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NICARAGUA-UNASEC SECTORIAL ANALYSIS OF
AGRICULTURAL MARKETING, POULTRY AND EGG REPORT

Presented to
Vice-Minister Mayo Vega
and
United States Agency for International Development/Nicaragua

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This is a report of the work done under an AID/University of Missouri contract to assist the Nicaraguan Government in a sector analysis study. The observations were made on visits to Nicaragua for one week in April and two weeks in late August and early September. The background for the author's assessment of the situation or analysis in Nicaragua consists of experience as a county extension agent, state extension specialist in poultry and egg production, state extension economist in poultry marketing and teaching and research in the field of poultry marketing as well as experience in broiler production. Analysis is based on observations, discussions, data and reports in Nicaragua about poultry and egg marketing. Visits were made to five commercial egg production units, two broiler production processor units, two feed dealers who also mixed feed, one hatchery, two supermarkets and three general city markets. The cooperation of the Nicaraguan National Agricultural Committee's Sectorial Analysis group in providing data, interpreters and transportation was greatly appreciated.

Poultry Production in Nicaragua

Nicaragua, a nation of slightly more than two million population, has available eggs and broilers produced at commercial operations. The operations are large and follow the good commercial

production practices that are used in the leading poultry production countries in the world. There is no commercial turkey production, although it is reported that a few farm flocks are found in Nicaragua, the production is used locally. Apparently there are few ducks, geese or other forms of domestic poultry produced in the country.

The commercial egg production is reported to be about 24 farms with approximately 425,000 hens. The largest farm has 260,000 or 61 percent of the commercial egg production. The second largest farm has 100,000 hens or approximately 24 percent of the total commercial production in the country. Best estimates would indicate that the egg consumption per capita is approximately 50 eggs for the population of Nicaragua from commercial sources.

The estimate on broiler production is about 2,300,000 birds, and of these, 1,650,000 are produced by one integrated firm. This is 73 percent of the total commercial broiler production in Nicaragua. The rest of the commercial broilers, about 870,000 head, is produced on a number of smaller farms. Recently a broiler production and processing unit that had been inoperative was operating again and producing at a rate of about 3,000 broilers weekly. Plans were hoped to increase in the near future to the capacity of 5,000 head weekly. The two commercial broiler production plants marketed all broilers in the frozen form. Apparently the consumption of broilers from commercial sources is between three to four pounds per capita annually.

The marketing survey reports taken by UNASEC and observations would indicate that the frozen commercial broilers and the eggs are widely distributed throughout the nation. In other words, commercial production was available in most markets in the country.

Some Production Details

In broilers and eggs the production is so closely related to marketing that a knowledge of the production details is probably essential in relation to the marketing. Therefore, this report will contain some description on the two broiler operations and some comments about a few of the egg operations. As information on the broiler production and processing units is more specific, the broilers will be covered first.

Broilers

Tip-Top Broiler Producer and Processor

The Tip-Top broiler processor plant is located 14K from Managua. The growing operation is somewhat further from Managua. The organization receives 38,000 chicks a week from Miami, Florida, preferring to get chicks from there rather than hatcheries in Central America such as Guatamala. These Central American Hatcheries also grow broilers in the areas where the breeders are kept and the manager of Tip-Top feels that it is possible that local diseases will get into the breeders and cause problems with the chicks. Also the U.S. chick prices are competitive.

The chicks are grown in adequate housing and in a very exceptable manner at seven owned or rented farms located some

distance from the Tip-Top processing plant. The broilers are dressed at about seven weeks of age at about 2.7 pounds liveweight. The dressed weight is about 2.2 pounds as the dressing percentage is 84 percent. The dressing percentage is high as the heads are included except for the beak which is cut off just in front of the eyes. The feet are also included. Prior to the earthquake, the Tip-Top broiler operation was receiving 42,000 chicks weekly. The feed conversion is from 2.35 to 2.45 pounds of feed per pound of liveweight which is higher than might be expected for birds at this young age. The mortality is 2 percent.

