16	27-1-75
	"	31-12-74	3-1-75	4	FA-2-74 B	8.51	18	13-1-75
27. J. Ardon	Desarrural	14-1-75	17-1-75	4	JA-1-74 B	9.04	16	28-1-75
28. R. Ardon	Desarrural	20-12-74	24-12-74	8	RA-1-74 B	16.32	22	10-7-75
	"	14-1-75	17-1-75	24	RA-2-74 B	54.63	16	23-1-75
	"	15-1-75	17-1-75	7	RA-3-74 B	15.52	16	28-1-75

APPENDIX III (cont.)

Contractor	Variety	Date Harvested	Date Received	No. Sacks	Lot No.	QQ Received	% Moisture*	Date Processed
29. L. Castellanos	Desarrural	15-1-75	17-1-75	4	LC-1-74 B	7.90	16	28-1-75
30. J. Cesar Sosa	Desarrural	8-1-75	9-1-75	14	CAS-1-74 B	31.35	18	14-5-75
	"	14-1-75	17-1-75	11	CAS-2-74 B	27.40	16	27-1-75
31. L. Sosa	Desarrural	10-1-75	18-1-75	15	LS-1-74 B	35.11	16	9-5-75
32. M. Sosa	Desarrural	13-1-75	18-1-75	27	MS-1-74 B	61.33	18	13-1-75
	"	13-1-75	18-1-75	14	MS-2-74 B	42.53	16	12-5-75

*All Beans Dried to 12% Moisture

APPENDIX IV

PROCESSING RECORDS FOR BLUE BONNETT - 50 RICE - LA LUJOSA

CONTRACTOR	HARVEST DATE	DATE RECEIVED	NO. SACKS	QQ RECEIVED	LOT NO.	% MOISTURE*	PROCESSING DATE
La Lujosa	5-11-74	5-11-74	80	120.0	CCL-1-74 BB	12	5-4-75
	7-11-74	7-11-74	60	90.0	CCL-2-75 BB	14	9-4-75
	7-11-74	7-11-74	45	67.5	CCL-3-75 BB	12	10-4-75
	14-11-74	14-11-74	100	138.0	CCL-4-75 BB	12	8-4-75
	30- 4-74	30- 4-74	78	117.0	CCL-5-75 BB	14	4-6-75
	8- 4-75	8- 4-75	37	55.5	CCL-6-75 BB	14	5-6-75

*All Rice Dried To 12%

APPENDIX V

EXAMPLE RECORDS FOR EACH BEAN SEED LOT

	LOT NUMBERS				
	AV-1-74 B	AV-2-74 B	AV-3-74 B	RR-2-74 B	RA-3-74 B
Date Received	24-12-74	8-1-75	11-1-75	18-1-75	17-1-75
Date Processed	3- 7-75	22-1-75	15-1-75	13-5-75	28-1-75
Lbs. Received	4645	4164	6697	2993	1552
Amount Paid	1103.65	999.36	1559.06	718.32	361.30
% H_2O	15	18	18	16	16
% Dried	12	12	12	12	12
Lbs. @ 12%	4486	3880	6240	2856	1481
Lbs. Seed	3858	3400	4750	2100	950
Lbs. Grain	445	295	1453	706	287
Lbs. Inert	94	197	.48	58	138
Lbs. Excess/Loss	-89	+12	+11	+8	-106