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SWINE PRODUCTION REPORT - ~~SUMMARIES~~



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## SWINE PRODUCTION REPORT

General summary

1 A statistical analysis of swine production in Latin America, a field survey of swine producers in Bolivia, Colombia, Ecuador, Guatemala and Paraguay, as well as an evaluation of CIAT's past swine training activities were undertaken from November 1978 to April 1979

2 During the period 1960-1976, the overall estimated growth of the swine population in tropical Latin America was greater than that in the temperate zones. Most of the countries in this area are net importers of grains and deficient in conventional protein feedstuffs

3 In the countries surveyed, the estimated annual growth rate of the swine production is less than that for pork demand. After beef, pork production is second in importance, supplying ca 20% of the total national meat production. It is also an important contributor to the total edible fats and oils production

4 The most common characteristics for swine production in the five countries surveyed are the following

a) Swine production forms an integral part of other agricultural activities, which often include beef and dairy cattle, as well as poultry

b) The majority of swine operations are within the range of small (1-4 breeding sows) and intermediate (5-19 breeding sows) producers

c) At the small producer level, native pigs predominate, but in the larger operations, the proportion of crossbred and improved breeding stock increases

d) Reproductive efficiency (number of litters/sow/year) is the parameter most affected as a result of existing production conditions

e) The small swine operations produce most of their own feedstuffs, usually consisting of feed scraps and crop residues or rejects, however, they also use corn, cassava, plantain, potatoes and whey

f) At the small and intermediate levels of production, conventional protein concentrates (soybean, cottonseed, meat and fish meals) are not used, the majority of feeds available on the farm supply appreciable quantities of energy

g) Pigs are normally sold to middlemen when they are 8-12 months old and have reached 50-70 kg liveweight

h) Vaccines and vermifuges are relatively easy to acquire, most swine producers vaccinate their pigs against hog cholera and deworm them at least once per year

i) In most cases, especially at the small producer level, the care of the pigs is a family responsibility, particularly of the housewife

j) An extensive, unconfined type of production, with simple sheltered and shaded areas, predominates at the lower strata (1-4 and 5-19 breeding sows)

k) For small producers, pigs and pork sales represent an intermediate source of income (between 10 and 50%) in relation to other products from their farms. Pork sales represent a high percentage (more than 50%) of the income for producers with more than 20 sows.

5 Some differences were observed with regard to certain aspects of swine production among the countries surveyed. The most important ones were the following:

a) In Colombia, and to a lesser extent in Ecuador, there are regions where swine operations with improved technology are becoming important as commercial enterprises. The central region of Colombia and the western region of Ecuador are following this trend. This situation was not clearly observed in Bolivia, Guatemala and Paraguay. Large swine operations (more than 50 breeding sows) were more frequently found in Colombia.

b) The small swine producer (1-4 breeding sows) was commonly found in all countries surveyed, but the proportion of this level of production was greater in Guatemala than in the other countries. Although the Paraguayan agricultural system is also based on small farm holdings, the economic approach seems to be based on a commercial rather than on a subsistence type of production.

c) There was not a clear division between the breeding type of production and fattening operations. Colombia was the only country where some specialization in production was observed.

d) Estimations of the energy/protein ratios in the feeding systems suggest differences among the countries studied and among the regions within a given country. Differences were also observed among the strata of production analyzed and were associated with level of technology.

6 From 1969 to 1978, the Swine Unit at CIAT has trained 88 professionals from national institutions in 16 Latin American countries. The following were the most relevant answers obtained from the survey evaluating CIAT's swine training activities:

a) Knowledge acquired from CIAT's training course appears highly applicable to the trainees' professional activities in their respective countries.

b) Ninety-six percent of the trainees have continued working for institutions involved in national development, research and education.

c) Almost half of the trainees dedicate all their time to swine production activities, which involve training, research, administration and extension work.

d) In the regions where the ex-trainees work, more than 50% of the small- and medium-sized rural producers have pigs, which increases the possibility that their work will have an appreciable impact on regional swine development.

## I - SWINE PRODUCTION IN LATIN AMERICA, 1960-1976

Summary

I 01 Of the swine population in Latin America, 93% is concentrated in the tropics, Brazil and Mexico account for 71%. From 1960-76 the swine population in Latin America grew at an average rate of 3.25% yearly. In the tropical region, the rate of growth was on the order of 3.46% and in the temperate zone, 0.87%. In the countries surveyed in the present study, the average annual population growth rate was 2.3%.

I 02 During the years 1975-76, 84% of the pork produced in Latin America came from the tropical regions, Brazil alone accounted for 60% of the animals slaughtered. Per capita pork production in Latin America is low (5-7 kg) in comparison to that in the United States (25 kg).

