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WITHDRAWN

An Assessment of Agricultural Marketing Needs of the Soybean and Grains Sector in Ecuador

FOOD & FEED GRAIN INSTITUTE
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REPORT SUMMARY

Title of Report/Publication: An Assessment of Agricultural Marketing Needs of the Soybean and Grains Sector in Ecuador

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SUMMARY STATEMENT

The objectives of the study are to assess the marketing structure in Ecuador for soybeans and other grains and make recommendations directed toward production, processing and marketing.

The current situation was reviewed in regard to: (1) strength and weakness of the overall marketing system, (2) marketing concepts, and (3) marketing goals.

Soybean production, oil seed processing and future demands were studied in regard to establishing soybeans as a major oil crop and the implementation of soya flour to meet the nutritional needs of the people.

Recommendations were presented in regard to future needs for: (1) professional training, (2) analysis of assembly functions, (3) market planning and research, and (4) auxiliary services.

AN ASSESSMENT OF AGRICULTURAL MARKETING NEEDS OF THE SOYBEAN AND GRAINS SECTOR IN ECUADOR

Prepared by

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Prepared for the
AGENCY FOR INTERNATIONAL DEVELOPMENT
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I. CURRENT SITUATION

Favorable production trends exist in Ecuador and there appears to be great opportunities to further increase agricultural production. Growth has taken place in the production of each major oilseed in recent years. A new agricultural crop, soybeans, could become a very important crop in that it could supply consumer oil needs as well as soya flour to meet the nutritional needs of the people. Potential also exists for the increased production of rice and the development of a rice export trade.

The Guayas Basin of Ecuador is the most important area of the nation in terms of agricultural production. It produces over three-fourths of the rice, one-half of the hard corn, and three-fourths of the oilseed crop, as well as being the major production area in bananas, cotton, cacao, and coffee. It also produces most of the soybeans, although soybean production is occurring in several coastal areas.

Strengths and Weaknesses

The current agricultural products marketing situation in Ecuador is viewed as a system which has both major strengths and major weaknesses. The major weaknesses have placed constraints on the current system, thereby causing inefficiencies to occur within the system.

The major strength of the marketing system is the private enterprise sector which is strong and viable.

Major weaknesses are the lack of a comprehensive market development plan, lack of adequate storage facilities and/or associated quality control equipment and technology, and lack of human resources development.

A comprehensive marketing plan may exist, however, it could not be identified. The government policies and programs that have been initiated are commendable in that they address specific problems. However, a lack of coordination between programs appears to be the case.

The Marketing Concept

The "marketing" concept is that marketing involves all functions in the flow of a good from production to final consumption. For the "marketing" concept to operate efficiently, marketing management must be applied. Marketing management is the analysis, planning, implementation, and control of programs designed to bring about desired exchanges with target audiences for the purpose of personal or mutual gain. It relies heavily on the adaptation and coordination of product, price, promotion, and place for achieving effective response.

The Systems Concept

The "systems" concept is that the production-distribution complex for food products is a total unit. The vital activities of production, processing, distributing, and utilization are closely linked. Groups of commodity systems are closely linked within a total food system. An impact on one commodity system will have some type of impact, either good or bad, on other commodity systems.

Marketing Goals

Discussion of soybean marketing with government, industry, and production segments produced a wide range of objectives. Objectives commonly agreed upon and associated with a sound grain marketing system appear to be the following:

1. To produce and market a larger volume of soybeans, with the idea of eventually becoming self-sufficient.
2. To strive for a higher-quality product.
3. To maintain stable prices at or near the world price level.
4. To establish an efficient marketing system.

The grain marketing system in Ecuador, in terms of physical flow, lends itself to becoming an extremely efficient system because the major soybean, corn, and rice production area is in close proximity to both the grain processors and the largest population center of the nation. Movements between stages of the system could be made in a minimum amount of time and with a minimum amount of unnecessary handling given the proper infrastructure. This favorable situation can be capitalized upon with proper planning and execution. Otherwise, the system will develop piece by piece, resulting in a poorly planned, uncoordinated, and inefficient system. Without proper planning and coordination between agencies of the government and the private trade, it is possible for the developing parts not to add up to, or become, an efficient system. Also, serious overcapacities and/or bottlenecks may be inadvertedly built into the system. Once these inefficiencies are built into the system, they become institutionalized and very difficult to change.

The following appraisal is aimed at assessing problem areas and addressing what is required to correct these problems in the overall context of creating a viable, efficient, and effective marketing system of agricultural products. There is still time to properly link the successive stages of the system together and to assess the creation of auxiliary services essential to the efficiency of the ultimate system.

II. CURRENT SOYBEAN MARKET DEVELOPMENT

Farm Production

In 1975, approximately 10,000 M.T. of soybeans were produced in Ecuador. This was an increase from approximately 1,000 M.T. in 1971 and 1972, or a tenfold increase. Estimates for 1976 place production at 13,800 M.T. Production is largely centered in the Guayas Basin in the Guayas, Los Rios, and Manabi Provinces. A detailed account of soybean areas by production zone and by size of farm is shown in Table 1.

Table 1. Number of farms producing soybeans by size and production zone, Ecuador, 1975

Production	Hectares of soybeans per farm						Hectares/farm	
Zone	1-5	6-25	26-50	51-75	75+	Total	Range	Mean
	(No. of farms)							
Babahoyo	-	28	19	5	7	59	7-320	48
Boliche	4	9	9	2	9	33	1-150	44
Chone	2	7	6	2	3	20	4-100	35
Machala	5	20	6	-	-	31	3-50	18
Portoviejo	17	12	2	-	1	32	1-100	13
Quevedo	2	15	24	6	13	60	3-150	49

1/ A production zone is a subsection of a province.

Source: Soybean Research, Breeding, Production, and Extension in Ecuador: Report No. 1, University of Illinois, 1975.

A slightly different accounting of 1975 production and its geographic location is shown in Table 2. As shown in these two tables, soybeans were produced on about 221 to 235 farms in 1975. In terms of size, 12.8 percent of the soybean hectarageper farm were in the 1 to 5 hectare group; 38.7 percent in the 6 to 25 hectare group; 28.1 percent in the 26 to 50 hectare group; 6.4 percent in the 51 to 75 hectare group; and 14.0 percent in the 75+ hectare group. Of the farms producing soybeans, 51.5 percent have soybean enterprises of 25 hectares or less.

Table 2. Soybean area, yield, production and number of farms by production zone, Ecuador, 1975.

