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Improving Grain Storage and Marketing
in Colombia*



FOOD & FEED GRAIN INSTITUTE
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SUMMARY STATEMENT

The team spent three weeks in Colombia to study the design and operation of the modern grain silos, to make suggestions for improvement and to conduct a seminar for those involved in the operation and management of the silos. At the end of their tour, the team was requested to prepare a written report of observations and recommendations for improving grain storage and marketing in Colombia.

In general, the physical facilities are adequate and, upon completion in 1973 of the building program under the BID loan, will provide a network of modern grain elevators for the country as a whole. Additional receiving capacity is recommended at some of the silos, and more buying stations are recommended in areas of predominately small traditional farms. Additional research is needed to determine the requirements for safe storage under the humid tropical conditions at the lower elevations.

Inadequate utilization of the facilities is a major problem. The solution is not a simple one and probably will require (1) elimination of bottlenecks and reduction of waiting times for unloading at harvest time, (2) development of accurate and timely crop and market reports, (3) development of a public grain warehousing system, (4) checking and certification of weighing and grading equipment, (5) shift to handling on a comingle basis of grain accepted for custom conditioning, handling and storage, (6) development of a system for integrating grain merchandising and custom storage at the silos, and (7) application of systems analysis for optimizing grain inventories and distribution patterns through the entire silo network.

The selection, development and training of management personnel for the rapidly expanding number of modern grain silos is a major task. Accomplishment of the task will require (1) taking full advantage of the technical

services and training authorized by the BID loan, (2) short-run recruiting from other industries, (3) an expanded pre-service training program, (4) carefully planned on-the-job training, perhaps under the leadership of two or three qualified foreign silo managers, and (5) a comprehensive program of in-service training, including regular managers conferences, intensive short courses and other activities.

**OBSERVATIONS AND RECOMMENDATIONS FOR IMPROVING
GRAIN STORAGE AND MARKETING IN COLOMBIA**

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INTRODUCTION

This report has been prepared at the request of US AID and the Government of Colombia for written observations and recommendations following the visit to Colombia by Dr. Richard Phillips and Dr. Harry B. Pfof in November of 1970. The team members were given excellent cooperation during their stay and had the opportunity to examine many of the silo facilities and visit at length with officials of IDEMA, INAGRARIO, ALMACENAR and other organizations directly concerned with grain marketing and storage in Colombia.

Many of the observations and suggestions contained in the report were presented at a seminar in Bogota November 17 to 19, 1970, for those involved with silo operation and management. The seminar program and lecture notes used by the team are included as an appendix to the report.

The major recommendations contained in the report were presented orally to US AID officials in Bogota at the debriefing session prior to the team's departure for Manhattan. This report is intended to provide content and documentation to the oral recommendations. It is hoped that it will serve to stimulate action for solving the current problems in silo operation and management and to help bring about continued improvement in grain storage and marketing in Colombia.

SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

Physical Facilities

1. In general, the design, location, capacity and equipment of the new grain silos in Colombia are quite satisfactory and provide a basis for converting from handling in bags to bulk grain handling.
2. The existing harvesting equipment, five-ton trucks, rail cars and barges can be converted for bulk handling of grain at reasonable cost. Specific suggestions for making the conversions have been presented.
3. The equipment used for weighing, sampling and grading is satisfactory. This equipment tends to get out of proper adjustment, especially in tropical climates, and special care should be given to checking and calibrating the equipment.
4. The hoppers and other equipment for receiving grain may need to be increased in capacity at some of the silos. Electric truck hoists for automatic unloading of bulk grain can be installed at nominal cost. The platform truck dumps at the larger silos can be converted for unloading both rail cars and trucks in bulk.
5. The control panels and temperature reading equipment at the silos are quite satisfactory. Care must be taken to coordinate operations at the control panel with those in the silo. The calibration of the temperature reading equipment should be checked regularly.
6. The design of the elevating and conveying equipment in the silos is satisfactory. The chain drag conveyors used in most of the silos are efficient for the relatively short runs used. The belt conveyors in the port silos are efficient for the relatively long runs. Both are equipped with adequate dust collection systems. All conveyors require cleaning and maintenance, and this must be recognized as a part of the normal silo operation. The abrasion to downspouts caused by rice is common and can be corrected by welding an extra thickness of steel at the point of abrasion.
7. Both the cleaning equipment and the drying equipment at the silos are satisfactory if properly operated. Because of the method of rating cleaner capacity and the amount of foreign material included in grain received, silo managers in Colombia cannot expect the cleaners to operate at rated capacity. The dryers will operate at rated capacity with the recommended operating temperatures if the grain is rough cleaned before drying.
8. The silos are of good slip-form construction, but there may have been problems of adequate concrete compaction during construction of some early plants. The roof design needs to be modified for

the silos in areas of prolonged torrential rains. The design and capacity of the aeration equipment is satisfactory for the higher altitudes, but special study needs to be made of aeration in the very humid localities.

9. More buying stations are needed in areas of predominately small traditional farms. The small farmers cannot be expected to bring grain more than a few kilometers to market, and country silos in these areas cannot be operated efficiently unless supported by satellite buying stations.

Utilization of Capacity

1. For a number of reasons, inadequate utilization of silo capacity is a major problem in Colombia. Annual fixed costs are relatively high for modern grain silos, and if the utilization problem is not solved, the silos cannot stay in operation and repay the loans used to finance them.
2. It is believed that the problem of inadequate utilization of the silos can be solved if a number of changes are made in the organization and operation of the silos and if adequate supporting services are provided. Points 3 through 9 represent specific recommendations for correcting the causes of the under-utilization problem.
3. The annual handling volume at many of the silos is determined by the amount of grain that can be received during the relatively short harvest periods. We recommend that everything possible be done to eliminate bottlenecks and reduce waiting times in unloading so that a greater percentage of the harvest can be taken in at the silos.
4. In order to plan effective use of the silos, producers, handlers and processors must have accurate and timely reports on crop production, demand and prices. We recommend that priority be given to development of a modern crop reporting service within the Ministry of Agriculture.
5. Those in position to store their own grain at the silos need the assurance and protection of a public grain warehousing system and the convenience of negotiable warehouse receipts. We recommend that a public grain warehousing system be established in Colombia and suggest that the system used in the State of Kansas could serve as a model.
6. The trading of grain in bulk requires that buyer and seller have full confidence in the weight and grade. Because weighing and grading equipment can get out of adjustment quite easily, we recommend that an agency of weights and measures be given the responsibility for checking and certifying all weighing and grading equipment at the silos.

7. Silo utilization can be increased materially by shifting from an "identity-preserved" system to a "comingle system" for handling grain which is custom cleaned, dried and stored at the silos. In order to make this system possible, we recommend that for each class of grain, there be established a trading grade with standard discount scales for excessive moisture, foreign material and damage and that this system be used for buying and selling grain throughout the country.
8. Even though all other recommendations are implemented, we believe that effective utilization of the silos will not take place unless the functions of grain merchandising and custom storage are fully integrated. This can be accomplished in one of two ways: (1) full entry into grain merchandising by organizations now operating the silos or (2) lease or sale of the silos to grain merchandising organizations. Although they would require separation of the administration of the price support program from the marketing of grain through the silo network, neither of the alternatives is as drastic as it might sound. Suggestions are given in the report as to how either alternative might be accomplished by IDEMA, INAGRARIO and ALMACENAR and other private banks operating silos.
9. As more and more silos to be included in the total network are brought into operation, the over-all management of movements through the network will be increasingly important for effective utilization. We recommend that systems analysis be employed to determine optimum grain inventories and distribution patterns through the entire silo network.

Management and Managerial Development

1. Colombia has undertaken a mammoth task in the development of competent general managers, plant managers, grain managers, traffic managers and office managers for the silos to be added to the network each year through 1973. If the task is to be accomplished, silo management must be accepted as a fruitful career, and recruiting and training must be accelerated.
2. In order to create the necessary image of silo management, we recommend that salaries, opportunities for advancement and other rewards be made comparable to those of other industries in Colombia. We further recommend that the managers at each silo be given full administrative authority within policy guidelines established by the central office and be judged on the basis of performance achieved at the silo.
3. In order to meet the short-run shortage of qualified managerial personnel, we recommend that the best people be recruited from wherever they can, e.g., plant managers from grain processors, grain equipment manufacturers, engineering companies -- grain managers from grain handlers and processors -- traffic managers

from transportation companies or traffic departments of major industries -- office managers from accounting companies or accounting departments of major industries.

4. In order to meet the longer run needs and to supplement the backgrounds of those recruited in the short run, we recommend a broadened and accelerated training program. The specific recommendations for management training and development are included in points 5 through 8.
5. We recommend that every advantage be taken of the provisions for silo management development in the BID loan, including the immediate services of top foreign consultants in silo management and grain marketing, scholarships for selected managerial personnel for specific studies abroad, and in-country pre-service and in-service training programs.
6. We recommend that the IICA-CIRA pre-service training be extended to nine months and broadened to include four additional parallel specialities: (1) plant management, (2) grain management, (3) traffic management and (4) office management. The entrance requirements for the four additional specialities should include college degrees in the appropriate majors if possible.
7. We recommend that a program be established to maximize the value of on-the-job experience in subordinate positions at the grain silos. The program might include foreign trainer-managers at two or three model silos as well as promotions and other rewards to managers who are successful in training subordinates for positions of greater responsibility.
8. We recommend a comprehensive program of in-service training, including regular conferences, intensive short courses, self-study programs, group study activities, night classes, correspondence courses, leaves of absence for specialized study, scholarship programs and other activities.

OBSERVATIONS ON PHYSICAL FACILITIES

This section will deal with the design, construction, and operation of the present facilities which were observed at various elevators and grain storage facilities visited in Colombia. Due to the limited time which was available for these visits, not all phases of the elevator systems were checked. Also, this report will deal with those areas which appear to be problems and not with the many good points of the system or the good points of the operating procedures which appear to present no problems. This report will follow the course of grain through trucking and transportation, handling, and storage in its logical order; discussions within each subheading will follow design, construction, and operation, in that order.

Grain Transportation

Considerable time was spent discussing problems of bulk handling with both American and Colombian groups. At the present time almost all grain is transported in sacks from the time it leaves the farm until it reaches the ultimate processors and consumers. Considerable time was spent in discussing how the existing stake trucks can be modified by adding additional boards to make a grain-type truck bed and how chains or other stays can be added to the truck to prevent the sides from bulging when loaded with bulk material. These truck modifications will have to be made while handling grain in bulk from the farm to the elevator or from the elevator to the consumer.

Time was also spent with representatives of the railroad regarding the possibilities for modifying box cars for the bulk handling of grain. Engineers of the railroad are giving considerable thought to the matter

and will undoubtedly arrive at a successful and workable design soon whereby loading ports can be installed in the top of the cars and discharge hoppers in the bottom of the cars.

Weighing

Incoming or outgoing grain is being weighed on good standard automatic or truck scales. Because of the extreme climatic conditions, scale maintenance will be a difficult and important problem. Steps should be taken to check all scales for accuracy at frequent intervals (perhaps once a week) by checking a known weight load. Scales should be checked at least once per year by a good scale serviceman or scale manufacturer's personnel.

Sampling and Grading

All of the elevators visited have well-equipped grain grading laboratories. With the excellent program now existing for training personnel, the grading should be well taken care of. Extensive use is being made of fast moisture test devices, and it is recommended that two of these devices be checked against each other each day to make sure that the calibration is accurate. Since most elevators have one moisture tester at the dryer and one in the laboratory, this should be no problem.

Personnel in the dump pits should be trained to look for characteristics of grain as it is unloaded that might indicate that the grading sample would be incorrect. For instance, they should be trained to look for stones or other foreign materials in bags or substandard grain in the bottom of the truck.

Grain Receiving

In general, the receiving dump pits appear to be well designed for handling either bulk or bagged grain. However, the number of dump pits

appears inadequate at some of the installations, and during the rush of harvest season fairly long lines of trucks are probably queued up to wait for unloading. This represents an unnecessary cost to the entire operation. If it is found that trucks are waiting more than, say, one hour for unloading very frequently, consideration should be given to adding additional dump pits. This situation will be improved if a switch is made to bulk handling in trucks so that the truck can be unloaded in approximately 10 minutes rather than 30 minutes.

If a switch is made to bulk handling, it will be necessary to install some type of truck-lifting device, and probably the cheapest and best solution is to use one of the cable-type systems that are generally used in country elevators in the United States. The hydraulic-type hoists which are installed in two of the elevators owned by one of the banks are superior to the cable hoist in some respects but are more expensive. Also, the traffic flow is poorer with these hydraulic hoists because the truck cannot drive straight across the hoist but must back into a position on the dump pit.

Control Equipment

The control panels which are installed in some of the elevators are excellent for the purpose and allow one well-trained operator to supervise the flow of the grain into the elevator from one central location. The only suggestion here is that it might be necessary to add intercommunication or telephone circuits from the control panel to the dump pits or from the control panel to the distribution system at the top of the elevator. This would allow the central operator to more conveniently communicate with the men who are receiving grain, setting the flow, etc.

Conveying and Handling Equipment within Elevator

In general, the conveying equipment within the elevators is of good standard design and appears to be adequately sized. Most of it is of a type which is self-cleaning between runs of different types of grains. Some trouble has been experienced with wear in spouts, valves, etc., due to abrasion of grain against metal. This is a rather normal occurrence and one which is to be expected. It is almost impossible to prevent certain wear spots from occurring, and as they are repaired they should be replaced with heavier gauge material which will have a longer life. Also, consideration might be given to the use of laminated stainless steel which is available from Japanese sources; materials about 5 mm thick is probably desirable.