The chicks are vaccinated for Newcastle, and a coccidiostat is used in the feed. The space allowed is 0.8 square foot per bird. The normal procedure is to use a fifty percent volume protein supplement which is added to an equal amount of corn or sorghum. The supplement is a U.S. brand. Local grain, usually sorghum as it is cheaper, is contracted ahead at the harvest time and stored for use throughout the year. The broilers are processed and frozen for marketing. Most are marketed whole, although there are some marketed as breast, legs, wings, backs and giblets. The giblets are packed as neck, liver, gizzard and heart together.

It is reported that the Minister of Economy has put on a broiler ceiling price since the earthquake. The wholesale price in August, 1973 was 3.75C per pound and the retail was 4.30C per pound. The wholesale price in April, 1973 was 2.9C per pound. The manager of Tip-Top reported the demand has increased 30 percent in Managua since April and that the high prices for beef have increased the demand for broilers.

Tip-Top reported that the most competition is now at Leone which is the only other processing plant which has started up again recently. The largest hand dresser sells about 1,500 weekly, half of which are dressed and the rest sold alive. Then there are a number of smaller producers some of which dress and some of which sell birds alive.

Broiler Processing at Leone

The only other mechanized broiler processing plant in Nicaragua was located near Leone and was part of a large poultry operation which consists of laying hens and egg production at one location. A hatchery and feed plant are in the town of Leone. Broiler production facilities and processing at another location near Leone. The entire operation had closed due to financial difficulties, but during the summer had started again. It has been operating since June 1.

The broiler production operation consisted of a series of 10,000 bird capacity houses. Approximately 15,000 are started weekly. The broiler processing plant is located at the production site. The processing facilities consist of a batch scalding, a batch picker and troughs and tables for viscerating, packaging and freezing facilities.

There appeared to be some opportunities for improvement of the management in production and sanitation in the processing facilities. Some of those in the management positions seem to lack experience in poultry production but appeared to be learning rapidly.

Egg Production

Discussion with the egg production operators consisted of visits to the two largest commercial production units in Nicaragua, and of three other egg operations. Two were cage operations and three were floor operations.

San Francisco Egg Farm

The San Francisco egg farm is the largest commercial egg production unit in Nicaragua, consisting of a cage operation of about 260,000 hens. The operation apparently is well and efficiently managed with a good production and marketing program.

There is a six week replacement cycle of 25,000 chicks. The chicks are brooded on the floor and moved into cages when they are ready for production. The chicks are being obtained from a hatchery in El Salvador where the breeding stock is kept. The chicks are of Shaver breeding.

The complete ration is mixed at San Francisco using as many of the indigenous products as possible. This enables them to have a relative advantage in feed costs.

The eggs are manually sized. Anything below large is sold as medium. Only the dirtiest eggs are removed and washed. The washed eggs are running about two percent of the total eggs produced. An automatic machine washer is used in washing the eggs.

The eggs are packed on filler flats and taken to the retail markets where they are bagged in plastic bags for the consumer. The eggs are delivered in attractive, specially built small trucks with a large egg on the cab. These trucks call attention to the good value of the eggs and to the San Francisco operation.

The San Francisco egg farm also produces coffee. The manure from the laying hens is used to fertilize the coffee trees.

Eggs that cannot be sold to consumers are broken, packaged two pounds in a plastic bag and frozen. These are sold to bakeries and such users.

The spent hens, hens which have finished laying, are sold to people who come to the farm and buy the hens alive. These are for their own consumption or are slaughtered, dressed and sold in the central markets at the cities. San Francisco can sell all of their old hens this way.

Pinta Mary Egg Farm

The Pinta Mary egg farm is located south of Managua and has a capacity of 100,000 hens. It is the second largest commercial egg product unit in Nicaragua. The houses are floor operations and are equipped with automatic feeders and waterers. The pullet chicks are Shaver breeding and are obtained from El Salvador. The eggs are marketed through San Francisco. San Francisco is paid .25C per dozen for the marketed service. The Purina fifty percent supplement in paper bags is received and mixed with equal parts of sorgo or corn, usually sorgo as it is cheaper. For the chicks and the pullets, another supplement is again mixed with local grain.

Laying Operations at Leone

This is the laying part of the poultry operation at Leone which was described under broilers as the second broiler processing plant in Nicaragua. The layer operation was also out of business

for some months and was recently started again by new financing.