Zone	Hectares	Yield Q/Ha	Production Quintales 1/	Number of farms
Babahoyo	2,433	27.5	60,825	63
Chone	820	25.0	20,000	31
Machala	298	24.2	7,225	19
Portoviejo	298	24.2	7,225	24
Quevado	2,661	25.0	66,525	40
Milagro	1,898	25.0	47,450	28
Peninsula	34	25.0	850	6
Balzar	265	25.0	6,600	10
Total	8,707		217,200	221

1/ 1 Quintal = 100 pounds

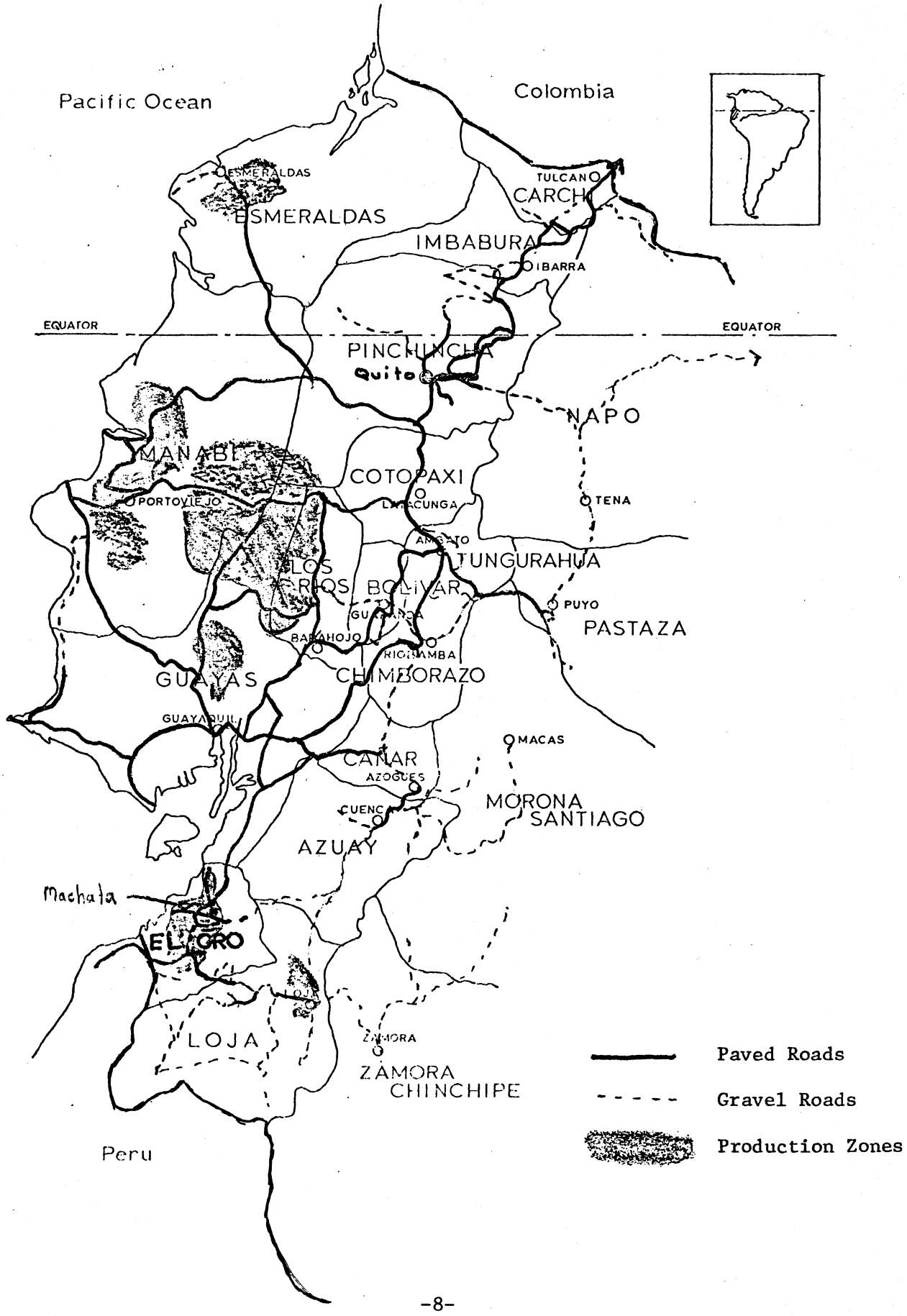
Source: Ministeris De Agricultura Y Ganaderia, Programa de Dosarrollo y Direrification Agricola, Guayaquil.

Eighty percent of the soybeans are produced in three zones; Babahoyo, Quevedo, and Milagro. Nearly 100 percent of the soybeans are moved directly from farms to processing plants. The majority of soybeans are transported to market by hired trucks. The maximum trucking distance is approximately 150 kilometers. The charge for the maximum distance is estimated at 10 sucres per quintal. Trucking costs are estimated to average between 7 to 8 sucres per quintal. Generally, main artery road conditions are sufficient for truck travel with a fair network of paved roads in this area. Figure 1 illustrates the relationship of production areas and road networks. Soybean production in Esmeraldas and Loja areas is just beginning. An estimated 100 hectares or .7 percent of the projected total for 1976 is in Esmeraldas and about one-half as much is expected in Loja.

The zones where soybeans are produced range from 1 degree North to 3 degrees 30 South latitude and from 0 to 100 meters above sea level. Rainfall in the soybean production area varies from 400 to 2500 mm per year with a distinct rainy season from January through April. In the Portoviejo area, soybeans are planted in the rainy season. This area is promising as a seed production area. In the San Mateo, Quevedo, Babahoyo, and Machala areas, soybeans are grown during the dry the dry season. In the Quevedo area, which lies in the humid tropics, irrigation is not necessary as it is in the other areas. Soybeans are usually grown in rotation with rainy season crops such as rice, cotton, and corn.

The three major varieties grown are Americana, 75 percent; ICA Lilly, 22 percent and Nacional De Peru, 3 percent. To meet increased seed needs in 1975, quantities of the ICA Lilly variety were imported from Colombia.

FIGURE 1. AREAS OF SOYBEAN PRODUCTION



This variety is short-stemmed, bearing its pods too low for efficient machine harvesting. The other two varieties also pose problems to producers which lead to economic losses in quality and quantity. The Americana variety is also short-stemmed (resulting in high losses when combining) and has a short growth cycle. It also has a large seed size of 24 grams per 100 seeds which makes it prone to injury during mechanized threshing. The Nacional De Peru variety is a mixture of tall and short, early and late types which also leads to field losses (especially lodging) and some quality problems.

Experimentation on varieties is being conducted within the country, however, this is on a private basis. It would seem that no governmental agency is actively involved in pursuing the problem of selecting improved varieties. This apparently is a result of limited human resource base to pursue the problem.

Given the financial position of most Ecuadorian farmers, credit is an essential need. Production credit is available for farmers interested in growing soybeans, if the farmer is capable of providing at least 10 percent of his production costs. While this may be a problem for some of the smaller sized producers, there are other credit problems. Because capital has been available from donor agencies, some farmers have been loaned money to purchase farm imput items in excess of what they need both in terms of size and quantity. Cases of over-budgeting farm costs, so that the 90 percent loan would cover full costs, were reported. Such practices, while perhaps being used in the name of aiding the producers, may be unduly burdening them with a debt that their hectarage will not support.