Since much of the grain being handled goes directly to human foods, it is desirable to prevent contamination between runs. Some trouble is being experienced with elevator boots, and the problems may be alleviated somewhat by using a floating boot design. On new installations it may be desirable to provide the belt take-up at the top pulley rather than the bottom.

Some troubles have been encountered due to repairs not being available when equipment is needed. It is imperative that when new equipment is ordered, particularly from abroad, that an adequate supply of repair parts such as sprockets, bearings, etc., be ordered along with the machine.

Cleaning Equipment

Some trouble apparently has been experienced in some of the elevators with cleaning equipment that did not have adequate capacity. Unfortunately, there are no good standards for defining the functional specifications for cleaning equipment. That is, there are no standards for efficiency of cleaners as related to throughput. The engineers responsible for writing

specifications for cleaning equipment should consult with the operating personnel and arrive at reasonable performance standards which will be asked of the equipment and required as a guarantee by the supplier.

Some of the cleaning equipment is subjected to very hard service in the tropical areas where moisture is a severe problem, and if grain arrives with a large amount of wet trash or mud, the operator will simply have to be trained to remove the screens and clean them as required.

If the grain is very wet, it probably should be given a rough cleaning before drying to improve the performance of the driers, and it should then be re-cleaned after drying when a better job of cleaning can be done before it is put into storage.

Some of the elevators are using very fine sieves on the lower screen and probably are putting too much cracked grain into the silos. This cracked grain will be very subject to mold and insect infestation and will also prevent good air movement when aerating or fumigating.

Drying

In general, the newer elevators appear to be equipped with adequate drier capacity. However, in some of the elevator installations it might have been better to have installed more and smaller driers in order to handle the wide variety of grains which must be dried simultaneously at the peak of harvest. This would justify some studies by industrial engineers and can probably be best done by using simulation techniques.

The drier capacity for small lots of grain is not good, and in many of the elevators it has been found necessary to dry small lots of grain in bags. This is a very laborious technique as it is presently done, and consideration might be given to installing some small batch-bin type driers

of, perhaps, 30-ton capacity per drier. These small bin-type driers will operate satisfactorily as small amounts of grain are added to the top.

The drying temperatures which are being used appear to be excellent and should result in a minimum of damage to the grains. This is particularly true for rice drying where the drying schedule is such that very few cracked kernels should result.

If grain is dried to 12 per cent before storage, this should be adequate for a considerable period of time.

Silos and Storage Facilities

Almost all of the elevator capacity is being built in the form of vertical hoppers, and most is of slip-form concrete construction. This conforms to the original recommendations by Weitz-Hettelsater Engineers. In general in the United States, it has been found that for long-term storage, from one harvest to the next or longer, it is much cheaper to use so-called flat storage. The cost per unit volume of flat storage in the United States is probably less than one-fourth the cost of vertical storage. It did seem that consideration should be given to investigating the economics of Colombian conditions to ascertain if more flat storage should be used in those elevators yet to be designed and erected.

Some trouble has been experienced with wall leakage in the slip-form concrete silos, but it is a little difficult to ascertain just what may have happened. However, the following suggestions might be considered:

- 1) In general in the United States, wall thickness of concrete silos is about 8 inches. This extra thickness provides a safety factor in case the concrete construction is a little below standard.
- 2) Concrete with a 28-day strength of 5,000 pounds is sometimes used. This provides for a more dense concrete than the 4,000 strength which is being used in some of the elevators now under construction.

- 3) In general, it is a common practice in the United States to provide only one layer of re-enforcing. Providing two layers of re-enforcing within a 7-inch thick wall probably adds difficulty in holding the re-enforcing in place and probably also makes it more difficult to tamp the concrete properly.

Some of the elevator operators were not familiar with the problem that can arise if a new elevator is loaded improperly the first time. They should be trained that it is necessary to keep the weight distributed over the entire elevator as it is first filled. For example, if all of the silos on one side of an elevator were loaded full on the first loading, the elevator may tip due to uneven settling of the footage and it is almost impossible to bring such an elevator back into vertical position.

Aeration and Thermocoupling Equipment

Much of the success of long-term storage of grain in the United States is due to developments which have taken place in the use of aeration and thermocouple equipment within the last 20 years. However, problems in tropical areas are severe and drastically revised procedures may have to be developed. At one installation the read-out instruments on bin thermocouples appeared to be operating improperly. Consideration should be given to the fact that electronic equipment in tropical areas is subject to rapid deterioration and may not give the service life that such equipment would have in a temperate climate. It may help to put any and all electronic equipment in air-conditioned rooms where both the temperature and humidity can be kept more normal. It is also recommended that a thermocouple cable be placed in a coil in a convenient location and that each day a temperature reading be taken inside this coil with a thermometer and then the read-out equipment be tested to see that it is working properly. Since this equipment is intended to detect temperature changes of one or two degrees which

would indicate the beginning of deterioration in the grain mass, it is absolutely necessary that this equipment be accurate.

Aeration of grain in a tropical area may be very hazardous. For instance, during the last six months of the year of 1963 at Gamarra, there was only one day when the 1 p.m. relative humidity fell below 70 per cent. This means that during this period there were only a few hours when aeration equipment could be used without raising the grain moisture above the normal safe preservation moisture. Under conditions approximating the most severe encountered in Colombia, it is very doubtful that it will ever be safe to use aeration as it is presently used in the United States. With the normal atmospheric conditions prevailing in the tropical climate, the equilibrium moisture content of grain tends to exceed 15 per cent when it is in contact with ambient air. This is too high a moisture to be stored safely under the high temperatures which exist in the tropics, for any period of time. One solution to this problem may be to watch the grain very carefully, and when the moisture content of the top layer exceeds about 14 per cent, it should be passed through the drier and again lowered to the 12 per cent moisture level. This practice will be unsatisfactory for rice, which will tend to crack with each drying and handling cycle. Here it may be necessary to dehumidify the aeration air in some manner, such as through the use of refrigeration equipment. Since the commercial storage of grain in tropical areas is not well developed, it should not be surprising if some grain is lost during the period when drying and storage practices for these severe climatic conditions are being worked out. Since most of the existing literature and research on grain drying and storage is applicable to northern temperature zone conditions, it may be necessary to carry out additional research in tropical conditions such as those existing in the lower elevations of Colombia.

Buying Stations for Small Farmers

A general problem which exists in Colombia and other similar countries is the problem of getting grain from small traditional farms to central elevators. It is not possible to move two sacks of grain by burro to a central elevator which is located 200 kilometers away. Consideration should be given to expanding greatly the number of buying points around the country so that the traditional farmer will be able to dispose of surplus grain in a reasonable manner. A small start has been made in this direction, but the possibility of a rapid expansion of the number of buying points should be carefully investigated. If it appears that worthwhile quantities of grain can be moved from surplus areas to centers of consumption, every effort should be made to develop this source of supply -- both to keep the elevators used to capacity and also to supply food to the urban areas. It will, of course, have the further advantage that it will offer a source of cash income to small farmers who may not now find a ready market for their surplus grain at reasonable prices.

Regardless of the marketing channels used, it is imperative that the grain be properly cared for before it leaves the farm, or if it is to be consumed on the farm, that it remain in satisfactory condition for food use. In areas of traditional agriculture it is generally found that only a small percentage of farm^{er's} production can move off the farm. That is, the family's requirements are almost equal to the total grain which can be produced on the farm. If 10 to 20 per cent of this grain production is lost through mold, insects, rodents, or other means, there is no surplus to move into market channels. Hence, there is a problem of helping the small farmer to improve the storage facilities at the farm level so that even the small surplus above the immediate needs of the family will not be lost but will be available for marketing and supply to the growing urban population.

OBSERVATIONS ON UTILIZATION OF FACILITIES

Effective utilization and turnover of the modern silo facilities appears to be a major problem in Colombia and one that will tend to worsen as the additional facilities in the long-range plan come into operation. The inventory of grain stored in November when the visits were made represented only about 25 per cent of the available bulk storage capacity at most locations and ranged to as little as 10 per cent of the capacity of the ALMACENAR silo at Cali. The present turnover of capacity in annual volumes of grain received, shipped, cleaned, and dried is correspondingly low at most of the modern silo facilities. This means that the actual total per-ton cost of handling, conditioning, and storage in the modern silos is considerably higher than in the existing facilities for handling bagged grain and several times as high as would be true if the modern facilities were fully utilized. If the utilization problem is not corrected, the privately owned silos, such as those of ALMACENAR, will have to be closed, and the IDEMA and INAGRARIO silos will not produce sufficient revenue to amortize the Interamerican Development Bank loan to Colombia.

Utilization and Operating Cost

The inverse relationship between utilization of capacity and operating cost in modern grain silos is direct and spectacular. These facilities are designed to handle large volumes of grain in bulk with a minimum of labor and other variable operating costs. However, the fixed costs for depreciation, interest, insurance, taxes, fixed maintenance, administration, and office expense represent a high portion of total annual operating costs. The total annual fixed cost for a 10,000-ton grain silo of the type in Colombia is in the order of U. S. \$135,000, for example.

This means that it costs about U.S. \$370 per day to own and maintain the silo, regardless of the volume of grain handled, conditioned and stored.

Fixed costs of this magnitude are not serious when spread over adequate handling volumes but are serious at low levels of utilization of

Exhibit 1. Illustration of Utilization Effect on Operating Cost

<u>Function</u>	<u>Allocation of Fixed Cost</u>		<u>Volume and Fixed Costs per Metric Ton</u>			
	<u>Percent</u>	<u>U. S. \$</u>	<u>Low Utilization</u>		<u>Adequate Utilization</u>	
			<u>Metric Tons</u>	<u>U.S. \$/MT</u>	<u>Metric Tons</u>	<u>U.S. \$/MT</u>
Handling	35	47,250	5,000	9.45	30,000	1.57
Cleaning	5	6,750	1,000	6.75	10,000	.68
Drying	10	13,500	1,000	13.50	10,000	1.35
Storage:	50	67,500				
Inventory			<u>/1,000/</u>	<u>/67.50/</u>	<u>/6,000/</u>	<u>/11.25/</u>
<u>Ton-Months</u>			<u>12,000</u>	<u>5.63</u>	<u>72,000</u>	<u>.94</u>
<u>Total</u>	100	135,000		35.33		4.54

the grain silos. This is illustrated in Exhibit 1, assuming the allocation of fixed costs to handling, cleaning, drying, and storage shown in the first two columns. At low utilization -- 5,000 tons of grain handled, 1,000 tons cleaned, 1,000 tons dried and an average storage inventory of 1,000 tons for the year (12,000 ton-months of storage) -- the fixed cost for the four operations totals U. S. \$35.33 per ton handled and ton-month of storage. With effective utilization of the silo -- 30,000 tons handled, 10,000 tons cleaned, 10,000 tons dried and average storage inventory of 6,000 tons -- the combined fixed cost is only U. S. \$4.54 per ton handled and ton-month of storage.

The annual tonnages shown for adequate utilization of a 10,000-ton silo are not unreasonable for Colombia. They represent 60 per cent utilization of storage capacity and a handling turnover ratio of 3 to 1.

Assuming effective handling capacities of 50 tons per hour for receiving and shipping and 25 tons per hour for cleaning and drying, they mean operating for 600 hours per year in receiving and shipping and 400 hours per year for cleaning and drying. Rates of utilization comparable to this would appear to be minimum desirable goals for each of the modern country and terminal grain silos in Colombia. Higher rates of utilization should be possible for the silos in more developed production areas such as Espinal. In the above example, if the annual volumes handled, cleaned, and dried were doubled and storage utilization raised to 80 per cent, the combined per-ton fixed cost would drop to U. S. \$2.51. Obviously, this would result in a very profitable silo operation.

Reasons for Utilization Problems in Colombia

There appear to be a number of reasons for the current problems of low utilization of silo capacity in Colombia. They include:

1. The biennial harvesting pattern for the major grains.
2. Lags in the rate of increase in domestic grain production.
3. Only partial completion of the grain silo system.
4. Separation of silo services from grain merchandising.
5. Lack of bulk handling on a true commingle basis.
6. Incomplete supporting public services.
7. Excessive waiting periods for unloading and loading.

Not all of these factors causing low silo utilization are under the control of those responsible for planning and operating the grain silos. Some must be taken as given and operations adjusted accordingly. Others are under the control of management and must be given careful attention if the silo system is to function efficiently in Colombia.

1. The biennial harvesting pattern lowers the requirement for grain storage space and makes it more difficult to achieve high utilization of storage capacity. Assuming that the major portion of the harvest is com-

pleted in a one-month period, the maximum requirement for seasonal storage is approximately 3-months' supply rather than approximately 11-months' supply as is true in the United States and other countries characterized by annual harvesting patterns. It means that if the capacity is filled only once each year, the maximum utilization of capacity for seasonal storage is about 25 per cent rather than about 50 per cent. It means that the annual turnover of the storage capacity must be in excess of two if capacity is to be utilized in excess of 50 percent. It means that the silos must be operated more as "working houses" than as "storage houses," so that annual handling volumes are several times the total storage capacity of the silos. In general, the silos in Colombia are designed for this kind of operation; the problem is one of finding ways of increasing handling volume and the annual rate of turnover of silo capacity.