There are seven cage houses, each has a capacity of 8,000 hens. At the time of the visit in late August, three of the houses were in operation with 24,000 hens of varying operation.

The egg production unit used Heisdorf and Nelson breeding for the laying operations.

There was a sales house near an improved road as part of the egg laying unit. At the sales house frozen fryers, dressed hens and eggs were sold. The products were also delivered to supermarkets in Leone. Some retailers came to the sales house to buy supplies. The eggs were not sized as the management stated that if they were sized all would want smaller sizes. The sales people said that their eggs and broilers were priced about 0.2C below Tip-Top and San Francisco to maintain the demand. They stated the Tip-Top and San Francisco set the price pattern.

At the present time all eggs and broilers, which they are able to produce, sell quickly. This is attributed to the high beef prices.

The entire Leone operation is serviced by their own hatchery and their own feed mill. For the feed mill, they use locally produced grain where possible and local protein sources consisting of cottenseed meal and meat scraps. They also use rice bran and rice flour.

The Jose Castillo Egg Farm

This egg farm has a capacity of about 25,000 hens and is a floor operation. Rice hull litter is used on the floor.

Hy-Line chicks are secured from Costa Rica. Mr. Castillo has a feed mixing unit and mixes his own feed using Pfizer vitamin and amino acid premix. He uses local cottonseed meal meat scraps and blood meal for protein.

The eggs are separated into two sizes, the dirty eggs are washed, and the eggs are delivered to a San Francisco location in Managua daily for marketing through San Francisco marketing organizations.

The Senor Gonzales Egg Farm

The egg farm of Mr. Gonzales was not visited but he was interviewed at a feed mill. He has a capacity for 25,000 hens on the floor. He mixes his own feed when the ingredients are available, although at the present time he was having trouble getting local ingredients. The feed is being mixed at a mill. He markets his eggs through the San Francisco marketing organization. His location is such that he takes his eggs to the San Francisco farm for San Francisco to market. Mr. Gonzales uses Hy-Line chicks obtained from Costa Rica.

The Joe Krsak Feed Mill, Managua

This feed mill has been in operation a long time but has grown greatly in the last few years. About 90 percent of the feed supplied is for chickens. Approximately 3/4 of the poultry feed is for laying hens and 1/4 is for broilers.

Local ingredients are used including cottonseed meal, meat scraps, blood meal and molasses. He mixes about three percent molasses in the hen and broiler rations.

Again, the problem he reported was a shortage of local ingredients from time to time, particularly the protein supplements, but also the molasses.

The Oak Crest Hatchery

The Oak Crest hatchery is one of the few commercial hatcheries in Nicaragua and is located near Managua. The egg capacity of the hatchery is 80,000. This consists of two Matterhorn incubators and one hatcher. The Matterhorn incubator is a Japanese make, similar to the U.S. Chickmaster and apparently operating very well. He is using the Matterhorn incubator because at the time it was purchased it was considerably cheaper than the U.S. brands.

The hatchery uses Heisdorf and Nelson Nick-Chick breeding, both for white egg production, brown egg production and for broilers. The Heisdorf and Nelson organization has breeding stock for each capability.

The hatch at the hatchery is about 60 percent broilers and 40 percent egg type. The hatching egg flocks are maintained near the hatchery with the broiler hatchery flock renewed every eight months and the egg type hatchery flock being renewed every twelve months. The owner of the hatchery stated that in most South American countries the local hatchery industry is protected by duty. He favors a duty on chicks in Nicaragua so a local industry could be built to produce hatching eggs and hatch chicks locally. Some South American countries allow only grandparent stock to come in duty free. Therefore, countries such as Costa Rica, El Salvador and Guatamala have successful local hatchery industries.

This hatchery has many sales of 100-200 straight run chicks. The smaller farmers prefer the brown egg breeds and like the larger "dual purpose" hens for use as meat.

Some of the cockrels of the egg type chicks are bought by small farmers and a few are left as males in the little home flocks where it helps upgrade egg production in the next generation. These cockrels do fairly well in the native environment.