In another credit related matter, some farmers are reported to be misusing capital which is loaned for agricultural purposes by using it for family living expenses. Closer supervision of the use of loaned capital could reduce this practice.

Perhaps the greatest problem, in terms of economic cost, was that of timeliness of loans. For proper decision-making, a good farm manager needs his operating capital for a period running from at least 1 month prior to planting to 3 months after harvest. For soybeans, credit is needed for approximately 9 months. Cases were reported where credit applications had to be made up to a year in advance in hopes of receiving it when needed. A 6-month delay seemed commonplace. Therefore, if a farmer applies for credit when he needed it, there is an excellent chance his loan would not be approved until it is too late to plan and properly plant a crop on time. Typical credit institutions require repayment within 30 days of harvest. It also appears that processors do not always pay immediately upon delivery. This practice causes farmers to have problems repaying loans within the current time frames. If, in the future, an administered price no longer applies, and farmers are faced with fluctuating prices -- depressed prices at harvest time -- the repayment provision could be especially critical.

Budgeted production costs in 1975 ranged between 7,500 and 9,500 Sucres per hectare. In the production process, the following inputs are used per hectare: 1,500 pounds of seed, 22.5 ounces of inoculant, one application of herbicide, 136 kg. of 10-30-10 fertilizer, and three applications of insecticides. Labor and machinery are needed for seeding, irrigation, herbicide and insecticide application, harvesting, and transporting functions. In addition interest, miscellaneous expenses, and

management fees are included in the budget estimate. A charge for land is not included. Assuming an average yield of 25 quintales per hectare, production costs ranged from 300 to 380 sucres per quintal (in terms of cost per bushel, the range would be $6.78 to $7.16). Given this range in production costs, it would take 18 to 23 quintales of top-quality beans to break even at in-country prices. Including land costs, the breakeven point would be nearer 27 to 30 quintales per hectare. These costs compare unfavorably to the price of soybeans in world trade which averaged approximately $5.99 in 1975.

Harvest occurs from May to November with the largest volume coming to market in June and December. Harvesting equipment ranges from self-propelled combines to small stationary thrashers with capacity of only about 70 quintales per day. Machine harvest losses are estimated at 5 to 10 percent because of low-pod set alone. For this reason, most soybeans are being cut by hand and stacked prior to threshing by a stationary thrasher or combine. Assuming the slow labor intensive method, it takes 9 or 10 days to complete the harvest on a 25 hectare enterprise.

Of the soybeans produced in 1975, an estimated 25 percent were not placed on the market. Fifteen percent was used for seed or home consumption and 10 percent was lost due to problems with quality from the time of harvest until the time of trucking them to market. It is presumed

that much of this loss occurs in the stacking and thrashing processes. Another 5 percent is lost each year due to bad handling from the farm to the processor's facility. The flow of soybeans, meal, and oil through the marketing system is illustrated in Figure 2.

Oil Seed Processing

Currently, domestic production supplies 11 percent of the country's total soybean oil demand and only 4.5 percent of total oil needs. The current supported price of soybeans is 420 sucres per quintal, well above the world price.[1/] Processors are assigned a quota and required to process domestic beans although it would be more profitable for them to process imported crude. The processors were found to be very understanding of the rationale for this government policy. They were, nevertheless, hopeful that as production increases the price will fall to the world level.

Soybeans are trucked to processors largely in bag, although each of the four large processors is equipped to handle bulk receipts. Soybeans may be received by farmer-owned trucks, hired trucks, or processors' trucks. In the latter case, soybeans are backhauled on trucks which have delivered processed products to retail or wholesale points throughout the country. On backhaul loads, processors charge up to 20 sucres per quintal for hauling, depending on distance. Soybeans are not cleaned prior to receipt and thus contain a large amount of foreign matter. Soybeans sampled at one processor were unquestionably of sample grade, using U.S. grade and standards. In one case, soybeans containing as high as 20 percent + humidity

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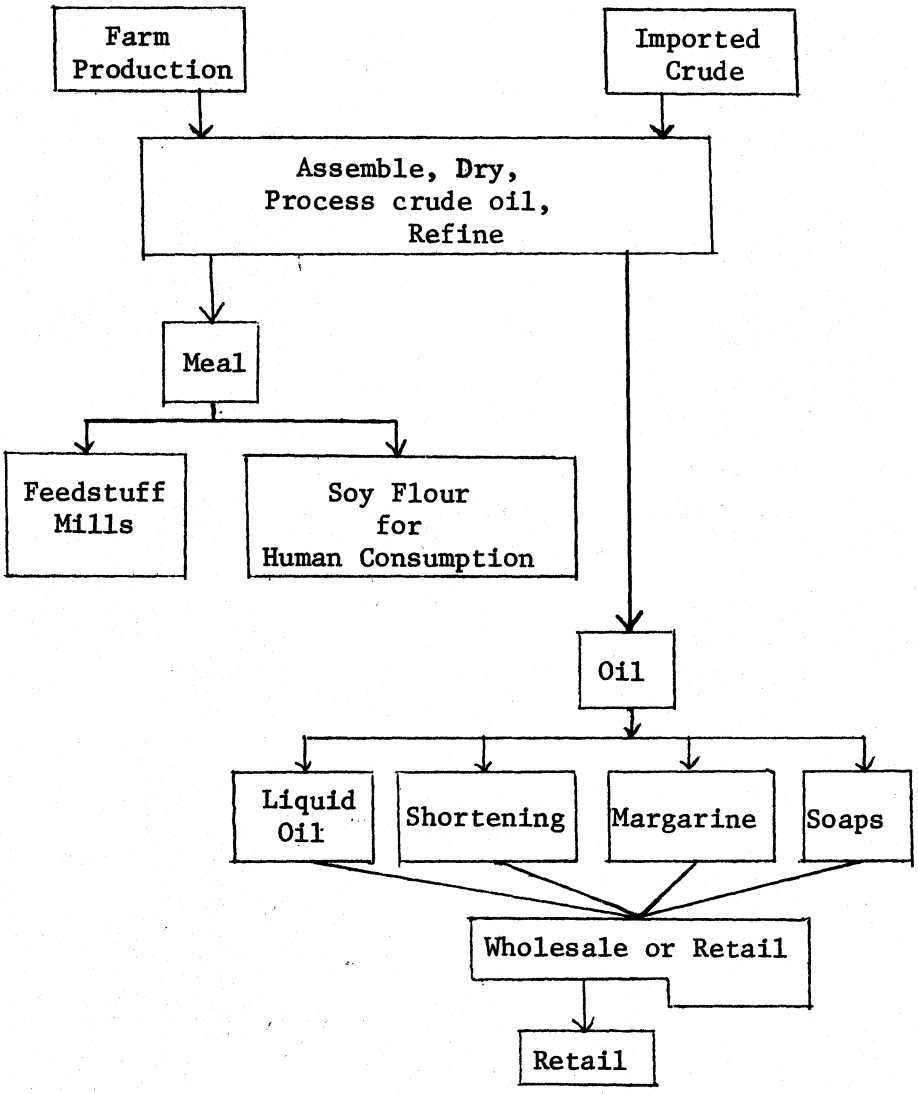
[1/] Quintal = 100 pounds, exchange rate 27.00 sucres to U.S. $1.00.