It would be possible to increase the utilization of present and planned silo storage capacity in Colombia by using the silos to store grain reserves for leveling out several-year cyclic fluctuations in grain production and prices. This does not seem to be a practical solution, however. In the first place, the increases in production are lagging behind increases in demand, so that the chances of building grain reserves in Colombia are very slim for at least the next five years. In the second place, long-term storage is much more expensive in silos than in flat structures for bulk storage. If and when Colombia needs capacity for storing grain reserves, it will be much more efficient to convert existing bag warehouses to bulk storage than to use the grain silos for this purpose.

It appears that the only practical solution is to increase handling volumes and rate of turnover of the silo storage capacity.

2. Lags in the rate of increase in domestic production add to the problems of achieving effective utilization of the grain silos. Some of those visited feel that Colombia already has excess silo capacity in view of this lag in production and that completion of the planned silos will aggravate the problem still more. We do not share this view because Colombia badly needs the network of modern grain silos to bring about efficient and orderly marketing of present grain production and to provide market incentive for increased production. However, a much larger percentage of total production must be channeled through the silos than would be true if for example, grain production were increasing at the rate of 10 per cent per year. Certainly ways must be found for channeling a much larger percentage of the production through the silos than is now true.

The lag in increased production indicates that Colombia will have to rely on imports of both wheat and feed grains to satisfy deficits in domestic supply-demand balances for the next several years. This means that the port elevators will need to serve primarily as importing facilities for some time, even though later they may serve as exporting facilities. Likewise, several of the terminal elevators which later may serve as assembly and merchandising houses for domestic grain will first serve as distribution houses for imported as well as domestic grain. Most of the planned port and terminal elevators are designed so that "flows can be reversed," but the management problems of maintaining effective utilization of the facilities will become quite different as the shifts take place.

3. The present only partial completion of the planned grain silo system aggravates the utilization problem in the existing silos because they cannot be operated as part of a total silo network. Only when the system is completed will it be possible to ship all grain in bulk directly from port silos through one or more terminal distribution silos and on to processors or to ship the grain in bulk from country silos through one or more terminal assembly silos on to processors or consumption points. At that time often the same lot of grain will pass through several silos in the network, adding to the volume and operating efficiency of each as it does. Movements, conditioning, and storage of grain can be managed systematically through the entire network to improve the time, form, and place utility of the product to all concerned.

On the other hand, completion of the silo network alone will not solve the silo utilization problem in Colombia. In fact, the job of systematic management for effective utilization of the entire network will be much more complex than that of the present individual silos. The restrictions now limiting utilization of the individual silos will grow from molehills to mountains when the complete network is in operation. Each additional 10,000 tons of silo capacity adds about U. S. \$135,000 and an additional 100,000 tons adds some U. S. \$1.35 million of fixed operating costs to be covered each year. Operating problems at one or two silos can adversely affect the utilization of the entire network. The utilization problem is not one which will take care of itself as the silo construction program is completed; rather, it is one that will grow into insurmountable proportions if not solved before the entire network is in operation.

4. Separation of silo services from grain merchandising is one of the basic reasons for the silo utilization problem. In most countries grain silos are operated by grain merchandisers who buy and sell, condition and store grain for their own account as well as provide custom cleaning, drying, storage, and shipping of grain for others. The merchandising operation and the custom services are highly complementary because custom-stored grain later can be purchased directly by the silo operator. Such grain may be resold to a third party and placed in custom storage at the same silo by him. Thus, utilization of the silo is increased by additional opportunities for custom storage and handling as well as by the storage and handling of the inventories owned by the silo operator in connection with his merchandising operation.

A less obvious but equally important reason for complementarity between grain merchandising and custom services by the silos is the added opportunity to enhance grain values by conditioning and blending. The silo operator must protect the quantity and quality of grain specified on all outstanding custom storage receipts, but within the grade tolerances he can trade his own supplies for those under custom storage. By doing so, he can obtain specific grade characteristics most useful for conditioning and blending to enhance the market value of his own inventory. The added silo income may average as much as one dollar for each ton of grain inventory exchanged in this manner.

Under the present system in Colombia, there is very little opportunity to capitalize upon the complementary relationship between merchandising and custom services to increase the utilization of the grain silos. The silos owned by ALMACENAR and other private banks provide only custom services and do no grain merchandising; the volume is further restricted

by limiting the custom services at these silos primarily to grain which is financed by the bank involved. Basically the same is true of the INAGRARIO silos except that the producer may choose to deliver grain stored in these silos to IDEMA under the price support program rather than to sell it to private merchandisers. The IDEMA silos are used for conditioning, storage, and merchandising of grain delivered under the price support program (and imported grain) and, to a limited extent, for providing custom services for processors and others in the private grain trade. They are not used for merchandising grain which is sold by the producers at market prices. Thus, the utilization of the grain silos operated by INAGRARIO, ALMACENAR and other financing institutions depends upon the volume of grain inventories financed by the institution involved, while the utilization of the IDEMA silos depends upon the volume of grain delivered under the price support program. The system is such that artificial walls have been created to keep grain which does not meet these restrictive conditions from moving through the network of modern grain silos in Colombia. The results are low levels of utilization and high operating costs at the silos and high marketing costs because much of the grain bypasses the silos and flows to market in bags through the old system.

5. The lack of bulk handling on a true commingle basis also contributes to the utilization problem at the silos. For the most part, the custom handling, conditioning and storage services of the silos in Colombia are provided on an "identity-preserved" basis. Under this system, the identity of the owner's grain is maintained, and he is delivered the same lot of grain as that he originally provided to the silo for conditioning and storage. The grain owned by one party is not mixed with that owned by another party.

In contrast, if the grain were handled on a commingle basis at the silos, there would be no attempt to keep the grain owned by one party separate from that owned by others. Instead, the grain is graded as received for custom handling, conditioning and storage, and each owner is given a certificate for the type, quantity and grade to which he is entitled. Grain which contains excessive foreign material and moisture is converted to the equivalent weight of clean dry grain by applying established formulas. From then on the grain of different owners is blended together, and handling and binning is done by quality rather than by owner. When an individual owner calls for delivery, the quantity, type and grade specified on his certificate is supplied by drawing the proper amount from one or more bins in the silo. He gets the quality and quantity of grain to which he is entitled, but only by accident will it be the same lot of grain which he delivered to the silo.

The potential utilization of the silo capacity is much greater when the grain is handled on the commingle basis. Bins can be filled to capacity with grain of uniform quality even though that in a given bin may represent lots delivered by ten different owners. Blending can be used ahead of the cleaner and dryer to increase the capacity and quality of cleaning and drying. Stocks can be rotated on a "first-in, first-out" basis to improve the storability of the remaining grain at a given time, thus lengthening the period of storage without danger of quality deterioration. The owner is insured of receiving the grade specified on his certificate and can plan his processing or merchandising operation accordingly. This means that once they have come to understand and accept the commingle system, owners of grain will provide increased volumes for custom handling, conditioning and storage at the silos.

6. Incomplete supporting public services further add to the problem of getting effective utilization of the grain silos. The essential services needed to support a modern grain marketing system are (a) standardization and grading, (b) crop and market reporting, (c) warehousing administration and (d) supervision of weights and measures.

a. Excellent progress is being made in standardization and grading. Official standards are being applied and grain grading laboratories are being well equipped. Qualified inspectors are being trained at an increasing rate. An aggressive educational program with producers and handlers is under way. Programs have been initiated for spot checking and other centralized control to insure the accuracy of grades established throughout the country. The current resistance to trading on the basis of official grades will disappear as producers and handlers become more familiar with the advantages. Assuming no let-up in the present plans and programs, the standardization and grading services should be adequate to support effective silo utilization within the next year or two.

b. There is need for a much improved and expanded system of crop and market reporting, however. It appears that relatively little progress has been made in recent years toward developing timely and accurate reports on grain plantings, crop conditions, yields, production, demand conditions, volumes of trading and market prices by crop and area of the country. Such information is essential for intelligent planning and conduct of marketing operations at all levels. Until accurate and timely market reports are available, neither producers, handlers nor public agencies will be in position to make maximum use of the grain silo system.

c. At present, Colombia does not have public grain warehousing legislation and administration to support a uniform program of grain storage under negotiable warehouse receipt. The agencies and organizations operating grain silos issue their own storage certificates, but these are not used as a basis for buying and selling the stored grain. There is no single public agency responsible for licensing and supervising silos as certified public grain warehouses. For this reason grain does not move into the silos for storage unless it is to be used as security for financing or is delivered to the Government under the price support program.

d. No single agency in Colombia is responsible for supervision of weights and measures at the grain silos. Each organization operating grain silos is responsible for checking and maintaining the calibration of scales, grading and inspection equipment and other equipment used in merchandising and handling grain. Producers and handlers alike would be assured of fair treatment and true grain values if the inspection and certification of such equipment were the responsibility of an independent Government agency.

7. The utilization of some of the grain silos is further limited by excessive waiting periods for unloading and loading. When the harvest in the area served by a silo moves during a limited period of time, the total volume of that crop which will move through the silo is determined by the speed with which the grain can be unloaded during the critical harvest period. The annual volume that can move through a terminal distribution silo may be determined by the rate at which grain can be received and shipped during critical periods of demand. Likewise, the volume that can move through a given port silo depends upon the rate at which grain can be unloaded and loaded out.

The solution to this problem requires that there be adequate receiving and shipping capacity at the silo and that the silo be operated in a way that will realize the full potential of this capacity. The need for adequate unloading and loading capacity at the silos is discussed in the section "Observations on Facilities." The planning of operations to realize the full potential of unloading and loading capacity involves the elimination of all bottlenecks so that trucks and other transport equipment can be moved in and out without delay. The processes of arrival, checking in, weighing, sampling, dumping, reweighing, flow of paper work and checking out should be arranged conveniently so there are no hold-ups. Loads requiring special handling should be pulled out of line so that they can be given the required attention without holding up other loads. If necessary, the hours of operation should be extended during the peak periods of grain movement. By doing these things, the peak daily volumes of receipts and shipments can be brought up very close to the rated unloading and loading capacities of the silo.

Recommendations for Improving Silo Utilization

The recommendations for improving the utilization of the grain silos in Colombia are based upon the problems related to effective utilization noted above. The recommendations are:

1. Elimination of delays in unloading and loading at the silos.
2. Development of improved crop and market reports.
3. Development of a public grain warehousing system.
4. Inspection of weighing and grading equipment.
5. Handling of bulk grain on a commingle basis.
6. Development of a system for integrating grain merchandising with custom storage and conditioning at the silos.
7. Systems analysis and planning to coordinate grain movements through the complete silo network.

These seven recommendations for solving the problems causing low utilization of the silos are discussed briefly in this section.

1. Elimination of delays in unloading and loading at the silos.

Assuming that all the silos will have adequate unloading and loading capacity, the reduction of waiting times after full conversion to bulk handling requires the elimination of bottlenecks and delays. Industrial engineering studies of flow patterns and the sequence of activities in the unloading and loading processes are recommended at key prototype silos. The studies should produce practical flow systems for eliminating bottlenecks and delays. After the studies are completed, a series of conferences can be held for silo managers to assist them in applying the results at their respective silos. It should be possible to initiate this kind of program at an early date so that the results are available to facilitate the complete conversion to receiving and shipping in bulk.

2. Development of improved crop and market reports. The development of accurate, timely and uniform reports on grain plantings, crop conditions, yields, production, demand conditions, volume of trading and market prices should be the responsibility of a specialized agency in the Ministry of Agriculture. It requires an organized system for crop and market reporting by province, based on sound sampling procedures and statistical techniques. It requires a system for reconciling the information and preparing accurate current reports at the national level. It requires a system for disseminating the information through press, radio, and other media to grain producers, handlers and processors. A crop and market reporting agency to perform these functions is essential to support orderly marketing and effective utilization of the grain silos. It is recommended that priority be given to the development of such an agency and the implementation of the crop and market reporting program.

3. Development of a public grain warehousing system. A public grain warehousing system is urgently needed to serve producers, handlers and processors who have grain to store and to improve the utilization of the grain silo system. The requirements for implementation of such a system are:

- a. Enactment of legislation providing for public grain warehousing and establishing the requirements for bonding, licensing and supervision of silos serving as public grain warehouses.
- b. Creation of an agency for administering the program and supervising the licensed warehouses.
- c. Establishment of a standard negotiable warehouse receipt with quantity based on certified weights and quality based on the official grain grade standards.
- d. Regulation of storage and conditioning to insure equitable treatment to all who desire to store grain in the licensed public grain warehouses.
- e. Education programs to inform producers, handlers, processors and financial institutions of the licensed public warehousing and its advantages.

The public grain warehousing legislation and administration in Kansas might be used as a model for Colombia.

4. Inspection of weighing and grading equipment. In order for the marketing of grain in bulk to develop successfully, producers, handlers and processors must have full confidence in the weights and grades established at the grain silos. Since weighing and grading equipment can get out of proper calibration quite easily, especially in tropical climates, an organized system is needed for inspecting and certifying the equipment. We recommend that an official agency be established with power to make unannounced visits to check and certify the weighing and grading equipment at all grain silos and to order immediate repair or replacement of equipment which does not meet minimum standards or cannot be calibrated properly.