I 03 During the period studied, the rates for pork extraction and the carcass yield of slaughtered pigs suggest that there was no noticeable improvement in swine productivity. According to these data, Brazil, the principal Latin American producer, is apparently one of the most inefficient pork producers in the region. Similarly, the Caribbean, Central American and some of the Andean countries have relatively low productivity indices.

I 04 Of the total meat production in Latin America, pork accounted for about 20% (range 9-40%). The percentage corresponding to pork is significantly higher in the tropical than in the temperate regions.

I 05 In Latin America on the whole, both production and demand have grown apace, at a rate of 4.1% yearly, nevertheless, in areas such as the Caribbean, Central America and certain Andean countries, production has increased at a much slower rate than that of demand.

I 06 The international trade of swine and pork in Latin America is of little importance as far as volume goes, occurring principally in Central American and Caribbean countries. This means that these countries depend almost exclusively on domestic production for their supply of pork.

I 07 Production of the principal sources of energy and protein used for animal feedstuffs is concentrated in Brazil, Mexico and Colombia, which are precisely three of the four main producers of pork in Latin America. The growth rate of these energy and protein sources from 1970-75 was slow, except for soybeans, which grew 5.6 times. It should be pointed out that more than half the soybeans produced in the region are exported directly or in the form of meal. Based on production figures for feedstuffs, protein/energy ratios were calculated for different areas in Latin America, and it was found that the region is deficient in the production of protein for animal consumption.

I 08 Tropical Latin America is a net importer of feed grains (sources of energy) and an exporter of protein sources in spite of the apparently serious deficit in protein production for both animal and human nutrition

I 09 The relative prices for pork/beef meat at the consumer level in the 5 countries studied did not differ substantially from one country to another. In Colombia, Venezuela and Bolivia, the price of pork has tended to rise less than that of beef

I 10 When analyzing the situation as a whole, it can be concluded that most of the human nutrition problems are found in Central America, the Caribbean and some of the Andean countries such as Bolivia and Ecuador, regions where some of the lowest efficiencies in swine production were found

## II - SWINE PRODUCTION IN COLOMBIA

Summary

II 01 The statistical data indicate that the annual growth rate of pork demand in Colombia is 4.3%, whereas that of production is 3.1%. On the other hand, the trends of beef also show the same disequilibrium in demand vs production, which causes adverse effects on prices and consumer access to these sources of protein.

II 02 Most of the limitations are related to technological aspects that have not been investigated using an integrated approach. Several studies at the small producer level are required in order to develop schemes to improve productivity for this type of operation. A large proportion of farmers-especially small farmers-use pigs as a means to utilize reject products or crop residues that would otherwise be useless and as a means to occupy family labor that would otherwise be unproductive.

II 03 At the commercial production level other type of limitations becomes relevant, the orientation towards improvements in production and productivity and the importance of production costs acquire a special dimension at this level.

II 04 The region where the survey was conducted involves two main areas -according to the characteristics of swine production- the northern (Córdoba and Sucre) and the southern (Nariño and Cauca) region with a large number of extensive or subsistence-type operations, and the central region (Valle del Cauca, Risaralda, Caldas and Antioquia) where the operations with improved technology become important and pork consumption is greater (more than 5 kg/per capita/year).

II 05 It was observed that as the producer has fewer pigs and smaller farmers, he depends to a greater extent on his own work and on family labor to take care of his animals.

II 06 More than 90% of the small producers use feed scraps and crop rejects as the main feed resources for the pigs. The percentage falls drastically and is replaced mainly by commercial feeds as the producer becomes bigger.

II 07 The small producers also use corn, cassava, plantain, potatoes and whey. More than 50% of the producers with less than 20 pigs also produce the corn that is used to feed their pigs, more than 70% produce the cassava, whey and plantain used, and more than 90% produce the potatoes used. In all cases -especially for potato and dairy farmers- the presence of pigs as a source of organic fertilizer (manure) is of vital importance for their crops and pastures.