FIGURE 2. SOYBEAN AND SOYBEAN PRODUCT FLOW

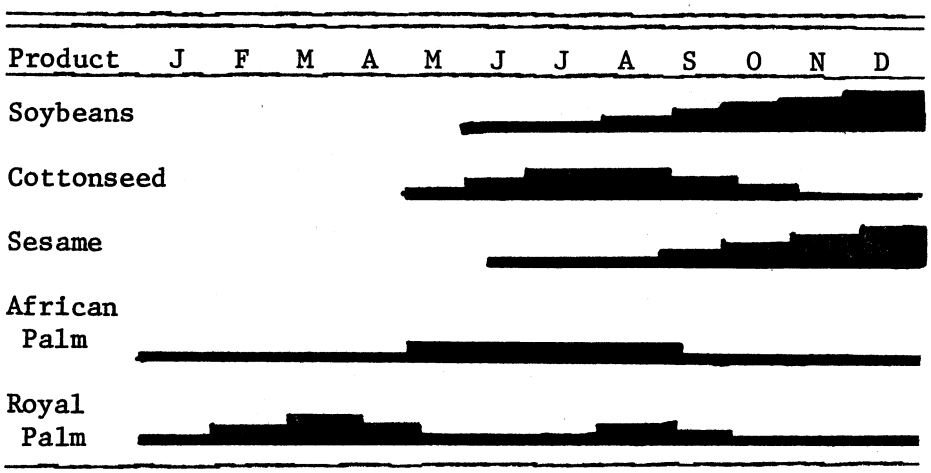


were received by a processor, who followed a practice of spreading the high moisture seeds on large concrete courtyards to dry. Tractors with front-end loaders were used to spread and pick up soybeans and other oilseeds dried in a similar manner.

Quality and, in turn, price are determined by using a moisture meter and "eyeballing" the soybeans for foreign matter, splits, dust, and mold. Quality is a major problem with which processors must contend. Plant equipment is damaged by foreign matter such as dirt, dust, and rocks. High moisture affects the acidity and protein content of the meal. Split soybeans cause an acidity problem if they are stored over any great length of time. If soybeans are moldy, processors can buy them only to use in soap making and at one-half price. Processors often discount heavier than the official discount schedule would indicate, in the case of foreign matter, to encourage a higher-quality product in the future. After considering all discounts, the average price paid producers in 1975 was estimated at 380 sucres, or about 90 percent of the official price. Thus, in addition to the high losses in quantity, producers lost over one million sucres due to poor quality in 1975.

Soybeans must compete with other oilseeds for receiving facilities and storage as well as processing capacity. Soybeans and other oilseeds are harvested in different months due to location and to the type of rotation. In the case of some oilseeds, it is hard to generalize on the flow or determine high volume months. A basic example of oilseed flow to processors is as illustrated in Figure 3.

FIGURE 3. MONTHLY HARVEST OF OIL SEEDS



Source: Ministry of Agriculture

As illustrated, soybeans tend to arrive on market at the same time as several other oilseeds, thus they cannot always be processed immediately. This adds to the risk taken by the processor who accepts low-quality soybeans because they may go out of condition before they can be processed despite careful handling.

Processors currently perform the following marketing functions: assembly, drying, storage, processing, refining, storage of processed products, transportation, and wholesaling. The current oil extraction rate for soybeans averages 17 percent thus the volume of products coming off the processing line is 83 percent meal and animal feed and 17 percent crude oil. Meal is marketed through feed manufacturers. Currently, markets are difficult to find because of the relatively high price of soybean meal to other feedstuffs. Refined edible oils are handled in three ways. A large portion is packaged on the premises. These products are packaged in retail-size packages. Liquid oils are largely packaged in 1 liter plastic or glass bottles. Shortening is largely packaged in 1 pound tubs as is margarine. In addition, some larger sized units are packaged for retail delivery. These are 30 pound tins of shortening and 80 liter drums of oil.

The second method of handling is to package wholesale lots for shipment to company-owned regional offices where the product is broken down into retail-size units. The third method is bulk delivery to non-company owned wholesalers. For the latter two methods, 350 pound drums are used for shortening and 200 liter drums are used for liquid oils.

As to plans for expansion, oilseed processors are much more interested in the growth of their processing capacity than their receiving and storage capacity. They prefer to receive high quality, clean oilseeds and pay accordingly rather than to invest in cleaning, drying, and storage functions.

At present, there are four large oilseed processors having a combined processing capacity of over 137,750 metric tons per year. Actual operating capacity is probably nearer 110,000 to 125,000 tons per year, assuming actual operating capacity to be 20 percent less than rated capacity. The four large plants, Ales, La Favorita, Oleica, and Phydaygesa, use the solvent extraction method. No information was available on the capacity or extraction method of three smaller oilseed processing plants.

Each of the extraction plants is now extracting mostly other oilseeds. In 1975, the quantities of oilseeds processed were as follows:

Oilseed	Volume (MT. Ton)[1/]
Palm fruit bunches	87.0
Palm kernels	4.0
Cottonseed	14.5
Sesame	2.0
Peanuts	1.3
Soybeans	10.0
Other	1.0
Total	118.8

These data indicate that processors are operating at nearly full capacity, but while they are the best estimates available, they should

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[1/] Fats and Oils Report, Office of U.S. Agricultural Attaché, Quito, April 1976.

be viewed with caution. Neither industry nor government officials could provide us with exact data concerning capacities or volumes.

It is our belief that increases in soybean production will not be offset by decreases in other oilseed production. Production of African oil palm fruit is expanding. An additional 2,500 hectares are being planted in 1976. Also the volume of kernels available to processors from domestically produced African oil palms continues to rise. Cottonseed production has held constant in recent years but is expected to rise because of increases in yield. One new cotton seed processing plant is being constructed at Manta and Alec is adding a new cottonseed lenter with a capacity of 100 ton per day. For sesame, oilseed processors indicate an increase from 600 tons in 1975 to 1,000 tons in 1976. Only peanut oil production appears trending downward. New areas of soybean production are largely former banana plantation lands that are being made available because of a rapid transition away from the fast growing Gross Michel varieties to a shorter, high-yielding Cavendish variety. If processors are going to meet the needs of increased soybean production, either new capacity must be added to existing plants or new oilseed processors must enter the industry because the total volume of oilseeds produced is increasing.