5. Handling of bulk grain on a commingle basis. We recommend that every effort be made to convert all silo operations from an identity-preserved basis to a commingle basis as soon as possible. This development will be facilitated by implementation of a public grain warehousing system and inspection of weighing and grading equipment. However, in order for commingling to be generally accepted and to work effectively, it also will be necessary to establish a single trading grade for each major class of grain. The Specifications for the trading grade should be based on the official grain grade standards but do not have to correspond to the exact specifications of a given numerical grade, such as No. 2. Whatever the specifications, they should be known and understood by all parties concerned so that price bids and offers can be based directly upon the trading grade. Standard discount scales should be established for moisture, foreign material and damaged kernels in excess of the trading grade standards.

In order to establish the trading grade, we suggest first a research study to determine the most practical and acceptable standards for the trading grade for each class and type of grain, together with the appropriate discount scales for excessive moisture, foreign material and damage. When the results of the study are available, we would suggest a series of seminars with representatives of producers, handlers, processors, silo operators, government agencies and others concerned. Following the seminars, a committee of key people representing those concerned might be selected to develop plans for initiating merchandising on the basis of the trading grade. If the groundwork has been done effectively, the actual implementation should have the support of the private trade as well as the government agencies.

The transition to handling grain on a commingle basis at the silos should not be difficult once the trading grade is established for merchandising and the negotiable warehouse receipt is established for custom storage. The scale ticket and the grade certificate define the grain for purposes of storage as well as for purposes of buying and selling. Once the weight and quality of individual lots of grain have been established, there is no reason for preserving the identity of different lots of the same quality, no matter how many owners are involved. Everyone relies on the weight and grade shown on his certificate and knows he will be delivered grain of these specifications. No one cares whether they will be the original kernels or different kernels of the same quantity and quality.

6. Developing a system for integrating grain merchandising custom storage at the silos. The integration of grain merchandising with custom storage will require rather drastic changes in the existing concepts of silo ownership and operation in Colombia. However, such integration would make a major impact on improved utilization and lower operating costs at the silos. We are of the opinion that the integration is the only way to insure effective utilization, even if all other recommendations are implemented. If the other recommendations are implemented, effective integration of grain merchandising with custom conditioning and storage services should insure near maximum utilization of the silos.

There are two basic ways of integrating grain merchandising and custom services at the silos. One is complete entry into grain merchandising by the agencies and organizations which operate the silos. The other is to sell or lease the silos to grain merchandising organizations.

Either route involves a major departure from present plans and concepts and may not be acceptable. However, if a major departure is not made soon, bankruptcy of the silo operations may force such a departure in the future.

Let us consider the alternatives for integration open to the different organizations and agencies operating modern grain silos in Colombia. The terminal silos operated by ALMACENAR and other commercial banks are losing money because of under-utilization. Implementation of a public warehousing system would improve utilization of these silos but probably not enough to make them profitable for several years. ALMACENAR could increase grain handling and storage volume at the silos by entering the trade as a major grain merchandiser. They then would buy grain at market prices from producers, handlers, country silos and other sources at harvest, condition and store it for their own account at the silos, and sell it throughout the year to processors and other outlets. They also would condition and store grain owned by processors and others on a custom basis, regardless of whether or not the grain is financed by the bank. If ALMACENAR could hire a sufficient number of skilled merchandisers, the addition of grain merchandising should make the silos quite profitable to them.

The other alternative for achieving the integration and storage at the ALAMACENAR and other commercial bank silos is to sell or lease these silos to experienced grain merchandising companies such as Cargill, Continental and Bunge. The grain company would then use the silos for merchandising and for providing custom conditioning and storage services. The bank would continue to finance grain stored in the silo, using the official warehouse receipt as collateral. This would include merchandising inventories owned by the grain company operating the silo as well

as grain stored at the silo under warehouse receipt by processors, handlers and producers.

The same basic set of alternatives for achieving integration of grain merchandising and custom services is available to INAGRARIO. If concepts and authorizations were changed, INAGRARIO could enter the trade as a major publicly owned grain merchandiser at the country silo level, buying grain from producers at prevailing market prices, handling it through the silos and selling it to processors in the area as well as to handlers and merchandisers at major consumption points. Grain would be conditioned and stored on a custom basis for producers at the silos, regardless of whether the grain is financed by INAGRARIO. Alternatively, the INAGRARIO silos could be sold or leased to farmers' grain cooperatives and private companies which would conduct grain merchandising at the country silo level. They would provide custom conditioning and storage for producers and producer groups, regardless of how the grain is financed. INAGRARIO would extend financing on the basis of the warehouse receipts, including merchandising inventories owned by farmers' cooperatives operating the silos.

The alternatives for bringing about effective integration of grain merchandising and custom services at the IDEMA silos are somewhat different because they now are used for merchandising imported grain and grain delivered under the price support program. If a public grain warehousing system were established, it would be relatively easy to provide custom handling, conditioning and storage services to all interested parties under the present IDEMA structure. The challenge in extending operations for effective utilization of the IDEMA silos lies in finding a way for integrating the merchandising of free market grain with that of merchandising grain delivered under the price support program. In this case, the integration could be

achieved by empowering IDEMA to buy and sell grain at free market prices as well as at support levels or by leasing or selling the IDEMA silos to major grain merchandising companies. Either alternative would involve a rather clear separation of goals and policies for price support programs from those for effective grain marketing programs.

If IDEMA were empowered to buy and sell grain at free market prices as well as at price support levels, the agency would become the major grain merchandiser in the country. The division of IDEMA operating the silos would be interested in efficient merchandising, marketing and distribution rather than in administering the price support program. The IDEMA division administering the price support program would be interested in regulating production and prices and not in marketing efficiency as such. The merchandising division operating the silos would buy grain from producers, handlers and importers, condition and store it and ship it to processors, handlers and exporters. Purchases would be made at market prices except when these prices fall below support levels. In such case, the price support division would authorize the purchase at support prices. Sale would be made at domestic market prices except when the wholesale market prices fall below support levels, in which case formula prices specified by the price support division would govern selling prices. The merchandising division operating the silos would provide custom conditioning, handling and storage at specified rates under the regulation of the public warehousing administration. Together, the complete merchandising and custom services operations would insure effective utilization of the silos.

If the IDEMA silos were leased or sold to a number of major merchandising companies such as Cargill and Continental, these companies would become major domestic merchandisers and would offer the custom services

under the public warehousing administration. IDEMA would become a major user of their services at times and places where major deliveries are made under the price support program. If the port silos also were leased to the merchandising companies, the balance between the world importing price and the domestic selling price would be collected by IDEMA at the import point from the merchandising companies authorized to make the import. IDEMA would govern the importation and distribution of imported grain and collect the import margin but would not have to take title nor handle the grain. At major production points, IDEMA might retain ownership to some of the existing bag warehouses and convert them for longer term bulk storage of grain reserves, hiring the silo operating companies to fill and empty them as necessary for effective management of the grain reserves.

This latter alternative is the one followed by most major grain countries in the world. For example, the principal terminal and port silos in Argentina are owned by the government but leased to Cargill, Bunge, Continental, farmers' grain cooperatives and other merchandisers on long-term leases which guarantee amortization of the loans under which the silos were financed. A government agency owns bulk flat storage structures called underground silos in which grain reserves acquired under the price support program are stored. Shorter term stocks owned by the government are stored under warehouse receipt by the companies operating the silos. The program in the United States is similar except that the government agency which owns and manages the grain reserves, Commodity Credit Corporation, owns very few silos. The policy of the CCC has been to provide incentives for private merchandisers to build more silos when needed for storage of Government grain and, whenever possible, to sell outright to private merchandisers those facilities which it has been necessary for CCC to build. The CCC

is a major customer for the custom services provided by the silo operators under supervision of the public warehousing administration.

We recommend strongly that serious thought and study be given to the alternatives for integrating merchandising and custom services at all modern grain silos in Colombia. We very much doubt that effective utilization of the grain silos can be achieved through half-way measures. Some system for fully integrating merchandising operations with custom services for conditioning, handling and storage is needed for efficient operations at the grain silos and efficient and orderly grain marketing for the country as a whole.

7. Systems analysis and planning to coordinate grain movements through the complete silo network. As more and more silos to be included in the total network are completed and brought into operation, over-all planning and management of movements through the network will become increasingly important. Day-to-day operating decisions at each silo will need to be coordinated so that the entire network functions efficiently. The planning of shipment patterns, levels and locations of grain inventories, price relationships, and other operating decisions must reflect conditions throughout the country.

The modern procedure for achieving this over-all coordination and planning is called systems analysis. Practical economic models are developed to link the individual silos and represent the entire network. Information on production, prices, demand, etc., is fed into the models for determining inventory and distribution patterns and time flows for least cost and optimum marketing efficiency.

When the complete system of grain accounting at the silos becomes operational and the full crop and price reporting system is developed,

application of systems analysis and planning will be practical in Colombia. In order to be ready, the development and testing of the systems models should be initiated early enough to insure completion when they are needed. The model development and systems design, the grain accounting and the crop and market reports all should be coordinated with the construction program for the grain silos.

As with all other phases of grain silo management, successful application of systems analysis requires a well-trained staff, and the training and development of people is as important as the design and construction of facilities and operating models. The planning for training of a core staff should be incorporated with plans for development and testing of the systems models.

OBSERVATIONS ON MANAGEMENT AND MANAGERIAL DEVELOPMENT

The importance of capable and well-trained people for positions of responsibility in the operation and management of the grain silos cannot be over-emphasized. As the conversion is made from handling and warehousing in bags to bulk handling on the basis of weight and grade through the network of modern grain silos, the demands for competent silo management will increase sharply. The specific demands for managerial personnel at each of the major grain silos will include the following:

1. plant management, including the operation and maintenance of the mechanical and electrical systems at the silos for weighing, receiving, unloading, elevating, conveying, dust collection, cleaning, drying, blending, binning, reading temperatures, aerating, fumigating, loading and shipping.
2. grain management, including supervision of grain merchandising and custom service operations, grading and pricing, formulating, blending, cleaning, drying and binning instructions, maintenance of quality in storage, establishing blending formulas for making up shipments and issuing shipment orders.
3. traffic management, including the selection, routing, scheduling and negotiation of transport equipment, supervision of weighing and sealing of loads, filing and negotiating claims for damage in transit, handling of demurrage charges and general supervision of the flows of grain to and from the silo.
4. office management, including supervision of the flow of papers and the entire grain accounting system, supervision of financial transactions and settlement with customers, issuing and cancelling of warehouse receipts and preparation of grain and financial reports of current transactions.
5. general management, with administrative responsibility for all four of the above areas as well as matters of personnel, customer relations, market research and development and planning, organization, direction, coordination and control of the entire silo operation.

The success of the silo system and the profitability of the silo operation depend directly upon how effectively these specialized areas of silo management

are carried out. By the end of 1973 when the entire silo network is completed, the combined storage capacity will be in excess of 200,000 metric tons and the total annual fixed cost of owning and maintaining the silos in excess of U. S. \$2.7 million. The only way that this cost can be recovered is by utilizing the silos to handle large volumes of grain efficiently and without costly management mistakes. The responsibility rests directly upon the shoulders of the people in charge of operations at each of the grain silos.

Colombia has undertaken a major task of "pulling itself up by its own bootstraps" in selecting and training the management staffs to direct the operations of two new large silos and three new country silos each year through 1973. Until recently, IDEMA and Colombia as a whole have had very little experience in the operation and management of modern grain silos. Both the conversion from bag to bulk handling and the conversion from trading on the basis of subjective examination to trading on the basis of weight and grade are in the early stages of implementation. Under these circumstances, skill in silo management cannot be developed overnight. Even with the most careful selection of capable candidates and the best of preparatory training, skillful silo management requires years of carefully directed practical experience. Colombia has a very limited base of experienced silo managers upon which to draw and faces the task of staffing at least 8 new major silos and 14 new country silos by the end of 1973. The challenge is great if not overwhelming, and a comprehensive program of training and development is a must if the challenge is to be met.

Management Assistance and Training under the BID Loan

The need for training and development of people for management of

the grain silos is recognized in the terms of the loan by the Banco Interamericano de Desarrollo to Colombia. The loan provides funds for foreign consultants and for management training as well as for the construction of the silos. The consultation and management training programs are as important as the silo construction program and should have the same administrative supervision to insure that they proceed on schedule.

We understand that the terms of the BID loan specifically provide for two foreign consultants to be in Colombia over the period of the silo construction program; one of the consultants is to be a specialist in silo management and operation and the other is to be a specialist in agricultural economics and grain marketing. We believe that the services of top-level consultants in these two fields are essential to the success of the silo program in Colombia. If the two consultants have not yet been obtained, we urge that immediate steps be taken to get them on the job and to make maximum use of their services in planning and conducting the total training program in silo management.

We have not had a chance to review the specific provisions of the BID loan with respect to scholarships for graduate work in silo management in foreign countries. We believe that a limited number of such scholarships are important for those who will be in key management positions. The selection of the candidates for the scholarships and the selection of the graduate training to be given must be given careful consideration to insure the best possible use of resources for the challenging job of silo management ahead. It will be of even greater importance to lay careful plans for effective utilization of these people upon their return to Colombia. The knowledge and skills to be acquired by these few people must be imparted to all of those directly concerned with the day-to-day problems of operation and management of the silos.

The provisions of the BID loan for in-country training of those who will be filling the actual positions of managerial responsibility at the silos are perhaps the most critical of all. The job of combining pre-service and on-the-job training for a sufficient number of plant managers, grain managers, traffic managers, office managers and general managers for all of the silos is a mammoth undertaking. Every effort must be made to provide the most effective and efficient training program possible if the challenge is to be met. Some of the major considerations involved in the in-country training program in silo management are discussed in the sections which follow.