This hatcheryman thinks that it would be beneficial to promote and expand the production of geese, ducks, and turkeys as none of these are raised to any extent in the country. It would give a variety of meats and provide opportunities for upgrading the local native diet. It would be necessary for the government to import the ducks and geese to start, and maybe some of the superior strains of turkeys. There are some very small farm flock turkeys in some parts of the country, a few to the farm. Some ducks are seen around country homes, mostly Muscovy types.

There might be some question in trying to raise turkeys with hens as turkeys get blackhead disease from hens very readily and it is fatal to turkeys, where the hens are merely carriers. However, ducks and geese take less care and can be raised in conjunction with small home flocks of hens without any difficult disease problems. It is commonly believed that ducks and geese need to be raised at bodies of water. This is not true, just so they have water to drink.

Supermarkets

Several supermarkets in Managua were visited. The eggs were displayed in filler flats in one supermarket. Purchases

were dispensed to customers in plastic bags in the amounts desired. In the other supermarket, there were some 3x4 cartons as well as eggs in filler flats. They were well displayed and good retailing procedures were used. The supermarkets both had a large quantity of whole frozen broilers that were well packed in plastic bags. Some frozen parts were available. A large amount of freezer space was devoted to the broilers. It was also noted that a packaged chicken soup which apparently had been made from the necks was available in plastic bags in the frozen food counter. No ducks, geese or turkeys were available.

Channels of Distribution

Distribution of commodities, from a standpoint of minimum cost, is to have a market channel that goes directly from production to the consumer, or certainly to the retailer, where the consumer shops. Poultry and eggs achieve this closely in Nicaragua. Apparently eggs are distributed mostly to the retailers or directly to consumers with a few exceptions in outlying areas where a dealer may be involved. With the new San Francisco marketing organization it is understood that the dealers are being bypassed and the marketing channel is approaching it's ultimate shortness. Of course some costs are involved in assembling the eggs from the various production units by San Francisco.

Broilers seem to move somewhat directly from the processing plant to the retail outlets or to the central retail markets, although in some cases a dealer may be involved. The marketing channel for poultry and eggs is at or near the minimum length and these costs of distribution are at a minimum.

The Small Farm Poultry Flocks

The data was not available, but conversations with various people including hatcherymen, feed dealers and commercial flock owners indicated that throughout Nicaragua there exists farm flocks of two types. One type is the flock of under 1,000 hens and usually from 100-200 hens in connection with a farming operation. This production is used for the family and for sale of eggs and spent hens to the neighboring area including the central retail markets.

The other type of small flock is a few hens, usually less than 20 hens allowed to forage and roam around the rural houses and premises to provide food for the family and maybe the occasional sale of a few eggs. It is easy to miss these small flocks as they are usually not seen during the heat of the day. Observations were made about sundown and they could then be seen near many of the houses and buildings. Practically all of the flocks observed seemed to be of nondescript, mixed breeding of a small type of native chicken. These flocks are usually continued by some hens setting on a nest of eggs and hatching some chicks which are raised around the buildings. Some of the males and hens are kept and the remainder are eaten. These small flocks, while not considered economically important, are sources of better quality protein and will upgrade the diet of many of these low income families. Usually no feed is bought for these chickens. They live on a few scraps that are available around the house and by foraging for bugs, worms and seeds. Chickens can more nearly subsist in this manner in the tropical climate as housing is no problem except for protection from varmints and there are usually

growth of plants and other feed sources for foraging chickens.

It is doubtful if there are very many small broiler flocks on the farms, although if chicks are purchased, they are probably straight run. The cockrels are disposed of at the local markets.

Commercial Egg Producers Marketing Organization

A new organization for marketing eggs for commercial egg producers had been started a few months prior to the author's visit in late August. This organization was the outgrowth of some price cutting between the two largest commercial egg producers. The retailer margin increased, but retail prices stayed the same, while prices to producers declined. The organization initiated through efforts of San Francisco, now markets about 90 percent of the commercial eggs produced in the country. These eggs are sized and prepared for delivery to retailers by the producers. Then the producers either deliver them to a San Francisco center or directly to retailers as designated by San Francisco. San Francisco is paid a rate per dozen for this marketing service. The producers who are marketing this way, think it is an aid to marketing and will prevent any reoccurring price wars between large producers.