Future Demand

Domestic consumption of edible fats and oils rose from 46,000 metric tons in 1974 to 60,700 tons in 1975 (+32%). A further increase to 79,600 tons (+31%) is projected for 1976. These estimates show rather sharp increases in demand, considering the consumption of oils and vegetable lards has been increasing at an average of only 8.9 percent since 1961.[1/] Ecuador

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[1/] Project for Fortification of Wheat Flour in Ecuador, Special Work Group, Technical Secretariat for the National Food and Nutrition Policy - Ponan March, 1975.

has been importing the majority of the raw materials which the industry needs to manufacture edible oil products to meet the increasing demand. Edible oil production from domestic sources increased from 19,100 metric tons in 1974 to 26,700 tons in 1975, and should rise to 31,600 tons in 1976. Thus, domestic production was deficit by 26,900 tons in 1974; 34,000 tons in 1975; and will be deficit by an estimated 43,000 tons in 1976. To make up the immediate deficit, Ecuador will continue to import edible crude oils. To meet the deficit in the long-run, plans are under way to make the country self-sufficient in edible oil production. The Ecuadorian government has developed a production policy centered around soybeans which are considered a favorable crop to make up a large portion of this deficit.

Shimon, in his evaluation of the current soybean situation, assumed population figures and per capita consumption figures for 1980 and 1985 as follows: 1/

Estimated Potential Demand

Year	Population	Per Capita Consumption
1975	6,825,000	5.86 kg
1980	8,145,000	8.79-11.72 kg
1985	9,721,000	8.79-11.72 kg

Both Ministry of Agriculture and U.S. Agricultural Attaché estimates appear higher than Shimon's. U.S. Agricultural Attachés 1975 consumption estimates place annual per capita consumption at 8.89 kilograms. Applying Shimon estimates of increases of 150 and 200 percent to per capita consumption,

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1/ Shimon, Don F., "Evaluation of the Current Soybean Situation in Ecuador," Food and Feed Grain Institute, Kansas State University, Report No. 53, (1975), 20 p.

Attaché estimates would be from 13.34 kg./c to 17.79 kg./c by 1980 and 1985 respectively. While all estimates do not agree, they all point in the same direction, showing a potential demand for 1980 and 1985 as follows:

Year	Oil Consumption (Estimates)	
	Low	High
1980	71,595 MT	144,900 MT
1985	85,488 MT	172,937 MT

With these predicted increases in oil consumption, the potential for increased soybean production is great in Ecuador. No forecasts can be accurate as to how a relatively new crop like soybeans will fill the growing deficit. However, the following range of possibilities based on the lowest oil consumption estimates will help planners in their decision making:

Year	Oil Consumption Estimates	Soybean production, if domestic production accounts for the following percentages of projected demand. (Metric Tons) 1/		
		25	50	75
1980	71,595	99,439	198,876	298,317
1985	85,448	118,677	237,354	356,031

Converted into hectares these projections reflect the following by 1980:

Assumed Yield	Percent of Projected Demand		
	25	50	75
Q/H	(Number of Hectares)		
25	87,665	175,330	350,662
45	48,702	97,405	198,810
65	33,717	67,435	134,870

1/ Assuming an 18 percent extraction rate.

Fulfillment of this growing demand, or even a sizeable share, with soybeans will require many changes in the market system that exists today. The following assessments are made as a means toward reaching the Ecuadorian goal of self-sufficiency in edible oil production. These assessments deal with the overall marketing for soybeans and grains as these crops are closely linked .

III. FUTURE NEEDS

The assessment of future needs in agricultural product marketing is based on the strengths and weaknesses of the system as it now exists. It is our assessment that someone in government, naturally the Division of Marketing, Ministry of Agriculture, should develop a core group thereby providing a center of excellence. This will allow the development of idea interchange and feedback. Also, the agricultural research institutions should develop marketing research as a specific center of concentration.

Market System Development

Efficiency, both technical and economic, of marketing systems is achieved by the proper preparation and application of a sound, comprehensive marketing plan. The development and application necessitates that both government and private enterprise be involved in all aspects of the system development. Therefore, this process should be considered a team effort. Only a joint coordinated effort between government and private enterprise, each acting within its specific scope, will assure complete benefit from the development of an agricultural product marketing system.

One of the first steps in the development of an efficient and effective marketing system is the construction of a comprehensive marketing plan. This allows planning assumptions to be made within time frames and by objective, with the purpose of the plan to answer questions, set goals, exert control, monitor performance, etc.

A comprehensive marketing plan has many facets. It may be constructed with either institutional, commodity, or supply-demand orientation. The contents of the plan involve research into such areas as marketing channels; transport requirements; farm, intermediate,and consumer markets; product flows; short-range and long-range forecasts of supply and demand; quality and quantity loss, and shrinkage; determination of margins at each marketing step to cover costs plus the required return to investment to assure continued growth and development for a healthier, viable agri-business industry; determination of what competitive elements need to be introduced into each marketing stage for necessary long-run efficiency; feasibility analysis of innovative ideas; etc. This requires that a good data collection system exist because the results of marketing research are only as valid as the quality of data being used. The results of this activity are then drawn together as a long-range plan with a time schedule and set of priorities.

Several strategic performance objectives may be included in the plan. Depending upon the purposes of the developers of the plan, they may include such objectives as marketing, innovation, profit requirements, human organization, physical resources, financial resources, productivity, social responsibility, utilization of facilities, etc.

Once a comprehensive marketing plan has been constructed and made operational, the basic steps within marketing management are used to develop the marketing system as to the strategic performance objectives of the plan. For example, product flows can be checked for out of position products or inefficient movement, or determination can be made as to the development of alternative marketing systems or different alternatives with the system.

It must be stressed again that the need for a good data collection system is of great importance. Only by having the real and correct facts can proper decisions be made by the public policy sector and the private enterprise sector. Many times it is not that incorrect decisions are made by Government Agencies or private trade, but that the data presented was in error.

A sound marketing system is a system which is not only efficient, but also effective. Efficiency is the optimization of yield from all resources. Effectiveness focuses on the opportunities to produce revenue, to create markets, and to change the economic characteristics of existing products and markets. Efficiency is concerned with doing things right. Effectiveness is doing the right things.

Human Resource Development

A workable system is only as strong as its weakest link. The entire capability of a system hinges on managerial ability. Thus management cannot be ignored. Experience has found that management in a developing nation is strongest in the off-farm agri-business sector and weakest at the producer level. The reason for this is the avenue through which the business, farm or firm, got its start. Whereas most small farms are passed from one generation to another, most agri-businesses have less intergeneration and more aggressive growth patterns. A look at record keeping systems alone reveals the basic difference between the farm producer and the market producer. Therefore, only through the development of the market system and a managerial capacity can small farmers be assisted.[1/]

[1/] This is not to say that all groups do not share in an improved marketing system, because they do. We have used this case in point to illustrate the need for adequate human resources.