Organizing for Effective Management

As each additional silo in the IDEMA network is completed and brought into operation, the importance of organization for effective management will become more evident. The goals of the management organization for the silo system include:

1. efficient operation of each silo in the network
2. coordination of operations of the individual silos for efficient functioning of the system as a whole
3. full opportunities for managerial development of subordinates

Each of these goals imposes certain requirements on the kind of management organization required for the silo network.

In order to obtain efficient operations at each silo, the management system must be organized in a way that will attract and hold a career management class. The expected salaries, opportunities for advancement and related economic benefits should be comparable to those for management in other industries in Colombia. The general manager and his immediate subordinates at each silo should have the full authority and responsibility of management, including (1) planning and decision making, (2) internal organization of

work, (3) direction of operations, (4) coordination of activities and (5) managerial control. They should be free of political influence and pressures from outside sources. They should be judged and rewarded on the basis of performance. The central office of silo management should be recognized as assisting them to do a better job rather than telling them what to do and how to do it.

The coordination of operations of the various silos in the network should be accomplished through clear policy guidelines, standardized reporting procedures and consulting services to management at the individual silos. Within the policy guidelines, the general managers of the individual silos should be free to hire and fire their own people, establish and enforce operating policies and direct and supervise their own operations. The managers should be held accountable for performance as revealed by uniform reporting procedures rather than by direct supervision. The consulting services of the central office of silo management should be operated to help the managers identify problems and solutions for improved performance rather than to issue instructions to the managers.

The creation of maximum opportunity for managerial development is essential in order to provide managerial personnel for the expanding number of silos in the network. Training and development of subordinates should be recognized as an important responsibility of every manager. Consultative management and the management team approach should be encouraged. Conferences on management problems should be held regularly for general managers, plant managers, grain managers, traffic managers and office managers. Scholarships to comprehensive management short courses should be awarded on a merit basis. Self-study programs and group study activities should be developed and encouraged. Managers who are able to develop subordinates for additional

responsibilities and for positions for general management at other silos should be given special recognition.

Sources of Managerial Personnel

For the most part, the skilled personnel required for managerial positions at the silos of IDEMA and other organizations must be acquired from domestic sources and completely trained for their positions. Unlike Cargill, Continental and other international grain marketing organizations, IDEMA is not in a position to transfer skilled silo managers from other Spanish-speaking countries to fill the gap until Colombians can be trained to take over full managerial responsibility. To make matters worse, there are very few qualified people in subordinate positions in existing silos who are ready for promotion to management for the new silos.

The kinds of positions at the silos which will give people qualifying experience for plant manager, grain manager, traffic manager and office manager are those which are immediately subordinate to these positions. Those now obtaining qualifying experience for general management are in positions such as plant manager, grain manager, traffic manager and office manager at the large silos are general manager at the country silos. Other personnel at the silos are not obtaining experience needed for management and generally cannot be considered candidates for the managerial positions until they have had experience in the immediately subordinate positions.

It will be noted from the brief position descriptions at the start of this section that the qualifications for plant manager are quite different from those for grain manager, traffic manager and office manager. Plant managers need an engineering background; grain managers, a grain grading and marketing background; traffic managers, a transportation background; and office managers an accounting and financing background. Until

more people can be given pre-service training and then several years of on-the-job experience in the subordinate positions at the silos, candidates with the right backgrounds will have to be recruited largely from other industries in Colombia. Plant managers might be recruited from grain processing plants, grain equipment manufacturers, engineering companies and similar sources. Grain managers might be promoted from positions as senior grain inspector or recruited from existing grain handlers and processors. Traffic managers might be recruited from transportation companies or from traffic departments of petroleum or other industrial companies. Office managers might be recruited from accounting companies or from accounting departments of major industries in Colombia.

Recruiting for the positions of general management at the new silos will be more difficult. Candidates should have had three to five years of experience as plant manager, grain manager, traffic manager or office manager under one of the most successful terminal silo managers in the country or at least five years of experience as manager of a highly successful country silo operation. There is no longer time to build this kind of training experience for the top management positions at the silos which will begin operations in 1971 and 1972. The most nearly qualified people will have to be recruited from existing silos, from grain processing plants and any other sources available. On-the-job and in-service training will have to be used to help supplement the experience of those obtained for the positions.

The longer run solution to the problems of silo management is to recruit adequate numbers of capable young men, give them specialized pre-service training for subordinate positions and then be sure that they get proper on-the-job and in-service training as they gain work experience. Such young

men can be recruited from the senior classes at the major engineering, agricultural and business colleges in the country as well as from those in positions of grain inspection and other more subordinate positions at the existing grain silos.

Pre-Service Training

Specialized pre-service training is essential for capable young men who are interested in preparing for careers in silo management. These people need training which will qualify them for subordinate positions at the silos immediately upon graduation and at the same time give them the foundation in silo management needed for professional development in their positions. The larger the number of young men who can be trained and placed in the silo system now, the larger the base of qualified people for managerial positions in the future.

The IICA-CIRA six-month pre-service training program is a step in the right direction. This program emphasizes grain classification and grading and is designed to train the students for starting positions as junior grain inspector. The minimum entrance requirements are a high school diploma and an entrance examination. The program is meeting the immediate needs for grain inspector, and it is hoped eventually that it will provide candidates for managerial positions at the grain silos. However, the program will need to be modified and expanded if it is to meet the immediate needs for plant managers, grain managers, traffic managers and office managers.

In order to meet the larger need, we recommend that the present program be expanded to include five lines of training, one in each of the above four areas plus the existing one in grain classification. The entrance requirements, in addition to passing specialized examinations in the five areas, would be:

1. Speciality in plant management -- college degree in mechanical, electrical or agricultural engineering
2. Speciality in grain management -- college degree in agricultural economics or business administration with major in marketing
3. Speciality in traffic management -- college degree in business administration with major in transportation
4. Speciality in office management -- college degree in accounting or in business administration with emphasis on accounting
5. Speciality in grain classification -- high school diploma

With these entrance requirements, the formal pre-service training could be covered in nine months. There would be a core of training courses common to all five specialities, including grain grading, basic silo design and operation, grain accounting, storage management, grain marketing in Colombia and related fields. In addition, there would be specialized courses in each of the five areas, including three to four weeks of supervised placement training.

Upon graduation from the nine months' pre-service training program, the students should be ready for positions as assistant plant manager, assistant grain manager, assistant traffic manager, assistant office manager and junior grain inspector at the major silos. Those in the first four specialities also should be ready for positions as assistant general manager at the smaller country silos. Should it be necessary to lower the entrance requirements, say to two years of college work in the respective fields, then a minimum of one year's placement experience probably will be required before the graduates are ready for the assistant manager positions.

If desired, a sixth speciality in price support programs could be added to the pre-service training program. The entrance requirements for this speciality would be a college degree in agricultural economics with a major in agricultural policy or a degree in political science with a

major in agricultural administration. Graduates would be placed in key subordinate positions in the price support division of IDEMA.

On-The-Job Training

The importance of on-the-job experience and training has been mentioned in previous sections. The on-the-job training for persons in each key position should be designed to prepare them for the next higher position, such as junior grain inspectors for intermediate grain inspector, assistant plant managers for plant manager and grain managers for general manager. The persons in the immediately superior positions largely determine the training value of on-the-job experience. By showing and instructing subordinates, by consulting with subordinates on matters which are the responsibility of the superior and by giving subordinates opportunities to "try their wings," the immediate superiors can maximize the value of on-the-job experience. One excellent way to encourage this approach is to follow a general policy of promoting the immediate superior only when he has a subordinate trained to take his place.

The training section in the central management office can do much to help with on-the-job training. Materials and guidelines can be prepared, and counsel and guidance can be given to both superiors and subordinates. Ratings can be made of progress and lists can be prepared and circulated to silo managers of employees in various positions who are ready for promotion. Special conferences related to on-the-job training can be held at both regional and national levels. In-service training programs can be designed and coordinated so as to stimulate and complement the on-the-job training.

For an interim period of 18 months or so, it may be advisable to bring in at least two highly qualified foreign grain silo managers and establish

them at model silos to train others on the job. Each model silo would have a counterpart general manager as well as the most competent plant manager, grain manager, traffic manager and office manager available. The job of the foreign manager would be to organize and operate the silo as efficiently as possible and to train his counterpart and immediate subordinates in effective silo management. In doing so, he also would be training them by example in how to provide effective on-the-job training to subordinates. The counterpart general manager and one or all of the subordinate managers might be promoted to other silos during the stay of the foreign manager, making way for others to be moved in for training under him.

In-Service Training

In-service training programs include conferences, short courses, self-study programs, group study activities, night school courses, correspondence courses and any other formalized training activities designed for those now in key positions at the grain silos. The purpose of the in-service training programs is to help the participants develop knowledge, understanding and skills to be more productive in their present positions and to prepare for positions of greater responsibility. The most fruitful in-service training programs are designed to supplement on-the-job experience and are timed so that the participants are ready to make maximum use of the training received.

IDEMA and other organizations operating grain silos in Colombia are making use of some in-service training programs. These need to be expanded and supplemented if the challenge for an adequate number of qualified people in silo management is to be met. As a minimum, we would recommend the following:

1. General managers conferences of about three days each, held every other month to discuss current problems and matters of general management in silo operation.
2. Plant managers conferences of two or three days each, held at least twice each year to discuss current issues in silo plant management.
3. Grain managers conferences of two or three days each, held three or four times per year to discuss current matters in grain merchandising, conditioning, storage and management.
4. Traffic managers conferences of two or three days each, held at least twice per year to discuss current issues in grain transportation and movement.
5. Office managers conferences of two or three days each, held three or four times per year to discuss current matters in grain accounting, reporting, and financial transactions.
6. Grain inspectors conferences of two or three days each, held at least twice per year to discuss developments in grades and grading procedures.
7. Grain marketing short course of at least two weeks, held annually for those ready for positions of greater responsibility. The short course could be divided into separate discussion sessions by interest and level of responsibility of those attending. A main feature would be work problems based on conditions in Colombia.
8. Organized self-study programs on all phases of silo management, complete with reference materials and study guides, to be offered to individual key employees requesting the program.
9. Group study programs on appropriate phases of silo management with reference materials and discussion guides to be offered to groups of employees at a silo (or at neighboring silos) who are interested.
10. Recommended sources of night courses and correspondence courses in various subject matter areas, together with information on content, cost, enrollment procedures, etc.
11. Leave-of-absence policies for qualified employees who desire to pursue a specialized course of study for six months to a year.
12. Scholarship programs for advanced study in Colombia and abroad to be awarded to selected employees on a merit basis.
13. Travel expenses to attend worthwhile meetings and conferences sponsored by engineering companies, equipment companies, transportation associations, financing institutions and other trade groups.
14. Contests and awards for outstanding papers on approaches to silo management and solutions to general problems in silo operation.

APPENDIX**Seminar Program and Lecture Notes****"Grain Marketing and Bulk Handling in Colombia"****Bogota, November 17-19, 1970**

S E M I N A R
S E M I N A R I O

Grain Marketing and Bulk Handling in Colombia
Mercadeo y Manejo de Grano a Granel en Colombia

Tuesday, November 17, 1970
Martes

- 9:00 a.m. 1) Developing an Efficient Grain Marketing System
(Desarrollo de un Sistema Eficiente de Mercadeo)
Dr. Richard Phillips
- 10:15 a.m. Coffee break - Receso
- 10:45 a.m. 2) Marketing Functions at Gathering Points and Country Elevators
(Funciones de Mercadeo en Lugares de Acopio y Silos del Campo)
Dr. Harry Pfof
- 12:00 noon Lunch - Almuerzo
- 3:00 p.m. 3) Marketing Functions at Terminal Elevators and Processing Plants
(Funciones de Mercadeo en Plantas de Silos Centrales y Plantas de Procesamiento)
Dr. Harry Pfof
- 4:45 p.m. 4) Setting Margins and Charges to Cover Costs
(Fijar Márgenes y Recargos para Cubrir Costos)
Dr. Richard Phillips
- 6:00 p.m. Adjourn - Clausura

Wednesday, November 18

- 9:00 a.m. 5) Reducing Costs and Improving Marketing Efficiency
(Reducción de Costos y Mejoramiento de la Eficiencia en mercadeo)
Dr. Richard Phillips
- 10:00 a.m. Coffee break - Receso
- 10:45 a.m. 6) Improving, Receiving, Weighing and Grading
(Mejorar, Recibir, Pesar y Clasificar)
Dr. Harry Pfof
- 12:00 noon Lunch - Almuerzo

Wednesday, November 18
Miercoles

- 3:00 p.m. 7) Improving, Cleaning and Drying Operations
 (Operaciones de Mejoramiento, Limpieza y Secamiento)
 Dr. Harry Pfof
- 4:15 p.m. Coffee Break - Receso
- 4:45 p.m. 8) Establishing Price Differentials for Quality
 (Establecer Diferencias de Precios por Calidad)
 Dr. Richard Phillips
- 6:00 p.m. Adjourn - Claudura

Thursday, November 19
Jueves,

- 9:00 a.m. 9) Providing Efficient Grain Storage
 (Suministrar Almacenamiento Eficiente de Grano)
 Dr. Harry Pfof
- 10:15 a.m. Coffee Break - Receso
- 10:45 a.m. 10) Role of Government Agencies in Grain Marketing
 (Papel de las Entidades del Gobierno en Mercadeo de Grano)
 Dr. Richard Phillips
- 12:00 noon Lunch - Almuerzo
- 3:00 p.m. 11) Providing Efficient Grain Transportation
 (Suministrando Transporte Eficiente de Granos)
 Dr. Harry Pfof
- 4:15 p.m. Coffee Break - Receso
- 4:45 p.m. 12) Coordinating Price Support and Marketing Programs
 (Coordinación de Programas de Sustentación de Precios
 y Mercadeo)
 Dr. Richard Phillips