The organization is not a cooperative although this possibility was discussed at some of the organizational meetings. It was expressed by some of the participants that possibly this organization could be the nucleus for organizing a cooperative or a central buying organization to secure feed and other supplies needed by commercial producers at a price advantage.

This section will deal with recommendations with reference to egg and broiler production and marketing. Because of the time restraints with reference to the preparation of this report, the comments of the favorable aspects of the broiler and egg production and marketing in Nicaragua will be very limited. The general production facilities and management techniques being applied to the production of broilers and eggs appears to be good. Time did not permit studies on costs and efficiencies, but there is every reason to believe that this is relatively good. One indication of this is the price of broilers and eggs in Nicaragua at retail. The price compares favorably with other high protein foods and is an indication that the costs are in line with what might be expected in the economy of Nicaragua.

Specific Recommendations

1. Trade Balance and Local Feed Allocation

To aid in maintaining a favorable balance between exports and imports it is important that every effort be made to utilize indigenous feed supplies for the poultry industry. There appears to be adequate supplies of grain and of protein feeds, if they are properly utilized. Local supplies of protein feed were in variable supply throughout the year. At times there were shortages of cottonseed meal, meat scrap and molasses. This was generally attributed by the respondents to the export shipments being made to such extent that there were local shortages. It would be much more efficient for the export-import balance if an adequate amount of these supplies are kept in Nicaragua to supply the local needs for efficient poultry and egg production.

The cottonseed meal that is produced in the three Nicaraguan plants is of three forms, the expeller process, the solvent process and the expeller-solvent combination process. Cottonseed meal can be utilized effectively in poultry rations, but the limiting factor is the gossypol content, which can cause off-colored yolks. There is a chemical in cottonseed meal that can cause pink albumen under certain conditions. The lowest gossypol content meal is from the expeller process while the lowest amount of the chemical causing pink albumen is in meal from the solvent process. Therefore, the combination of expeller-solvent produced meal is the best for use in poultry rations. It is therefore recommended that the supply of cottonseed meal at the expeller-solvent plant at Managua be allocated for use in poultry rations. Cottonseed meal is used in cattle feed and the other two processes are equally good for cattle feed, although it is reported at times those buying cottonseed meal for cattle use enough meal at the Managua plant so there is not enough left for the poultry rations. The allocation of this to poultry use will cause some inconvenience, but is justified in view of the superior qualities of the combination processed cottonseed meal for poultry. The low gossypol cottonseed meal is also better for broiler ration.

At times it is reported that there is an inadequate supply of meat scraps due to exports. Again, it is recommended that the adequate supplies be allocated to poultry production and steps be taken to assure that is is good quality meat scraps, suitable for poultry.

Enough molasses should be retained in the country for domestic use. Some of this can be utilized in poultry rations to a limited extent and it is a good, cheap source of feed energy in Nicaragua.

2. Assistance with Rations

The economy of Nicaragua as far as poultry egg production is concerned, and this is probably true of other types of rations also, could be greatly aided if qualified help were given, through government funding, on formulation of rations. This could be in the form of analysis of local feeds, sample rations and limitations on the use of local ingredients and such. The conversations with producers and feed mixers indicates that such expertise is not generally available. This service could be used to maximize the use of local feed ingredients which would contribute to the export-import balance of the Nicaraguan economy. Some producers are using the 50 percent protein supplement which is mixed with an equal weight of local grains for the ration. This is more expensive than a ration of indigenous feed ingredients. While some of these supplements are mixed in Nicaragua, others are not and they all contain some imported ingredients to the greater extent than needed to maximize the local feed ingredient usage. As an example, in the limited number of interviews conducted, and limited questions about rations, the amount of cottonseed meal being used in the ration varied from 17 percent to 7 percent. The reasons given were that the gossypol is a problem in broiler growth and in egg yolk mottling. Discussions with nutritionists plus the knowledge of who was using the 17 percent cottonseed meal would indicate that

somewhere near 17 percent is probably satisfactory in rations, over twice what some were using. With some care the meat scraps could be maintained as a stable and uniform product output from the packing plants, and the blood meal could be prepared in such a way as to make a satisfactory high protein ingredient for poultry feed. This could all be part of the program to maximize the use of indigenous feed ingredients.