II 08 There are no differences in the fertility indicators for gilts and sows among the different strata of swine producers, although due to the fact that producers with less than five females practice late weaning and obtain smaller litters at weaning the average number of pigs weaned per female/year is eight, which is below the average (13) obtained by producers with more than 50 females

II 09 The extraction rate for the lower strata -measured in terms of number of pigs slaughtered per year or kg of pork sold per year- is less than half of that obtained in the higher stratum

II 10 The mortality index in adult animals is more than 8% for the lowest stratum, becoming smaller for the higher strata and reaching the value of 2.2% for the highest stratum (more than 50 animals)

II 11 Most small producers sell their pigs with a light bodyweight (50-70 kg) and an age over 8 months. This age and weight improves until almost all producers of the highest stratum sell their pigs at ages less than 8 months and weighing more than 80 kg

II 12 Pork sales represent a high percentage (more than 50%) of the income for producers with more than 20 pigs, however, for smaller producers, pigs still represent an intermediate source of income (between 10 and 50%) in relation to other products from their farms

## III - SWINE PRODUCTION IN ECUADOR

Summary

III 01 The swine population in Ecuador (ca 1,200,000) is evenly distributed in the Andean region (50.6%) and in the western part of the country (46.8%). Swine production contributes approximately 25% to national meat production and 30% to the production of edible fats and oils, in the form of lard.

III 02 The majority of swine operations in both regions are within the range of 1 to 4 and 5 to 19 breeding sows per farm. Approximately 50% of the operations surveyed belong to the smaller operations (1-4 breeding sows).

III 03 In both levels of operations, swine production forms an integral part of other agricultural activities, which often include beef and dairy cattle, and poultry. The size of the agricultural enterprises is slightly larger in the western than in the Andean region.

III 04 The small swine operation (1-4 breeding sows) occupies only a part of the producer's time, but the regular work is usually done by family labor, especially the wife and children.

III 05 The majority of the swine operations tend to include breeding, growing and finishing phases. On the small farms (1-4 sows), the sows are usually native breeds (70-80%), and 50-60% of the farms do not have boars. Of the farms that do have boars, 40-50% have mostly native breeds. In the larger operations (5-19 sows), the proportion of crossbred and improved breeds in relation to the number of native sows increases, and there is a tendency to introduce boars of improved breeds, especially in the western region.

III 06 Because of the characteristics of these swine operations, litter yields are relatively low but above all, reproductive efficiency (No of births or litters/sow/yr) is minimal.

III 07 The installations for breeding and as well as for fattening are mainly of an extensive unconfined type, where there are simple sheltered and shaded areas. Part of the more technical commercial operations in the western region tend to have absolute confinement systems with cement floors.

III 08 The majority of the feedstuffs used for the pigs are produced on the farms. Slops and maize constitute the most common feeds in the Andean region, whereas bananas and maize are the most common inputs in the western region. In the latter, whey is also frequently used.

III 09 The number of pig farms that utilize balanced rations is very small (20), they are mainly found in the western region. Of all the balanced rations produced in Ecuador for 1977-78, 91% was utilized for poultry, 7% for beef cattle and only 2% for pigs.

III 10 The majority of the feeds available on the farm supply appreciable quantities of energy but limiting quantities of protein. The protein-containing foods available at the producer level are usually whey and forage. Concentrated sources of protein such as fish meal, soybean and cottonseed cakes are difficult to obtain, especially for the small farmers. The production of these protein products does not satisfy the normal demand of the plants producing balanced feeds.

III 11 Vaccines and vermifuges are relatively easy to acquire, and in general the majority of the farmers vaccinate their hogs against cholera and apply antihelminthics once or twice a year.

III 12 The pigs are normally sold to middlemen when they are from 8-12 months old and have reached an approximate 50-70 kg liveweight.

III 13 In the majority of cases, income from the sale of pigs represents less than 10% of the total income from farm sales. As the size of the operation and degree of technology increase, the swine enterprise becomes a principal source of income. This occurs mainly in some of the operations in the western region.

## IV - SWINE PRODUCTION IN BOLIVIA

Summary

IV 01 The annual growth rate of the swine population in Bolivia has been estimated at 4.9% from 1960-64 to 1970-74 and over 5% in more recent years. Pork consumption has been increasing in recent years and is presently close to 23% of the total meat consumption.

IV 02 Chuquisaca, Santa Cruz and Cochabamba are the three leading states in swine production, accounting for 57% of the total swine population in Bolivia. The main purpose of this study was to characterize swine production in several areas of Santa Cruz and Chuquisaca.

IV 03 In Santa Cruz almost all the pork produced is consumed locally and only a small proportion is exported to Cochabamba. Among the producers interviewed, 11% sell their pigs to packing house, 79% to middlemen and 11% to butchers. In contrast, a large proportion of the pigs produced in Chuquisaca are sent to other states (Cochabamba, La Paz, Oruro).

IV 04 In Santa Cruz a variety of products are being used for swine feeding, mainly, corn, rice by-products, sugar cane molasses, whey, feed scraps and crop residues. Cottonseed meal and soybean meal are produced locally.