SEMINAR - Grain Marketing and Bulk Handling
SEMINARIO - Mercadeo y Manejo de Grano a Granel

(1) Developing an Efficient Grain Marketing System
(Desarrollo de un Sistema Eficiente de Mercadeo de Granos)

A. Characteristics of an Efficient Marketing System
(Características de un Sistema Eficiente de Mercadeo)

1. Distribution of grain and grain products to buyers at the right time and place and in the right form
 (Distribución de granos y sus productos a compradores a tiempo y lugar oportuno y en forma correcta)
2. Reasonable marketing costs and charges
 (Costos y cargos razonables de mercadeo)
3. Reflect to producers the demand of consumers
 (Manifestar a los productores las demandas de los consumidores)

B. Major Marketing Functions
(Principales Funciones de Mercadeo)

1. Grain merchandising
 (Negociaciones de Granos)
 - a. Possession utility - who?
 (Valor de Posesión - quién?)
 - b. Pricing
 (Establecimiento de Precios)
 - c. Buying and selling
 (Comprando y vendiendo)
 - d. Margins reflecting value added
 (Márgenes que reflejan el valor agregado)
2. Grain distribution
 (Distribución de granos)
 - a. Place utility - where?
 (Colocar valor - donde?)
 - b. Assembly
 (Recolección)
 - c. Transport
 (Transporte)
 - d. Delivery
 (Entrega)
 - e. Margin reflecting transport costs
 (Márgenes que reflejan costos de transporte)

3. **Grain conditioning and processing**
(Acondicionamiento y procesamiento de granos)
 - a. **Form utility - what?**
(Valor de condición - cuál?)
 - b. **Cleaning and drying**
(Limpieza y secamiento)
 - c. **Blending**
(Mezclado)
 - d. **Processing**
(Procesamiento)
 - e. **Packaging**
(Empacada)
 - f. **Margins reflecting quality and form differentials**
(Márgenes que reflejan la calidad y diferencias de forma)
 4. **Grain storage**
(Almacenamiento de granos)
 - a. **Time utility - when?**
(Tiempo de utilidad - cuando?)
 - b. **Warehouse**
(Bodegaje)
 - c. **Maintaining quality and quantity**
(Conservar calidad y cantidad)
 - d. **Seasonal price differentials reflecting storage costs**
(Diferencias estacionales de precios que reflejan costos de almacenamiento)
- C. Supporting Marketing Functions**
(Apoyando funciones de mercadeo)
1. **Financing inventories**
(Financiación de inventarios)
 2. **Grading and inspection**
(Clasificación e inspección)
 3. **Market news**
(Información sobre mercados)
 4. **Others**
(Otros)

- D. Key Functions by Level in Marketing System**
(Funciones claves por nivel en sistemas de mercadeo)
- 1. Producers**
(Productores)
 - a. Harvest
(Cosecha)
 - b. Transport to market
(Transporte al mercado)
 - c. Sales to handlers or processors
(Venta a manipuladores o procesadores)
 - 2. Gathering points in traditional production areas**
(Lugares de acopio en areas tradicionales de producción)
 - a. Weighing and grading
(pesada y clasificación)
 - b. Pricing
(Establecimiento de precios)
 - c. Buying from producers
(Compras a productores)
 - d. Transport and sale to country elevators or other handlers
(Transporte y venta a silos de campo u otros compradores)
 - 3. Country elevators**
(Silos de campo)
 - a. Weighing and grading
(Pesada y clasificación)
 - b. Pricing
(establecimiento de precios)
 - c. Buying from producers and gathering points
(Compra a los productores y lugares de acopio)
 - d. Cleaning, drying and blending
(Limpieza, secada y mezclada)
 - e. Short-term storage
(Almacenamiento a corto plazo)
 - f. Transport and sale to terminal elevators and processors
(Transporte y venta a silos centrales y procesadores)

4. **Terminal elevators**
(Silos centrales)
 - a. **Weighing and grading**
(Pesada y clasificación)
 - b. **Pricing**
(Establecimiento de precios)
 - c. **Buying from other handlers and producers**
(Compra a otros manipuladores y productores)
 - d. **Cleaning, drying and blending**
(Limpieza, mezclada y secada)
 - e. **Long-term storage**
(Almacenamiento a largo plazo)
 - f. **Transport and sale to processors, exporters and other outlets**
(Transporte y venta a procesadores, exportadores y otros)
5. **Grain processors**
(Procesadores de granos)
 - a. **Weighing and grading**
(Pesada y clasificación)
 - b. **Pricing**
(Establecimiento de precios)
 - c. **Buying from grain handlers and producers**
(Compra a manipuladores de granos y productores)
 - d. **Short and long-term storage**
(Almacenamiento a corto y largo plazo)
 - e. **Conditioning and processing**
(Arreglo y procesamiento)
 - f. **Packaging**
(Empacada)
 - g. **Transport and sale of products**
(Transporte y venta de productos)
6. **Wholesale distributors of products**
(Distribuidores mayoristas de los productos)
 - a. **Purchase from processors**
(Compra a los procesadores)
 - b. **Warehousing of products**
(Almacenamiento de los productos)

- c: Separation and packaging into smaller lots
(Separada y empague en lotes más pequeños)
 - d. Transport and sale to retailers and consumers
(Transporte y venta a minoristas y consumidores)
7. Retail distributors of products
(Distribuidores minoristas de los productos)
- a. Purchase from wholesalers or processors
(Compra a mayoristas o procesadores)
 - b. Short-term warehousing of products
(Almacenamiento de productos a corto plazo)
 - c. Sale and transport to consumers
(Venta u transporte a los consumidores)

**(2 and 3) Equipment and Facilities for Grain Marketing and Storage
(Equipo e Instalaciones para Mercadeo y Almacenamiento de Granos)**

**A. Receiving Points
(Puntos de recibo)**

- 1. Receive mostly bags from any transportation and ship by truck daily to weekly
(Se reciben principalmente bultos de cualquier transporte y se embarcan por camión diaria o semanalmente)
- 2. Equipment required
(Equipo requerido)
- 3. Scales for bags
(Básculas para pesar los bultos)
- 4. Grading and moisture tester
(Aparato para clasificar y medir humedad)
- 5. Bag storage
(Almacenamiento de los bultos)
- 6. Load generally to trucks
(Cargue principalmente a camiones)

**B. Country Elevators
(Silos del campo)**

- 1. Receives grain primarily by truck from receiving points or growers. Should receive both bag and bulk mostly from truck. Loads out truck and rail.

(El grano es recibido principalmente por camión de los puntos de recibo o de los cultivadores. Se debe recibir tanto en bultos como a granel. Despachos por camión y ferrocarril).

2. Equipment required
(Equipo requerido)

- a. Grading and moisture testing
(Para clasificar y medir humedad)
- b. Trucks, scales
(Camiones, básculas)
- c. Bulk or bag
(A granel o en bultos)
- d. Cleaning equipment which will produce standard grade
(Equipo de limpieza para producir grado standard)
- e. Working bins
(Silos de trabajo)
- f. Drying equipment, small and large lots
(Equipo para secar, lotes pequeños y grandes)
- g. Bulk and bag storage for short-time storage
(Almacenamiento a granel y en bultos para almacenamiento a corto plazo)
- h. Bagging equipment
(Equipo para empaque)
- i. Bulk load-out
(Cargue a granel)

C. Terminal Elevator
(Elevador central)

- 1. Receives from large growers, receiving points or country elevators. Should receive both bag and bulk from truck and rail, sometimes barge. Ships bag and bulk by truck, rail and barge.
(Recibo de grandes cultivadores, puntos de recibo o silos de campo. Deberá recibir tanto en bultos como a granel por camión y ferrocarril algunas veces por lanchón. Remite en bultos y a granel por camión, ferrocarril y lanchón.)
- 2. Equipment required
(Equipo requerido)
 - a. Grading and moisture testing
(Aparatos para clasificar y medir humedad)

- b. Scales for truck and automatic scales for rail and barge
(Básculas para camión y básculas automáticas para ferrocarril y lanchón)
- c. Receiving as required
(Recibo según la necesidad)
- d. Cleaning as in country elevator
(Limpieza como en los silos del campo)
- e. Drying mostly bulk
(Secada principalmente a granel)
- f. Storage - bulk and bag for long-term storage
(Almacenamiento - A granel y en bultos para almacenamiento a largo plazo)
- g. Aeration equipment for bulk
(Equipo de ventilación para secamiento a granel)
- h. Thermocouple equipment for bulk storage
(Equipo termocuple para almacenamiento a granel)
- i. Fumigation equipment
(Equipo de fumigación)
- j. Should consider economics of flat versus vertical storage
(Se debe considerar la economía de almacenar en lo plano contra almacenamiento vertical)
- k. Should have bulk load-out for all transportation which is applicable
(Deberá disponerse de medios de cargue a granel para todo el transporte aplicable)

D. Processor
(Procesador)

Processors may need facilities similar to a country elevator or terminal elevator.

(Los procesadores pueden necesitar facilidades similares a silos de campo o silos centrales).

(4) Setting Margins and Charges to Cover Costs
(Fijar márgenes y recargos para cubrir costos)

- A. Relationship between Marketing Costs and Margin from Producer to Consumer**
(Relación entre costos de mercadeo y margen de productor a consumidor)

1. **Costs the major factor (say 95% of total margin)**
Costos el principal factor (digamos 95% del margen total)
2. **Profits a minor factor (say 5% of total margin)**
(Utilidades un factor pequeño -- digamos 5% del margen total)
3. **Margins and charges must be adequate to cover costs**
(Los márgenes y los recargos deberán ser adecuados para cubrir los costos)
 - a. **Cleaning and drying (including shrinkage)**
(Limpieza y secada, incluyendo merma)
 - b. **Receiving, handling and loading**
(Recibo, manejo y cargue)
 - c. **Storage**
(Almacenamiento)
 - d. **Transportation and distribution**
(Transporte y distribución)
 - e. **Processing**
(Procesamiento)
 - f. **Packaging**
(Empacada)

B. Categories of Costs
(Categorías de Costos)

1. **Fixed costs of facilities and equipment**
(Costos fijos de facilidades y equipo)
 - a. **Depreciation**
(Depreciación)
 - b. **Insurance**
(Seguro)
 - c. **Taxes**
(Impuestos)
 - d. **Interest**
(Intereses)
 - e. **Fixed maintenance**
(Gastos fijos de mantenimiento)
 - f. **Supervisory labor**
(Trabajo de supervisión)

2. **Variable Costs**
(Costos variables)
 - a. **Labor**
(Mano de obra)
 - b. **Supplies and materials**
(Provisiones y materiales)
 - c. **Fuel and power**
(Combustible y fuerza)
 - d. **Repairs and variable maintenance**
(Reparaciones y mantenimiento vario)
 - e. **Insurance, interest and taxes on stocks**
(Seguro, intereses y los impuestos sobre existencias)
 - f. **Shrinkage and quality deterioration**
(Merma y deterioro de la calidad)

3. **Overhead Costs**
(Gastos generales fijos)
 - a. **Management salaries and expense**
(Sueldos y gastos de administración)
 - b. **Office fixed costs**
(Costos fijos de oficina)
 - c. **Bookkeeping**
(Teneduría de libros)
 - d. **Office staff**
(Personal de oficina)
 - e. **Utilities**
(Servicios)
 - f. **Office supplies and miscellaneous**
(Provisiones, papelería, de oficina y varios)

C. Characteristics of Fixed Costs
(Características de los costos fijos)

1. **Apply to every cost center for marketing grain**
(Aplicar a cada central de costos para mercadeo de grano)
2. **Remain constant and must be paid regardless of volume**
(Permanecer constante y hay que pagar sin tener en cuenta el volumen)
3. **Mean that idle or underutilized facilities are costly**
(Significa que las facilidades ociosas o subutilizadas son costosas)

4. Are a function of the design and original cost of the facilities
(Son una función del diseño y del costo original de las facilidades)
5. Are lower per unit of volume with increased utilization, e. g.
(Son más bajos por unidad de volumen con mayor utilización, Ejj.)
 - a. Ton-months, or ton-days, of storage
(Tonelada-mes, o tonelada-días, de almacenamiento)
 - b. Tons handled, cleaned or dried
(Toneladas manajadas, limpiadas o secadas)
 - c. Ton-kilometers transported
(Tonelada-kilometros transportadas)

D. Characteristics of Variable Costs
(Características de los Costos Variables)

1. Apply to every cost center for marketing grain
(Aplicar a cada central de costos para mercadeo de granos)
2. Are a direct function of volume; constant amount per ton, ton-month, ton-kilometers
(Son una función directa del volumen; cantidad constante per tonelada, tonelada-mes, tonelada-kilómetros)
3. Reduced by reorganization to reduce amount of labor, materials and other variables inputs required to do the same job, not by increasing volume
(Merma por reorganización para reducir cantidad de mano de obra, materiales y otros insumos variables necesarios para ejecutar el mismo trabajo, no por aumento del volumen)