3. Survey of Other Feed Ingredient Potentials

A survey should be conducted to determine what other sources of protein feed ingredients might be made available. For instance, it is possible that shrimp meal could be made from the waste of the shrimp processing operations. Every effort should be made to conserve the by-products of the rice industry for use in feed. Some of these contain a fair amount of protein and some are good sources of energy. It is possible that a thorough survey could reveal other sources of protein feeds that could be processed and made available for use in local rations.

The full utilization of the by-products of packing plants should be encouraged by converting these by-products into high protein feed ingredients of high uniform quality. Also the proper processing of blood to make this high protein ingredient of the most desirable type for use in poultry rations. The offal of the broiler processing plants, which is now being discarded, should be transported to nearby meat packing plants where it could be processed into meat scrap along with the material of the cattle packing plant. If the offal were processed at a packing plant, the feathers from the broiler processing plant would need to be kept separate, but this should not be difficult to do.

Further studies would need to be made of whether it would be feasible to centralize the feathers from the broiler processing plants and convert them into feathermeal, which is a high quality protein feed ingredient for poultry. With the present dressing procedure used in Nicaragua, it is estimated that about 10 percent of the liveweight of broilers processed would be feather-free offal.

4. Price Ceilings

In accordance with the accepted economic traditions of the United States, most economists think that the imposition of government controls should be minimized rather than maximized. However, in some cases some types of controls are justified to eliminate the possibility of a much more difficult problem occurring at a later time.

In the case of the economy of Nicaragua, it is believed that there is justification for price ceilings on eggs and broilers, both at the producer level and at the retailer level. In the case of broilers with 70 percent of the production of commercial broilers in Nicaragua being by one firm, this firm could easily be in a position to control broiler prices and the management could successfully choose to embark on a program of maximization of net returns rather than maximize production at a satisfactory return. Therefore, price ceilings which should be adjusted from time to time can be justified in this situation. Some control of retailer margins which can be added if the price ceiling were applied to the production, is needed.

In the case of eggs with two producers producing over 85 percent of the commercial supply, and the larger of these producing

over twice as much as the second largest, it would appear that price ceilings should be established.

The developments within the last few months of an egg marketing organization that places the marketing of 90 percent of the commercial production under one control is another reason why ceilings would be justified. Ceilings have been imposed since the earthquake, but their continuation indefinitely would be in order.

This recommendation is not to imply that prices have been excessive in relation to the cost of production, but merely to forestall any problems in the future. The situation is such that without ceilings the efforts at maximization of returns could be successful.

Time did not permit the determination of a recommended ceiling price for broilers and eggs. In determination of proper ceiling prices, it would be necessary not only to consider the usual costs of production, but also land costs, capital costs, and the returns that would be necessary to retain capital in poultry production as compared to other types of production. This type of information can best be obtained by someone who is familiar with the economy and with the sources of data.

The ceiling needs to be changed as the economic situation warrants and should not be the type of ceiling that is imposed at an unrealistically high level. It should effectively accomplish the orderly pricing of broilers and eggs in relation to the cost of production and net returns to poultry and egg production in accordance with returns from comparable enterprises.

The use of price ceilings will also give some protection and confidence to new producers who might be entering the growing industry. There are indications that some expansion is being planned and normally if such expansion plans are justified there is opportunity for new growers.

5. Egg Sizing and Cleanliness

It was observed that eggs were often sold unsized, and in another case, eggs of small size had no size label. Eggs labeled large contained a great variation in egg size. Very few eggs were labeled other than large. In view of the rapidity with which eggs moved and the general quality observed, it would not appear feasible to have a national egg law with reference to interior quality. An egg law that would require certain minimum weights and size labeling of eggs would be justified. Two sizes would appear to be adequate with the large having a minimum weight per dozen of 24 ounces and the other size classification, mediums, having no minimum weight requirement. The large size could have the same tolerance provision as in the United States, which is that eggs weighing 23 ounces per dozen, 1 11/12 ounces each, which would be permitted in the large pack without restriction, except that the dozen must weigh at least 24 ounces. As eggs are sold in lots of less than one dozen, the regulation should provide for a sampling procedure to determine if the egg weights met the requirements. This sizing could be done manually and does not require the use of sizing machinery. About 75 percent of the eggs laid in a laying year by a hen are large or above.