This may be illustrated by two examples.

(1) The most commonly mentioned problem and the area in which much research time and money has been spent in recent years is grain storage capacity. Studies and plans have been developed for soybeans, corn and rice. In this assessment we ask the following question, "If 100,000± tons of space had been constructed near the farm level in the last 5 years, where would the marketing system be today? Would it be well on its way to an efficient system?" Our answer to these questions is most important in terms of market system and human resource development. Our assessment is that the system would have been less efficient, not more. This conclusion is based on several factors.

(a) Technical and managerial human resources was and is not available to properly operate and manage the storage-drying-cleaning facilities recommended.

(b) No managerial consideration has been given to flows of grains and the relationship to storage, handling equipment sizes, or the recommendations of storage without considering drying and cleaning needs. These problems could easily result in serious under-utilization of capacity and very high, fixed costs -- an item producers in a developing system cannot afford.

(c) No marketing managerial consideration has been given to the location and flow of soybeans, corn, and rice in terms of space, time or form.

(2) The experience of developing countries with farm cooperatives has been disappointing. This has not been due to the farmer lack of ability to unite, although this is said to be the case. In reality, it

is due to the lack of an efficient marketing system that a cooperative can be placed into, and more importantly, the lack of managerial ability to operate a cooperative (lack of human resource development).

Within the general framework of this assessment there are four specific areas of need in human resource development. They are marketing management training; training in technical service in grain storage, handling, quality control; farm management; and technical services to farmers. These needs were expressed by the vast majority of people with whom discussions were held. Again, solving the human resource problem should be a joint and coordinated effort involving both private enterprise and government. Training could consist of two general types-- short courses, both in-country and out-of-country, depending on language restrictions that may be encountered; and university-level training for specific management of technical personnel.

Storage and Quality Control Systems

In soybean and grains there is an apparent need for storage and a system of quality control. Evidence of these needs was determined by the following indicators:

1. Lack of storage space and cleaning and drying equipment at oilseed processors.
2. Arrival of soybeans at processing plants having high moisture content, excess foreign material, and high proportion of splits.
3. Incidence of moldy beans caused either by inadequate storage or harvesting problems.
4. Incidence of corn being offered for sale to feed mills being of poor quality due, apparently, to post-harvest problems.

5. Excess supply of rice (over current demand) and this rice being of extremely low quality, therefore, no opportunity to sell into an export market.
6. Rice being sold at retail outlets in very poor condition, including foreign material, unhulled rice, and musty odors.
7. Lack of farm and/or regional storage or quality control facilities.
8. No apparent grading or standards systems that rewards quality production of food or feed grains.

This does not indicate that storage should be provided on an indiscriminate basis, but that storage construction decisions be preceded with an analysis of grain flows to assure the type of system that will be efficient as well as effective for all commodity markets.

IV. ADDRESSING SPECIFIC FUTURE NEEDS

Before attempting to resolve the specific needs of the soybean and grain agricultural marketing sector, a great many questions bearing on policy must be answered by government, private enterprise, and out-of-country donor agencies. If these questions cannot be resolved in the affirmative and with integrity on each group's part, no total efficient and effective system can be devised.

Does the government of Ecuador desire assistance to make the on-farm and off-farm agri-business, private enterprise system function and grow so it will be viable? Does the government of Ecuador desire to introduce coordination into the marketing system, regulatory agencies, and credit agencies? Is the private enterprise sector willing to cooperate in this endeavor in a spirit of willingness, or will they take the position of "dragging their feet"? Are the credit agencies (involving donor groups, government credit structures, and the private banking industry) willing to coordinate efforts to reduce the apparent constraints, inefficiencies, and slowness that prevents the proper flow of credit? Do the donor agencies desire to provide assistance for requirements that will provide a viable market system or are they more inclined to concentrate their efforts toward providing monetary assistance for physical facilities?

There is no reason that all needs cannot be addressed at the same time, thereby acting as part of the Human Resource training function and creating the necessary and correct analysis to solve problems.

These areas of concern must be addressed in relation to their individual contribution to the overall objectives of an efficient marketing system as defined earlier in this report. They should be pursued in full cognizance of the need for a stable agricultural policy -- that regardless of political party in office, an ongoing agricultural policy is vital in the performance of the nation's marketing system -- that a viable marketing system is crucial in the delivery of food and fiber to the people. Solutions that are not based on anticipated conditions beyond the current pricing policy for soybeans will likely fail.

Each of our assessments are made with the longer time frame in mind. Also taken into consideration is the impact that each suggestion will have on the total marketing system.

A Professional Training System

It is our considered opinion that a training system should be developed considering both short-run and long-run aspects of training. A basic prototype could be designed to include both government and private enterprise sectors. A suggested program is as follows:

1. In beginning the training system, a series of in-country short courses and consultant aid would be the ideal way to proceed. This is what is known as "On-Job Training". Such a program could consist of a minimum of 2 hours daily of classroom training plus consultant assistance to trainees on the practical aspect of the project or field they are employed in. This would allow the daily application of practical problems to the learning process as well as effectively minimizing any language barrier. In addition, this type of structure leads itself to self-perpetuation. Once installed, it could become a continuous process of training, with Ecuadorians training other Ecuadorians. Training should be structured to include such diverse areas as follows:

A. On-Farm Agri-business

(1) Technical Services

(a) operation and calibration of machinery
(b) maintenance and service
(c) variety selection
(d) soil testing and proper application of fertilizer
(e) management of agri-chemicals
(f) irrigation water management

(2) Marketing Services

(a) principles of decision making
(b) records keeping systems
(c) budgeting procedures
(d) proper establishment of lines of credit
(e) buying and selling procedures

B. Off-Farm Agri-business

(1) Technical Services

(a) drying and cleaning
(b) handling and storage
(c) insect, rodent, disease, and moisture control procedures
(d) quality identification practices (grade and standards system)
(e) location, size, synchronizing construction and capacity of facilities with production forecasts.

(2) Marketing Services

(a) market channels
(b) forecasting and planning
(c) delivery services and systems
(d) procurement and sales
(e) alternative business systems
(f) personnel management

2. Out-of-country short course training, especially, could be offered to qualified individuals or those qualified individuals who have completed an "on-job training" program successfully and need more in-depth training in a specialized area.
3. University level training out-of-country should be offered to qualified individuals in the area of marketing or general management.
4. A series of seminars, with the participants being private enterprise management and government policy makers and administrators, to introduce general marketing management concepts such as price policies and their effects, agribusiness planning for consumer

needs, quality identification as related to raw products and finished products, planning in commodity areas as related to total systems planning and the introduction of new production and marketing techniques.