E. Characteristics of Overhead Costs
(Características de los Costos Generales)

1. Apply to the operation as a whole rather than to specific cost centers
(Se aplica a la operación total más que a las centrales de costos)
2. Distributed to each function on the basis of the relative contribution of the function to the total operation
(Distribuidos a cada función en base a la contribución relative de la función a la operación total)
3. Reduced by improved organization of overhead activities
(Se reducen por mejoramiento en la organización de las actividades generales)
4. Reduced per unit of volume by expansion and diversification
(Se reduce por unidad de volumen por medio de ampliación y diversificación)

F. Total Annual Cost for a Given Operation at a Given Location
(Costo total por año de una operación específica en una localización específica)

1. $F + VC + \frac{VO}{S} = T$, where

- F = total fixed costs for the operation
- V = total annual volume for the operation
- C = the per-unit variable cost for the operation
- O = the total overhead cost
- S = the sum of the volumes for all operations supporting the overhead costs

$(F + VC + \frac{VO}{S} = T)$, donde

- F = costos fijos totales por depreciación
- V = volumen total por año para la operación
- C = el costo variable por unidad para la operación
- O = el total de los costos generales
- S = la suma de los volúmenes para todas las operaciones que cubren los costos generales)

2. Total unit cost for the operation: $T/V = U$
 (Costo total por unidad para la operación: $T/V = U$)

G. Setting Margins and Charges
(Fijar márgenes y recargos)

1. Geographic price differences to cover transportation costs
 (Diferencias de precios geográficos para cubrir costos de transporte)
2. Position price differences to cover handling margins
 (Diferencias de precios de posición para cubrir gastos de manejo)
3. Moisture discounts, dockage, to cover shrinkage and drying costs
 (Descuentos por humedad, muellaje, para cubrir merma y gastos de secado)
4. Foreign material discounts, dockage, to cover shrinkage and cleaning costs
 (Descuentos por impurezas, muellaje, para cubrir merma y costos de limpieza)
5. Damage discounts to cover blending costs and lower value of damaged kernels
 (Descuento por danos para cubrir gastos de mezclado y menor valor por los granos dañados)
6. Storage charges and seasonal price differences to cover total storage costs.
 (Gastos de almacenamiento y diferencia de precios por estación para cubrir costos totales de almacenamiento)

7. **Premiums for bulk or discounts for bagged grain to reflect differences in handling costs**
 (Prima para granel o descuentos para grano empacado para reflejar diferencias en costos de manejo)

(5) Reducing Marketing Costs and Increasing Operating Efficiency
(Reducir Costos de Mercadeo y Aumentar Eficiencia de Operación)

- A. Planning Number, Type and Location of Facilities**
 (Planear número, tipo y ubicación de las facilidades)
- As discussed under topics No. 1, 2 and 3
 (Según lo discutido en tópicos 1, 2 y 3)
- B. Convert from Bag to Bulk Handling as soon as Possible**
 (Cambiar tan pronto como se a posible el manejo en sacos por manejo al granel)
1. **More efficient and lower cost handling**
 (Manejo más eficiente a menor costo)
 2. **Savings of bag costs**
 (Economía en el costo de los costales)
 3. **Elimination of insect harbors**
 (Eliminación de albergue de insectos)
 4. **Lower cost transportation**
 (Más bajo cost de transporte)
 - a. **Faster loading and unloading**
 (Cargue y descargue más rápido)
 - b. **Saving of freight on bags**
 (Ahorro en fletes de los costales)
 5. **Necessary for commingle system of grain handling**
 (Necesario para sistema mixto de manejo de granos)
- C. Keeping Facilities Busy**
 (Mantener ocupadas las facilidades)
1. **Reducing unused capacity**
 (Reducir la capacidad desocupada)
 2. **Avoiding delays**
 (Evitar demoras)

3. **Balancing equipment to eliminate bottlenecks**
(Equilibrar el equipo para evitar cuellos de botella)
 4. **Joint use of equipment**
(Uso conjunto del equipo)
- D. Reducing Repair Costs**
(Reducir costos de reparación)
1. **Effective maintenance program**
(Programa efectivo de mantenimiento)
 2. **Systematic replacement**
(Reemplazo sistemático)
 3. **Spare parts inventory**
(Inventario de repuestos)
 4. **Using qualified repair services**
(Utilizar servicios de reparación calificados)
- E. Minimizing Insurance Costs**
(Reducir costos de seguro al mínimo)
- F. Selecting Appropriate Depreciation Schedules**
(Seleccionar programas adecuados de depreciación)
- G. Reducing Fuel and Power Costs**
(Reducir costos de combustible y energía)
1. **Selecting economical source**
(Selección una fuente económica)
 2. **Avoiding unnecessary stopping and starting**
(Evitar paradas y arranques innecesarios)
 3. **Operating at optimum rates**
(Operar a niveles óptimos)
 4. **Avoiding waste**
(Evitar desperdicio)
- H. Reducing Labor Costs through Effective Utilization**
(Reducir el costo de la mano de obra con utilización efectiva)
1. **Effective work organization**
(Organización efectiva del trabajo)
 2. **Industrial engineering studies**
(Estudios de ingeniería industrial)
 3. **Maintaining spirit of productivity**
(Mantener espíritu de productividad)

- I. Minimizing Shrinkage and Quality Deteriorating**
(Reducir al mínimo las mermas y el deterioro de calidad)
 - 1. **Cleaning and drying grain for storage**
(Limpiar y secar el grano para almacenarlo)
 - 2. **Proper use of aeration and temperature reading equipment**
(Uso adecuado del aireador y del equipo para leer la temperatura)
 - 3. **Fumigation**
(Fumigación)
 - 4. **Housekeeping**
(Cuidado y mantenimiento de las facilidades)
 - 5. **Conversion to bulk handling**
(Conversión a manejo a granel)
 - 6. **Blending and handling practices**
(Prácticas de mezclado y manejo)
 - 7. **Systematic physical handling**
(Manejo físicos sistemático)

- J. Using an Effective Accounting System**
(Utilizar un sistema efectivo de contabilidad)
 - 1. **For grain inventory control**
(Para control de inventario de granos)
 - 2. **For operating cost control**
(Para control de costos de operación)
 - 3. **For planning to reduce operating costs**
(Para planear reducción de costos de operación)

- K. Diversifying To Spread Overhead Costs**
(Diversificar para esparcir los costos generales)
 - 1. **Complete grain handling services**
(Completar servicios de manejo de granos)
 - 2. **Addition of related lines**
(Adición de líneas relacionadas)
 - 3. **Development of a complete marketing system**
(Desarrollar un sistema completo de mercadeo)

(6 and 7, 9, 11) Equipment Selection and Operation
(Selección y Operación del Equipo)

A. Grading Equipment
(Equipo clasificador)

1. Sampling - May use probes but may prefer to use a scoop if grain has much straw
(Muestreo - Puede usarse sondas pero podría ser preferible usar una pala o cucharón si el grano tiene mucha paja)
2. Grading screens required for all grains to be received
(Se requieren mallas clasificadoras para todos los granos que se reciban)
3. Electrical moisture testers are necessary but must be checked frequently. Country elevators and terminal elevators should have two testers to be checked against each other daily.
(Son necesarios los probadores eléctricos de humedad pero tienen que ser controlados con frecuencia. Los silos de campo así como los silos centrales deben tener dos probadores para comparar diariamente el uno con el otro)
4. Grading must be done quickly, perhaps a minimum of 10 minutes, to decide whether to buy the grain and where to dump it.
(La clasificación debe hacerse rápidamente, tal vez un máximo de 10 minutos, para decidir si comprar el grano y donde verterlo)

B. Weighing Equipment
(Equipo para pesar)

1. All scales should be checked at least once a week for accuracy by weighing test weights.
(Se deben chequear todas las básculas por lo menos una vez a la semana pesando pesos de prueba para precisión)
2. All scales should be checked by a scale maintenance mechanic at least once a year or more frequently if trouble is noticed.
(Se deben chequear todas las básculas por un mantenimiento por es menos una vez el año o mas frecuentemente si pasan problemas.)

C. Receiving
(Recibo)

1. Bulk handling is badly needed to reduce labor and truck costs and the cost of bags.
(Se necesita con apremio el manejo al granel para reducir los costos de mano de obra, camiones y costo de los costales)
2. Most bag dumps can be converted to bulk dumps by installing a truck hoist or cable-powered scoop.
(La mayoría de los vertederos de bultos pueden convertirse a vertederos al granel instalando una grúa de camión o una pala movida por cable.)

3. Enough dump pits must be provided to reduce truck waiting time to a practical minimum.
(Deben hacerse suficientes vertederos para reducir el tiempo de espera de los camiones a un mínimo)
4. Calculations should provide an optimum (least) cost considering truck, rail or barge waiting time cost and the facility cost for the elevator. Generally, an unloading or loading facility should not be in use more than about half the time in order to reduce length of waiting lines.
(Se deben hacer cálculos para proveer un costo óptimo (mínimo) que tenga en cuenta costo del tiempo de camión ferrocarril o lanchón y el costo de los silos. Por lo general, una instalación para cargue o descargue no deberá permanecer en uso mas de la mitad del tiempo con el fin de reducir las colas de espera)
5. Some studies should be made, probably by industrial engineers, of arrival rates under Colombian conditions. This data is needed for optimum sizing of all the facilities.
(Se deben hacer algunos estudios, probablemente por ingenieros industriales, de ratas de llegada bajo condiciones Colombianas. Estos estudios y sus datos se necesitan para decidir el tamaño óptimo de todas las instalaciones.)

**D. Cleaning
(Limpieza)**

1. All grain should be cleaned upon arrival at elevators and the clean grain should meet the standard trading grade.
(Todos los granos deben ser limpiados cuando se reciben en los silos y una vez limpios deberán llenar el grado standard de comercialización)
2. It would probably be best to provide one cleaner for each dump pit or receiving elevator.
(Probablemente sería mas conveniente tener un limpiador para cada vertedero o silo recibidor)
3. There are no good standards for grain cleaners - the specifications should include capacity and efficiency requirements.
(No existen buenos standards para limpiadores de granos - las especificaciones deberán incluir requisitos de capacidad y eficiencia)
4. Provisions should be made to dispose of much of the material removed as an animal feed ingredient.
(Se deben tomar medidas para deshacerse de la mayor parte del material que se quita como ingrediente para fabricar alimento animal.)

**E. Drying
(Secada)**

1. May need some small dryers for bulk at many facilities.
(Es posible que se necesiten algunas secadoras pequeñas para granos al granel en muchas de las instalaciones)

2. Could consider some bins with perforated floors having capacities of 20-100 tons. These could be used for minor crops or when arrival rates are low.
(Se podrían considerar algunos depósitos de piso perforado con capacidades de 20-100 toneladas. Estos se podrían utilizar para cultivos menores o cuando las ratas de llegada son bajas.)
3. Drying temperatures should not be too high.
(Las temperaturas para secar no deben ser muy altas.)
4. Generally best not to remove over 4% moisture per pass except on feed grains.
(En general es mejor no extraer mas de un 4% de humedad por cada pasada excepto para granos de alimento animal.)

F. Storage
(Almacenamiento)

1. Consideration should be given to more use of flat storage.
(Se debe considerar el mayor uso de almacenamiento horizontal)
2. Tropical areas are very difficult and will require very careful handling of aeration equipment. Aeration rates may need to be much higher than in USA and air flow may be best if up.
(Las áreas tropicales son muy difíciles y requerirán un manejo cuidadoso del equipo de ventilación. Las tasas de ventilación es posible que deban ser mas altas que en los Estados Unidos y el flujo del aire puede ser mejor arriba.)
3. All instruments - psychrometers and thermocouples - must be checked for accuracy.
(Todos los instrumentos - psicrómetros y termocuples - deben ser controlados para precisión.)
4. Fumigation can be aided by aeration systems.
(La fumación puede ser ayudada por sistemas de ventilación)
5. Housekeeping is very important for rodent and insect control.
(El mantenimiento de los edificios es muy importante para control de roedores e insectos.)

G. Transportation
(Transporte)

1. Much attention should be given to efficient use of trucks.
(Se debe prestar mucha atención al uso eficiente de los camiones.)
 - a. Avoid delay time during loading and unloading.
(Evitar demoras en el cargue y descargue.)
 - b. Provide loads both ways if possible.
(Tratar de que haya carga para los viajes de ida y regreso.)

2. May need to give some thought to how present trucks can be converted easily to bulk.
(Puede ser necesario pensar en cómo los camiones actuales se pueden convertir para cargue al granel)
3. Bulk railroad loading and unloading may require some changes but should not be difficult.
(Cargue y descargue al granel por ferrocarril puede necesitar algunos cambios pero éstos no deberían ser complicados.)
4. Bulk barge facilities will require considerable study but will be very economical.
(Las facilidades para cargue al granel en lanchones requerirán bastante estudio pero serían muy económicas.)
5. Ship loading and unloading will be very good at Santa Marta and should be used to reduce demurrage costs.
(Cargue y descargue por barco sería muy bueno en Santa Marta y deberá aumentarse para reducir costos por demora.)