If consumer surveys indicate that there is no objection on the part of consumers to some stains or small amount of dirt on eggs, then a regulation requiring clean eggs, such as in the United States, is not needed but something should be included in the regulations to prohibit the sale of very dirty eggs. The very dirty eggs could be cleaned before they were offered for sale.

6. Packaging Eggs

If consumer surveys indicate that many eggs are sold in quantities of six and twelve, it might be feasible to encourage egg packers to place eggs in cartons in quantities of six and twelve. It is possible that surveys of consumers would reveal that one of the reasons they do not purchase more eggs at the retail stores is because of the breakage problem in taking the eggs home. This experience with breakage of eggs while in the hands of the consumer could lead to less use of eggs and therefore be a factor in the low per capita consumption of eggs. Eggs are economical and a good protein source in the diet.

7. Produce Infertile Eggs

All egg producers need to be encouraged to produce infertile eggs for the better keeping qualities in the warm climate of Nicaragua. Experience with fertile eggs that have some germ development, and therefore some blood streaks, can reduce the consumption of eggs. The commercial producers are producing infertile eggs.

8. Small Flocks Producing Eggs for Sale

The farmers keeping small numbers of hens for the purpose of selling eggs, and these are usually hen flocks of 100-200 birds,

need to be provided with information and training on management, feeding and sale of eggs. The use of chicks bred for egg production, the use of good feed and proper management, and housing should be encouraged. Potential producers should be cautioned that unless a special market is available for the production of the flock this is an uneconomical size flock to keep.

9. Subsistence Flocks

The small flocks kept around rural homes for the purpose of providing some eggs and meat for the family can be improved. If information could be gotten to these families with reference to the basic elements of care and management, the volume of eggs, which would hopefully go into their diet, could be increased. The greatest immediate improvement could come from improving the genetic capability for egg production. The improvement could come from encouraging the use of the cockrels that are the by-products of producing replacement pullets. A hatcheryman informed the author that these cockrels withstood the native environment fairly well. If these males were allowed to be with the hens the resulting chicks should have a greater egg production potential than the hens that laid the eggs. If this is kept up for several generations there would be more improvement. Experience has shown that if the genetic potential for egg production is present, more eggs will be produced even though the management and feeding is not improved. More eggs used in the diet would improve the diets of these rural people. While it is realized that the income of many of these people living in the rural homes is limited, the

cockrels of the egg types are also extremely reasonable as they are by-products of pullet chick production.

10. Sanitation in the Broiler Processing Plants

The sanitation at broiler processing plants could be greatly improved. A great improvement that could be made would be to follow procedures in dressing that would prevent contamination of the broiler carcass with fecal material. The visceration should be handled in such a way as to not allow fecal material from the intestine to come in contact with the broiler carcass at anytime. There are other improvements that could be made but this would be an important starting point.

Fecal material contamination does not cause immediate problems as the broilers are frozen immediately and marketed in the frozen state. However, the shelf life of the thawed broiler in the refrigerator is shortened as this contamination could cause spoilage in a much shorter time than if the broilers are dressed in a more sanitary manner. There is also danger of the transmission of some diseases.

11. Dressing Procedures for Broilers.

It is recommended that a consumer survey be conducted of the people who buy broilers, and this is believed to be in the middle and upper income level, to determine what they do with the feet, giblets, (gizzard, liver and heart) head and neck. A few people that the writer of this report asked reported they did not use the head, feet and usually not the neck either. A more common way of dressing broilers is to cut the head from the neck and discard

the head and feet. There are consumers who eat the feet, head, neck and the giblets. These consumers are in a different income class than those who buy broilers. It would be feasible to market these latter items separately. They would probably be purchased by lower income consumers. In the United States the neck, gizzard, liver and heart are included and put in the body cavity, but the head and feet are included in the offal which is converted to meat scraps.