Analysis of Assembly Functions

It has been pointed out that quality losses can be related to the lack of storage facilities as well as poor on-farm harvesting and post-harvest handling techniques. It has also been pointed out that grain flows can be a problem because of seasonal surges of supply at the processing level. Thus, in devising a solution to this problem, the impact upon the total marketing system must be assessed. It should also be recognized that an assembly subsystem which works well in one marketing system, i.e. the USA, cannot be simply established in a developing system without considering all aspects of its adaptation and redesigning it to fit.

Before any decision regarding the assembly sector of the marketing system should be made, a precise study of flow by marketing channel should be conducted. Such a study is basic to a storage location; size of cleaning, drying, and storage units; and other functions that perhaps should be incorporated into each assembly substation. A proper flow analysis should show origins and destinations as well as trends of such by the lowest possible political subdivision, by grain, by month, by mode of transportation, by type of handling, and by receiving institution. Accurate flow data are essential planning tools. They serve as a basis for industry location and growth. Flow data also are vital elements in forecasting and policy making. Accurate flow data serve as upper and lower limits or boundaries for practical operation.

This type of information was not available in Ecuador. In contrast, it was not unusual to find two or more sets of data, each considerably different, to exist for certain occurrences within the system. Without the type of information needed to make a detailed analysis of specific assembly needs, only cursory observations can be made.

The close spatial relationship of a large percent of the production area to processor location suggests the potential for a tremendously efficient system of direct marketing. If additional levels of marketing (assembly centers) are not absolutely necessary, they should not be established. Important aspects to consider before making this decision include: (1) the adequacy of the country's highway and secondary road network, (2) the economic ramifications of the farmers' ability to clean and dry their own beans, singularly or in association versus the current system of discounting for poor quality, (3) problems with current flow surges at peak harvest times, (4) potential problems with flow surges if local facilities were constructed, and (5) future price patterns at harvest time (beyond expiration of the current soybean price policy).

In terms of economic efficiency location of storage, cleaning, and drying facilities at the processing locations could be highly desirable given long-run price stability and a current desire on the part of the processors to assume these functions. Currently, the best technical expertise in the grain marketing system of Ecuador is found in established industries. However, the oilseeds industry currently has little interest in expanding their facilities for handling soybeans because of the present domestic-world price relationship. The continuance or discontinuance of

this relationship would appear to be an important factor influencing long-run decisions of which the construction of storage space is one. If this alternative were found economically feasible, a method of encouraging the construction of storage at the processor level could be centered around a tax incentive system, namely an investment credit type policy.

Several other alternatives exist for developing the assembly system in Ecuador. First, a policy for encouraging on-farm storage could be followed. The success of such a policy would be predicated on, (1) the farmer's technical knowledge of cleaning, drying, and storing, (2) the farmer's access to credit for such a system, and (3) the availability of units to fit the farmer's needs. On-farm storage has the following advantages: (1) the creation of value through (a) drying, (b) cleaning and, (c) time utility; (2) flexibility in marketing decisions -- a bargaining tool, a chance to shop for the best market; (3) a means of avoiding low prices at harvest time; and (4) a means of holding a reserve to stabilize farm income.

Another alternative policy which could be considered is a system of quick service, off-farm cleaning and drying pre-storage units designed to improve the quality of soybeans enroute to market. Such facilities would have space only for handling soybeans -- working space. A small number of these units could be located in the outlying areas not too distant from major processing centers, for example in and around Babahoyo. This type of subsystem would be the least expensive to construct and it could be used for several grains and oilseeds. It could provide transitional facilities for converting the flow from a bagged to a bulk system.

Furthermore, this type of subsystem could lend itself to a cooperative effort and function of the units could be expanded to include sales of agricultural inputs as well as related services. It would not, however, alleviate the storage needs problem and it would involve two extra handlings of the soybeans in comparison to having these functions performed at the processing level. In addition to these considerations, there are other questions which would require attention: (1) Are economies of scale lost by adoption of this method -- how would the cost of cleaning and drying at these country points compare with similar costs at the processing level?, (2) How would the cost of cleaning and drying compare with the added price received for higher quality soybeans?, (3) Who would operate the units? (They would probably not be large enough to support a full-time owner-operator and who would an association of farmers find with the technical expertise to operate the facilities part-time?), and (4) How would the problem of, for example, ten producers all needing or wanting to use the facility at the same time be resolved?

An off-farm cleaning, drying, and storage system is envisioned to be more elaborate than the preceding alternative. It essentially would have the same advantages and disadvantages as the preceding system. It would offer additional advantages in that (1) it could handle a larger volume of business and additional services, (2) it could offer full time employment, (3) a system of official weights and grading would be incorporated, (4) it could involve bonding and issuance of official warehouse receipts, and (5) it could serve as the off-farm market by actually purchasing and selling grains and oilseeds. By operating on a larger scale,

the problem of cluster demands could be lessened somewhat. This type of system could also operate as a cooperative. It could be especially beneficial to soybean producers in areas of considerable distance from the processing centers of Guayaquil and Manta. For example, this type of facility could be economically feasible in Quevedo, Chone and Machala and possibly in Esmeraldes and Loja as soybean production increases.

This type of system could also be organized as a free enterprise system. Capital and technical service requirements could be great but with the right kind of management such a venture could be profitable both to the investor and the farmers it would serve. The investment credit concept could also be applied to this alternative to aid in its development.

An assembly development and storage construction policy need not be directed entirely toward any one of these alternatives. In other words, a combination of the preceding alternatives could be adopted. A system which is developed simultaneously on all fronts should offer the greatest benefit and support of the growing soybeans and total grain and oilseed industry. Starting with a zero base and considering soybeans only, capacity should be expanded at a minimum rate of 20,000 MT per year to meet the demands placed on the system by increases in production.[1/] It should be stressed once again that plans for developing the storage systems should be broader than just soybean considerations.

[1/] This assumes that by 1985 soybeans will account for 25 percent of the projected oilseed demand. The rate of expansion would need to be doubled if the goal is set at 50 percent.

The need for a large amount of investment capital, the risk involved, and the lack of qualified human resources serve as barriers to the development of a storage system in Ecuador. Thus to implement such a program it may be necessary for the Government to take the initiative by constructing the assembly system and supporting a human resources training program. In the early or transition period, the system could be operated by lease-purchase or some other form of agreement which would eventually lead to a private enterprise system.

Development of Ecuador's grain marketing system, as previously mentioned, is a major rural development process. This process has wide ramifications for the total economic future of the country and is highly symbiotic with industrial development. The country's system of transportation is crucial to both. As oil exploration and development and the timber products industries grow in the hinderland, new roads are being opened to agriculture. As agriculture is developed in this new area, farm-to-market roads should be improved for all-weather travel. As agriculture expands and roads are improved, agri-business and other industry will move into these areas. This is a natural development process. Of course, not to be over-looked is (1) the added employment that will result, (2) the effect that added productivity in the country will have on its balance of payments, and (3) general economic conditions and the improved level of living afforded the people. Transportation is the foundation of any rural development process, upon which is added industry (agriculture and non-agriculture and the associated marketing system), employment (and offsetting decrease in unemployment), increasing wage rates, and the resulting improvement in quality of life -- housing, education, health facilities, etc.