(8) Establishing Price Differentials for Quality
(Establecer diferenciales del precio por calidad)

- A. Standardization as a basis for trading
(Estandarización como base para negocios)
 1. Grain characteristics affecting value
(Características del grano que afectan el valor)
 2. Characteristics of standardization
(Características de normalización)
 - a. Official grain grade standards
(Normas oficiales de calidad)
 - b. Inspection system for grain classification
(Sistema de inspección para clasificación de granos)
 - c. Sorting into lots according to standards
(Separación de lotes según normas)
 3. Importance
(Importancia)
 - a. Price differentials for quality to producers
(Diferenciales de precio a los productores de calidad)
 - b. Handling and marketing on a commingle basis
(Manejo y mercadeo en base de grano mezclado)

- c. Bulk storage and transportation
(Almacenamiento y transporte a granel)
 - d. Financing and trading on basis of warehouse receipts
(Financiación y negocios en base de certificados de depósito)
- B. Basis for standards and grading
(Bases para normas y clasificación)
 - 1. Definition of classes
(Definición de clases)
 - 2. Numerical or special grades within classes
(Grados especiales o de número dentro de clases)
 - 3. Factors affecting weight and quality
(Los factores que afectan el peso y calidad)
 - a. Moisture content
(Humedad)
 - b. Foreign material content
(Impurezas)
 - c. Application of dockage system
(Aplicar el sistema de muellaje)
 - 4. Factors affecting quality but not weight
(Los factores que afectan calidad pero no el peso)
 - a. Damaged kernels
(Granos dañados)
 - b. Heat-damaged kernels
(Granos dañados por calor)
 - c. Test weight
(Peso de prueba)
 - 5. Special grade factors
(Factores especiales de calidad)
 - a. Weevils
(Gorgojos)
 - b. Smutty
(Tizado)
 - c. Foreign odors
(Olores extraños)
 - d. Others
(Otros)

- C. **The Trading Grade**
(El grado o norma de negocios)
1. **Basis for price quotations**
(Bases para cotizaciones de precios)
 2. **Normally a numerical grade, e.g. No. 2, by class**
(Normalmente un grado numérico, como No. 2, por clase)
 3. **May have special requirements on one or more grade factors**
(Se pueden tener requerimientos especiales para uno o mas factores de grado)
 4. **Good average quality which a large portion of crop meets**
(Calidad buena promedio la cual incluye la mayor parte de la cosecha)
 5. **Exact specifications may vary slightly from year to year**
(Las especificaciones exactas pueden variar ligeramente de año a año)
- D. **Discounts and premiums for quality**
(Descuentos y premios por calidad)
1. **Dockage**
(Muellaje)
 - a. **Applied to moisture and foreign material**
(Aplicado a humedad e impurezas)
 - b. **Adjustment in weight to the equivalent clean and dry basis**
(Ajustar el peso al equivalente limpio y seco segun las especificaciones de las normas para negocio)
 - (1) **Computed shrinkage**
(Merma computada)
 - (2) **Hidden shrinkage**
(Merma oculta)
 - (3) **Cleaning and drying costs**
(Costos de limpieza y secamiento)
 - c. **Separate dockage on each factor**
(Muellaje distinto para cada factor)
 2. **Price discounts**
(Descuentos del precio)
 - a. **Adjustment in price of grain**
(Ajustar el precio del grano)

- b. Separate discounts for each factor
(Descuentos distintos para cada factor)
 - c. Damaged kernels most important factor in addition to moisture and foreign material
(Después de humedad e impurezas el grano dañado es el factor mas importante)
- E. Setting appropriate price differentials
(Fijar las diferenciales apropiadas de precio)
- 1. For moisture content
(Para humedad)
 - 2. For foreign material
(Para impurezas)
 - 3. For damaged kernels
(Para grano dañado)
- F. Reflecting price differentials to individual producers
(Reflejar las diferenciales de precio a los productores individuales)
- 1. Grading and pricing by first handler
(Clasificar y fijar el precio por el primer comprador)
 - 2. Educational programs for producers
(Programas de educación para productores)
 - 3. Reflection of differentials in price support programs
(Reflejar las diferenciales de precio en los programas de sustentación de precios)

(10) Role of Government Agencies in Grain Marketing
(Papel de las Agencias del Gobierno en Mercadeo de Granos)

- A. Essential Functions of Government in Grain Marketing
(Funciones Esenciales del Gobierno en Mercadeo de Granos)
- 1. Price support for grain producers
(Sustentación de precios para productores de granos)
 - 2. Facilitating services for grain marketing
(Facilitar servicios para mercadeo de granos)
 - 3. Regulations to prevent monopoly and excessive marketing charges
(Reglamentos para evitar monopolio y recargos excesivos de mercadeo)

- B. Price Support for Grain Producers - See Discussion No. 12.**
(Sustentación de precios para productores de granos. - Véase Discusión No. 12.)
- C. Facilitating Services for Grain Marketing**
(Facilitar servicios para mercadeo de granos)
- 1. Reporting of supply, demand and prices**
(Información sobre oferta, demanda y precios)
 - a. Importance of accurate and timely information**
(Importancia de información precisa y oportuna)
 - b. Assembling accurate information**
(Recopilar información precisa)
 - c. Reconciling and tabulating information**
(Reconciliar y tabular información)
 - d. Informing public of results**
(Informar al público de los resultados)
 - 2. Grade standards and grain inspection services**
(Standards de calidad y servicio de inspección de granos)
 - a. Training and certifying licensed inspectors**
(Entrenamiento y certificación de inspectores licenciados)
 - b. Checking official grades**
(Chequeo de grados oficiales)
 - c. Official grades**
(Grados oficiales)
 - d. Educational material and programs**
(Material y programas educativos)
 - 3. Weights and measures**
(Pesas y medidas)
 - a. Standardization of weights and measures**
(Uniformar pesas y medidas)
 - b. Checking and certification of scales**
(Control y certificación de básculas)
 - (1) Original certification of new scales**
(Certificación original de básculas nuevas)
 - (2) Unannounced periodic checking and certification**
(Control periódico sorpresivo y certificación)

4. **Certification of licensed public warehouses
(Certificación de bodegas públicas autorizadas)**
 - a. **Licensing requirements
(Requisitos para registro)**
 - b. **Bonding requirements
(Requisitos para seguro)**
 - c. **Unannounced checking of warehouses
(Control sorpresivo de bodegas)**
 - d. **Reporting requirements
(Requerimientos para divulgación)**
5. **Supervision of transportation
(Supervisión del transporte)**
 - a. **Requirements for licensing
(Requerimientos para registro)**
 - b. **Supervision and control of freight rates
(Supervisión y control de las tarifas)**
 - c. **Supervision of claims for losses and damage in transit
(Supervisión de reclamos por pérdidas y daños en tránsito)**
6. **Supervision of imports and exports
(Supervisión de importaciones y exportaciones)**
 - a. **Licensing of importers and exporters
(Licencias a importadores y exportadores)**
 - b. **Collection of duties
(Recolección de impuestos)**
 - c. **Issuing import and export permits
(Expedir permisos de importación y exportación)**
 - d. **Promotion of international trade
(Promoción del comercio internacional)**
7. **Other facilitating services of government agencies
(Otros servicios de entidades del gobierno)**
8. **Regulation to Prevent Excessive Marketing Charges
(Reglamentos para evitar recargos excesivos de mercadeo)**
 1. **Approval of rates and charges
(Aprobación de tarifas y recargos)**
 - a. **Transportation rates
(Tarifas de transporte)**

- b. Drying charges
(Recargos para secar)
 - c. Cleaning charges
(Recargos para limpieza)
 - d. Storage charges
(Recargos para almacenamiento)
 - e. Elevating and handling charges at ports
(Recargos por manejo en los puertos)
2. Licensing for handlers and processors
(Licencias para el personal de manejo y procesadores)
- a. Licensing companies
(Licencias a compañías)
3. Maintenance of fair trade practices
(Mantener prácticas justas de comercialización)
- a. Investigation and prosecution of violators
(Investigación y acusación a los infractores)
 - b. Anti-monopoly legislation and administration
(Legislación y administración anti-monopolio)
 - c. Education and public relations programs with grain industry
(Programas de educación y relaciones públicas con la industria cerealista)

(12) Coordinating Price Support and Marketing Programs
(La coordinación de los programas de sustentación de Precios y los de Mercadeo)

- A. Distinction in Objectives of Marketing System and Price Support Program
(Distinguir los objetivos del sistema de mercadeo y los de programas de sustentación de precios)
- 1. Objectives of marketing system - efficient and low-cost distribution of all cash grain from producer to final consumer
(El objetivo del sistema de mercadeo - la distribución eficaz y al bajo costo de todo el grano comercial del productor al consumidor final)
 - 2. Objectives of price support programs
(Los objetivos de programas de sustentación de precios)

- a. Assure producers of prices sufficient to cover production costs
(Garantizar a los productores los precios adecuados para cubrir los costos de producción)
 - b. Assure consumers of adequate supplies at reasonable costs
(Asegurar a los consumidores suministros adecuados a un costo razonable.)
 - c. Prevent excessive year-to-year variations in production and prices
(Evitar fluctuaciones anuales excesivas en producción y precios)
- B. Relationships between marketing and price support programs.
(Relaciones dentro de los programas de mercadeo y los de sustentación de precios)
- 1. Neither can accomplish objectives of the other
(Uno no puede lograr los objetivos del otro)
 - 2. Both types of programs are essential for economic development
(Ambos tipos de programas son esenciales para el desarrollo económico)
 - 3. Challenge is to operate each of the programs efficiently without adverse effects on the other
(El desafío es operar eficazmente cada uno de los programas sin afectar adversamente al otro)
 - 4. The two programs often become confused, particularly when the same government agencies are involved in both
(Muchas veces se confunden los dos tipos de programas, particularmente cuando la misma agencia del gobierno está comprometida en ambos.)
- C. Essentials of the Colombian Price Support Program for Grains
(Esenciales del Programa Colombiano de Sustentación de Precios para los Granos)
- 1. Establishing minimum guaranteed prices to producers
(Establecer precios mínimos de garantía a los productores)
 - 2. Buying and storing grain when market prices are below support prices
(Comprar y almacenar grano cuando los precios en el mercado estén por debajo de los de sustentación)
 - 3. Selling grain from storage reserves to help prevent excessive price rises
(Vender grano de las existencias almacenadas para ayudar a evitar alzas excesivas de los precios)
 - 4. Regulating imports and exports to maintain adequate domestic supplies and help stabilize prices
(Regular importaciones y exportaciones con el fin de mantener suministros domésticos adecuados y ayudar en la estabilización de precios)

**D. Essentials of Grain Marketing in Colombia
(Esenciales del Mercadeo de Grano en Colombia)**

1. See discussions No. 1, 2, 3, and 4.
(Vea discusiones Nos. 1, 2, 3 y 4)
2. Receive all cash grain from producers at harvest and pay a fair price for the quality delivered
(Recibir todo el grano al contado de los productores al cosecharlo y pagar un precio justo por la calidad entregada)
3. Dry, clean and store or ship the grain
(Secar, limpiar y almacenar o despachar el grano)
4. Distribute the grain to competing uses and locations at the time and place and in the quantity and form needed
(Distribuir el grano a los usos y lugares competitivos, al tiempo y lugar, y en las cantidades y formas requeridas)
5. Distribute to export outlets surplus grain not needed for domestic use
(Distribuir a los mercados en el exterior el grano en exceso de las necesidades domésticas)
6. Distribute imported grain to supply requirements over domestic production at the time and place and in the quantity and form needed.
(Distribuir grano importado para suministrar los requerimientos domésticos no llenados por la producción doméstica al tiempo y lugar y en las cantidades y formas requeridas.)

**E. Role of Government-Owned Marketing Facilities
(El Papel de las Facilidades de Mercadeo del Gobierno)**

1. Should be operated to perform these essential marketing functions with equal effectiveness for all grain marketed, whether delivered under the price support program or sold by producers to private handlers and processors
(Se deberán operar en una manera que desempeñen las funciones esenciales de mercadeo con la misma eficacia para todo el grano mercado, si es entregado al gobierno en el programa de sustentación de precios, o es vendido por productores a los compradores o procesadores de empresa privada.)
2. Marketing of government-owned grain should be accomplished with equal effectiveness through privately owned marketing facilities and government owned marketing facilities
(El mercadeo del grano que pertenece al gobierno deberá cumplirse con igual eficacia por las facilidades de mercadeo de la industria privada y las del gobierno)

**F. Using Price Support Programs to Improve Marketing
(Utilizar los Programas de Sustentación de Precios para Mejorar Mercadeo)**

1. Price differentials for quality
(Diferenciales de precio por calidad)
 - a. Grading and discounts for delivery under price supports can be used to pioneer grading and buying practices for all grain
(La clasificación y descuentos para entrega por los programas de sustentación de precios se podrán usar para introducir nuevas prácticas de clasificar y comprar granos generalmente)
2. Premiums for bulk delivery
(Premios para entrega al granel)
 - a. Bulk premiums for delivery under price supports can be used to encourage bulk premiums on all marketings of grain
(Premios para entrega al granel en programas de sustentación de precios podrán usarse para fomentar el uso de premios para el granel en todo mercadeo de grano)
3. Handling, drying, cleaning and storage charges
(Recargos para manejar, secar, limpiar y almacenar)
 - a. Rates offered and paid for contract services on government grain can be used to establish precedent for the private trade
(Las tarifas ofrecidas y pagadas por servicios contratados para grano del gobierno podrán usarse para establecer un precedente para el comercio privado)
4. Price differentials by area
(Diferenciales de precios por zona)
 - a. Differential support price levels in surplus and deficit areas can be used to help stabilize price differentials by area on free market grain
(Niveles diferenciales de los precios de sustentación en zonas de producción excedente y en las de déficit podrán usarse para ayudar estabilizar las diferenciales zonales de precios para grano en el mercado libre)