If there are indications that there is no market for any of the items, then these are wasted resources when they reach the consumer with the whole broiler. It would be better to have them included in the waste of the poultry processing plant so they could be processed into meat scraps.

The basis of this decision should be carefully planned and conducted consumer use surveys.

12. Expansion of Production

Some of the growers indicated they are planning to expand production. Extensive production increase would need to be based upon increase in population and increased consumption rather than on the export potential of poultry and eggs from Nicaragua. The absolute and comparative advantage of some of the larger commercial poultry and egg producing countries is such that it would be difficult for the Nicaraguan producers to compete. However, there might be a potential for expansion through the promotion of the consumption of poultry and eggs in Nicaragua. Increases in the per capita consumption would be a great help in improving the diets of many citizens of Nicaragua.

13. Hatchery Protection

If some import protection could be given to the hatchery industry, it is possible that this industry would expand and the Nicaraguan producers would have a more stable supply of laying type chicks and broiler chicks. It would also help make available to the local growers more good strains of the egg types which now need to be imported from sources over which they have little control. A hatchery producing good broiler strain chicks might solve the problem of short supplies of imported chicks. This has sometimes been a problem when the supply of broiler chicks or broiler hatching eggs in the United States is in somewhat short supply. The larger hatchery industry would provide opportunities for local citizens to produce hatching eggs.

14. Integrated Production

The large operations are owner integrated, that is the owners of the operation have all the facilities and hire labor for the production. If the integration could be moved out to production units, operating as contract producers with supervision by the integrator, it would provide more opportunities for more producers and less people working as laborers. This would also require less capital on the part of the integrator and would apply equally to broilers and eggs. The potential for income for the growers would be better as they would have an opportunity to expand production for a greater income potential.

15. Growers Supply Cooperative

The possibility for the organization of a cooperative to

secure supplies for commercial poultry producers should be investigated. The supply of grains is often seasonally unstable according to reports. It is possible that a cooperative could operate in such away as to stabilize the grain supply for poultry producers.

16. Climate Tests

There are reports that there is enough variation in climates in various parts of the country to provide an advantage in the production of eggs and broilers in some areas of Nicaragua. There does not seem to be any definite data on this. Tests or surveys might be made to determine if this is true. This information could then be made available to the people who are starting new operations or moving their operations. They may not choose to produce in these areas but at least they have the basis for making a decision as to location.

SUMMARY

It was a pleasure to see the good commercial poultry production and marketing in Nicaragua. The use of stock with good breeding background, adequate housing, balanced rations, good management, and well adapted marketing procedures were found. The potential exists for more use of poultry and eggs in Nicaragua to upgrade the diet.

There are facilitating adjustments to be made and changes to be encouraged to improve marketing and production of poultry and eggs. The most important is to assure the availability and use of local feed supplies in good rations and to facilitate the availability of local feeds now not being utilized.

The marketing channel is short and direct for eggs and broilers. The sale of spent hens alive to local users is direct and good. Changes to assure consumer satisfaction with reference to broilers and egg purchases are in order. The price ceiling recommended at the producer and retailer level will protect prices to consumers from the seller market power. The expansion of the industry is in order if based on intra-country demands from population growth and increase per capita consumption that can be promoted. Nicaragua will probably not want to try and compete in the export market.

Tables and extensive data are not included as time did not permit securing the information. Costs studies, as a basis for ceilings, are not included as these are best obtained by knowledgeable, local people who know wage rates, interest rates, credit systems and returns to capital needed, to keep capital in poultry production as well as cash costs.

A potential exists for the production of other poultry such as turkey, ducks, and geese to add variety to local food supplies.

INSTRUCTIONS

1. This report is to be done in the same format as the one enclosed (Overview of Beef Cattle Markets and Marketing With Recommendations).
2. Front cover and back cover should be same material as enclosed report, cover page is included in report. (indifferent to color)
3. All of the report is in proper order and is to be bound at the left side accordingly. (same as report included)
4. There are to be ten copies reproduced with twentynine pages in each copy. (front and back cover included) This is a total of 290 pages to be reproduced.
5. If there are any further questions, please contact me at 882-7310 (Rose Ragsdale, Agricultural Economics)