The basic network of current roads in Ecuador are shown in Figure 1. The current road system, while not excellent, is nevertheless functional. The primary weakness in the present system occurs during the rainy season. At the most crucial time for moving grain to market, (the season when it is most difficult to dry grain to a marketable moisture level and protect grain from spoilage) it is most difficult to transport it to market. Because quality maintenance is highly dependent upon rapid movement from farms to the marketplace, an all-weather road system is very important in this high-rainfall country. Thus improvement, particularly in the secondary system, could inhance the quality of soybeans and other commodities.

The road system must be developed along with the total marketing system for still another reason. If Ecuadorian farmers are going to expand production into new areas and produce larger volumes in present areas, it is important that forward planning in road configuration be coordinated with persons responsible for the spatial location of grain assembly facilities. Otherwise uneconomical decisions may be made which result in unnecessary flow patterns and poor utilization of facilities constructed in wrong places.

Like the road system, it is important to have a sufficient trucking system to handle the volume of products considering peak seasonal demands. The existing transportation system, principally composed of hired trucks, appears to be working satisfactorily in the assembly system. Furthermore, no serious problems are anticipated as the assembly subsector evolves in the near future. Three main considerations to keep in mind as the system is developed are (1) ability of trucks to adapt from bagged to bulk delivery, (2) an increase in size of truck demanded, and (3) an increase in the number

of trucks required. Particularly important is the potential problem that could occur by duplicating a system that is currently performing reasonably well. Are government owned and operated trucking fleets adding to the efficiency or demands of the system?

Finally with regard to the transportation, some major inefficiencies in Ecuador's port facility operations were noted. In the short run these inefficiencies, largely in handling, compound an already high cost situation. In the long run the lack of an efficient system places the country at a competitive disadvantage. As an approach to solving this problem, the feasibility study of a deep water port facility should be made.

Because a strong transportation system is the "backbone" of any marketing system we suggest that special efforts be made by the Ecuadorian government to coordinate its national transportation policy with its agricultural development policy. In this coordinated effort, forms of transportation other than roads should not be overlooked.

Market Planning and Research

A comprehensive marketing plan, with coordination between government and private enterprise, could be constructed to include all commodity groups. Through the use of this plan, a well-balanced, synchronized, and efficient system could be developed. Through the employment of this plan, all components of the system could be kept in balance. This and the necessary market research to construct a plan has been previously discussed within this report in section III. This area of need can be resolved only through the application of developing human resources. Adequate training allows for the development of planning procedures.

An additional facet to the need for market research, is the need for consumer research. One of the factors that may stifle the growth of soybean production is the lack of a large market outlet for soybean meal under current price policy. At the present time, the commercial feed industry is able to consume the amount of soybean meal currently being produced. However, it is the consensus of those in industry that with the projected increase in soybean production, there will be a glut of soybean meal due to domestic prices being set above world prices.

The need for improved human nutrition opens an avenue for resolving this problem. Consumer research could be applied to the problem of soybean meal usage for at least three types of products: (1) soya flour for bread and pastry products, (2) textured vegetable protein products either in the extruded or spun form, and (3) soya-milk. Market research should also be conducted to determine new uses of soya products for animal and poultry needs. For the consumer acceptance research, in-depth studies are suggested.

Once the acceptability of the market for these products is determined, a feasibility study including both technical and economic feasibility should be conducted. Consumer acceptance must be measured both in terms of taste preference and cost-price constraints. If the results of this research are positive, a rigorous educational and public awareness effort should follow. If the results are negative, greater attention must be turned to finding new uses in the area of feeds or industrial products. A glut in the soybean meal market could cause the entire soybean production policy to fail.

Auxilliary Services

Auxilliary services are those groups of services which, while not vital to marketing agricultural products, are significant since they aid in developing an effective marketing system. Auxilliary services include such things as market news, price reporting, insurance programs, financing, weights and measures, and grades and standards.

At present, weights of soybeans and other grains are obtained on reputable equipment. Nevertheless, there is no procedure for impartially testing the accuracy of this equipment. Other than scales and moisture testing equipment, little in the way of mechanical devices is available to assist the human eye in quality judgements.

One of the main complaints aired by producers dealt with humidity test results. In cases where the same load of grain was taken to more than one buyer, the results varied by several percentage points. A system of calibrating and periodic inspection of instruments for accuracy would be of benefit throughout the entire system from assembly points to the retail level.

Separate from the problem of weights is the problem of not having a uniform system for determining value. It was found in our study that the only uniformity in the system was a price discount schedule for soybeans which showed the amount of discount depending on percent of moisture and percent of foreign matter. While meters were used to measure moisture, foreign matter was "eyeballed". Other factors contributing to lower quality were likewise "eyeballed". This arbitrary procedure is far from satisfactory and attempts should be made to correct this problem while the marketing system is still in its infant stage.

The establishment of a grading or quality identification system is not easy. If a grading system is devised, there are several basic questions which must be answered including (1) What should be the criteria for various grades of quality?, (2) How many grades are needed? (consideration must be given to end products), (3) What terminology should be used? and (4) Should the standards be compulsory or permissive? The principal objectives of a workable system of standards should be to aid the communications process at each stage of the marketing process.

Another area of auxilliary services which needs investigation is the collection of marketing information and the dissemination of market news. Market information development as well as statistical data gathering needs to be considered because, as stressed earlier in the report, this type of data is imperative to market planning and management. Since there is a glaring deficiency in this area, great advancements could be made.

USAID's Role in Development

The following discussion presents how we perceive USAID's role in the development of agricultural product marketing in Ecuador.

Within the planning process, the strategic resources available are human, financial, and physical. Since the concern is to develop an efficient and effective marketing system for agricultural products, it is quite evident that the first priority is the need for human resources to manage development.

We believe that USAID could be a catalyst in the following areas:

1. Assisting the government of Ecuador in becoming aware of the tremendous need for human resource development.
2. Underwriting and assisting in the planning, preparation, and implemention of marketing and technical in-country short courses, as well as other types of training that may be specifically required.
3. Underwriting and assisting in the development of a comprehensive marketing plan and associated research as previously described.
4. Underwriting and assisting in the development of grades, standards, weights, and measures in the soybean industry. Also, the planning for this quality definition process is to be applied to other commodities.
5. Act as an intervenor in introducing to other donor agencies the areas of need and possible solutions described herein.
6. By informing appropriate Ecuadorian government officials of the importance of establishing goals, using a total systems approach, and the value of a coordinated effort in market development.