IV 05 In Chuquisaca swine feeding is based almost exclusively on corn. In the province with the largest concentrations of pigs (Hernando Siles), it was estimated that 72% of the corn produced is being used for swine feeding. It was also found that corn production is growing at a lower rate than swine production.

IV 06 The agricultural enterprises from the different regions have several characteristics in common. Medium- and large-size enterprises with hired workers are most frequent. All of them combine agricultural and livestock activities and are usually involved with more than one crop and more than one animal species. Swine production is not a priority commodity, whereas corn is a priority in all regions.

IV 07 The amount of protein used for swine feeding is deficient in all regions studied, except in the Monteagudo Project (Committee on Rural Development - IDB). In distant regions where there are market and financial difficulties in obtaining commercial protein supplements, the problem of how to obtain protein from local farm production becomes priority.

IV 08 The energy requirements are mainly covered by corn, sorghum or cereal by-products. In general there is also a deficient supply of energy in relation to the needed requirements, however, the limitations in this case are mainly associated with (a) herd size and (b) the establishment of an adequate schedule for the feeding program.

IV 09 It has been considered that the areas of major importance for developing a research program are related to the possibility of incorporating grain legumes and green forages in swine feeding. In Bolivia, the legume species of major interest are soybeans (Glycine max), cowpeas (Vigna sinensis) and lupin (Lupinus communis). It seems important to evaluate a feeding model based on grain legumes, corn, green forages and vitamin-mineral mixes.

IV 10 Government support for swine production in Bolivia is channeled through two institutions. The El Prado Project (Universidad Gabriel René Moreno in cooperation with CIAT) in Santa Cruz and the Swine Development Project in Chuquisaca (Committee on Rural Development - IDB) in Montegudo.

## V - SWINE PRODUCTION IN GUATEMALA

Summary

V 01 Swine production in Guatemala represents in real terms 6% of the total production in the primary sector, and its participation in the Gross National Product is on the order of 1.6 to 1.8%

V 02 The swine population, which is estimated at 850,000 animals, has grown at a much slower rate (1%) than that of the human population (2.9%) during the last 15 years

V 03 The extraction rate (No. of animals slaughtered/stock) is estimated at 35-37%, nevertheless, these figures might be doubled if nonreported slaughtering is taken into account

V 04 Almost all production is destined for domestic consumption. Per capita consumption has decreased as a result of the growing gap between animal production and human population growth rates

V 05 The swine population is distributed throughout the country, but 50% is concentrated in the northwestern, southern and western zones. Of 270,000 farms in existence in 1974, 66% had swine

V 06 Agricultural production is highly diversified. Maize and beans are the most important crops, being basic in the people's diets, the former is also important in animal feeding. Other agricultural activities of importance are cattle raising, cotton, sugar cane, cocoa and coffee in the southern region, sheep and goats, wheat and coffee in the central region, and bananas and plantains in the northern region

V 07 Swine production operations have been classified according to their primary functions, either breeding or fattening. The great majority correspond to producers who have fewer than 4 breeding sows and less than 10 fattening animals

V 08 Middle- and large-sized operations (20-49 and more than 50 breeding sows) are characterized by their ample availability of capital. They use imported technology, and their indices of productivity are satisfactory. The major problem lies in the low availability of protein sources in the country

V 09 The small of family-type enterprises (average 2 ha) employ traditional technology using mainly family labor

V 10 Pig production has a stabilizing effect on the economic situation of the small producer, who is not only able to increase his capital gradually with a minimum of inputs but is also able to use the animals as reserve liquid assets that can be used when the need arises. The animals represent a high percentage of the farmer's yearly cash income and are among the three primary items of the total farm income

V 11 The indices of productivity in the family-type operation are very low. The factors affecting productivity are very diverse in nature. Rations are basically energy based (28 g protein/Mcal supplied) and deficient in total nutrients. The majority of the swine population is composed of native breeds or indeterminate crosses with no selection whatsoever. No sanitary precautions are taken so there is a high incidence of infectious diseases (e.g., hog cholera) and parasites, resulting in high mortality rates (26% in young pigs and 9.7% in adults). Management practices are inadequate, pigs are left loose or are confined under inappropriate conditions. On the other hand, marketing is characterized by the great number of middlemen

## VI - SWINE PRODUCTION IN PARAGUAY

Summary

VI 01 The Paraguay River separates the country into two distinct regions East and West. The same phenomenon that has been observed with the population distribution and agricultural production, holds true for the swine population: the eastern region concentrates almost all the swine population (97.8%), which has been calculated to be over 1,100,000 head.

VI 02 Most rural holdings (86.4%) have pigs, especially in the states of Itapúa, Coaguazu, San Pedro and Guairá, which concentrate 10.5, 11.7, 9.5 and 8.9% of the national swine population, respectively. The principal crops for family-consumption are corn, cassava and beans and the principal commercial crops are cotton, soybeans and sugar cane.

VI 03 There are substantial differences in technology depending on the size of the swine enterprise. Those with less than 5 breeding sows or less than 10 fattening pigs generally correspond to traditional-type technology, whereas the larger enterprises are almost always commercial-type operations with improved production technology.

VI 04 Swine production in Paraguay is basically family operated. Close to 95% of the population is located on farms with less than 21 ha. Moreover, 82% of the pigs correspond to breeding enterprises and only 16% to operations where there is just fattening. Ninety-three percent of the population is located on holdings with less than 5 breeding sows or less than 10 fattening pigs.

VI 05 The swine enterprises are relatively stable operations and perform two main functions. An important part of their production is dedicated for consumption of fresh meat and fat at the farm level. In addition, the animals constitute a strategic liquid asset that is built up through gradual investment of low-cost opportunity resources, and can be used in critical periods of high financial need.

VI 06 In most cases the care of the pigs is a family responsibility, particularly of the housewife. The feeding of animals is based on products and by-products obtained from the farm (corn, cassava, kitchen scraps, whey), which not only provide an unbalanced diet but are also supplied in quantities below the requirements for optimal growth.

VI 07 A large part of the population is based on native pigs or undetermined crossbreds, with poor selection and low productivity. The pigs are maintained under poor sanitary conditions, with no vaccination or deworming practiced. There is a high incidence of hog cholera and parasites, with a high mortality rate in both young and adult animals.

VI 08 At weaning (~ 2 months) the pigs weigh no more than 5 kg, and the market weight of fattening pigs (more than 90 kg) is reached at 18 months or more. Sows and gilts produce no more than 1.2 litters per year, and the number of weaned piglets is less than 7/female/year. In the case of animals production is sold directly to other farmers for both reproduction and fattening purposes. In the case of animals for consumption, they are sometimes slaughtered and sold on the farm, but more frequently, they are sold to middlemen who take them to marketing centers.

VI 09 There are a small number of swine enterprises operated by government institutions and a few large commercial-type enterprises, which although they do not represent a large volume in the national context do work with improved technology, obtain better productivity and participate in a better organized marketing system. There is a trend towards an increase in this type of operation, both in number and size.

VI 10 Any improvement of swine production in Paraguay should take into consideration the production systems of the small farmer, through the evaluation of its performance both economically and physically. Moreover, it is necessary to obtain information on general production aspects (i.e., feeding, genetics) under conditions similar to those of the small farmer since most of the presently available technology has been obtained under quite different conditions.

## VII - EVALUATION OF CIAT'S SWINE TRAINING ACTIVITIES

Summary

VII 01 The Swine Unit at CIAT has trained 88 professionals from national institutions in 16 Latin American countries. From 1969 to 1975, training was offered to 23 graduate interns, who came mainly to do research. From 1976 to 1978, a larger number of professionals (65) received courses in which training for the transference of improved technology to small- and medium-sized swine producers is stressed.

VII 02 The ex-trainees consider that the knowledge they acquired during training is highly applicable in their regions and in the daily work involved in their professional activities. They continue receiving information on the latest developments as well as support in their work from CIAT through the international cooperation program and participation in regional courses and workshops.

VII 03 The return benefits for the ex-trainees' countries of origin are also considered when taking into account their participation in national programs as well as in the entities who sponsored them. Ninety-six percent of the trainees have continued working for institutions involved in national development, research or education, and on the average, they have been working for said entity more than 36 months.

VII 04 All the ex-trainees are still involved in swine production, and almost half of them dedicate 100% of their time to this area of work. The majority are involved in the following types of activities: training (81%), research (76%), administration (74%), and development, extension work and credit (69%). In other words, most of the ex-trainees dedicate their time to two or three of these areas, which indicates that their activities are relevant to the development and improvement of swine production.

VII 05 In the regions where the ex-trainees work, more than 50% of the small- and medium-sized rural producers have pigs, which increases the possibilities that the work being done by these technicians will have an impact on a great number of production units. On the other hand, the ex-trainees believe that it is important to have professionals trained in swine production on the site in order to offer more effective support for the swine programs.

VII 06 The great majority of professionals working in activities related to swine production have not received specific training in this area, which may partly be due to the fact that there are apparently no other entities in Latin America that are in a position to give this type of training. From the foregoing, it can be seen that the Swine Unit could have great potential in professional training activities.

