AGRICULTURAL POLICY ANALYSIS PROJECT, PHASE II

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THE PHILIPPINE CORN/LIVESTOCK SECTOR:

PERFORMANCE AND POLICY IMPLICATIONS

Executive Summary

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1. INTRODUCTION

This study was undertaken by the International Food Policy Research Institute (IFPRI) in cooperation with the Department of Agriculture of the Philippines (DA). The project received funding from the United States Agency for International Development (USAID), and was implemented through the Agricultural Policy Analysis Project, Phase II. The analysis was motivated by four major concerns identified by the DA and IFPRI. First, it was evident that growth in demand for corn for livestock feed is likely to be a major impetus for growth in domestic corn production. Despite relatively slow growth in production and consumption of livestock through the mid-1980's, the share of corn utilized as feed has increased significantly. In the years to come, as income growth in the Philippines recovers, it will likely be income-led demand growth for livestock, particularly poultry and pork, which will drive domestic demand for corn. Second, a number of important on-going agricultural policy debates arise from the linkages among corn, feed, and livestock industries, including pricing policies for these commodities, tariff policies, and import/export policies. Third, the domestic marketing and distribution of corn has been identified as a major constraint to the feed/livestock industry. Fourth, the data and analytical framework to permit rigorous assessment of policy options in the corn/feed/livestock subsector are in many cases inadequate.

In order to examine these issues, the report addresses a series of research topics to assess the economics of the corn/livestock sector, and integrates these analyses using an agricultural supply/demand model to derive sectoral level policy implications.

Chapter 1 provides an introduction to the report. In Chapter 2, "*Trends in the Supply and Demand for Corn and Livestock*," general trends in supply and demand for corn, feed, and livestock are assessed, together with a description of government policies in the corn/livestock sector. Chapter 3, "*The Economics of Corn Production in the Philippines*," assesses the costs of production and marketing, comparative advantage, and effects of government policies on incentives for corn production, by variety and technology levels. In Chapter 4, "*The Economics of Hog and Poultry Production*," a comparable analysis is undertaken to assess the incentives, efficiency, and performance of hog, broiler, and egg production, by region and size of operation.

In Chapter 5, "*Marketing of Corn in the Philippines: Market Integration and Dynamics of Price Formation*," the degree of market integration, patterns of price determination, and long run price transmission within Philippine corn markets are examined. Chapter 6, "*Comparative Analysis of Production and Marketing of Corn in the Philippines and Thailand*," undertakes a

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*This summary presents major findings and conclusions from the report, The Philippine Corn/Livestock Sector: Performance and Policy Implications. Results are summarized according to chapter of the main report.

comparative study of sources of differences in production and marketing costs in Thailand and the Philippines, in order to assess the potential for policies to reduce costs in the Philippines.

Chapter 7, *"Supply Response in the Philippine Livestock Industry,"* analyzes the response of hog and chicken supply to output and input prices. Chapter 8, *"Food Demand Elasticities by Income Group by Urban and Rural Populations for the Philippines,"* undertakes an analysis of disaggregated demand parameters for food in the Philippines. Estimated parameters from these two chapters are utilized in an agricultural supply/demand model in Chapter 9, *"Policy Alternatives for the Corn Livestock Sector: A Simulation Analysis,"* to analyze alternative pricing and trade policies for the corn/livestock sector. Finally, policy implications are discussed in Chapter 10, *"Conclusion and Summary of Policy Implications."*

2. TRENDS IN THE SUPPLY AND DEMAND FOR CORN AND LIVESTOCK

Trends in supply and demand for corn and livestock are provided in the report. This summary focuses on trends in government policies.

Government Policies

Over the years, the Government of the Philippines (GOP) has pursued a set of sectoral and economy-wide policies that have directly and indirectly affected the corn-livestock subsectors. Among these are trade policies; foreign exchange rate policies; grain stabilization policies reflected in the regulations of domestic market entry and operations; inter-island shipping policies affecting the distribution of corn; and corn and livestock production programs.

Trade Policies

Like most agricultural commodities in the Philippines, international corn trade is generally regulated in two ways: imposition of import tariffs and import licensing. As of 1990, the Philippine government imposed a tariff rate of 20 percent on corn. This is lower than other feed ingredients, such as broken rice, sorghum, cassava, and sweet potato at 50 percent each, but still higher than the 10 percent tariff on soybeans, soybean meal, fishmeal, and bone meal. The proposed Executive Order 413, provides for a further increase in corn tariffs to 30 percent. In addition, beginning the end of 1990, an ad valorem levy of 9 percent was imposed on all imports. Corn trade is also regulated through import licensing administered by the Department of Agriculture (DA). Every first quarter of the year, the DA, through an interagency committee, assesses corn import needs and decides the volume and timing of corn imports.

The Philippines charges import tariffs on live animals, meat products, meat preparations, eggs and dairy. Tariffs range from 20 percent (beef, hogs, and goat's meat) to 50 percent (chickens and eggs). In addition, tariffs are imposed on feed ingredients ranging from 10

percent (fishmeal, meat and bone meal, and soybean meal) to 50 percent (sorghum, cassava, and sweet potato). Mixed feeds are taxed by 30 percent of their import values. Tariffs for feed ingredients negatively affect the domestic production and expansion of the livestock industry, since feeds comprise a substantial portion of costs in commercial livestock production.

Grain Stabilization Policies

The GOP regulates the market entry and operations of the grains (rice, corn, sorghum, wheat) industry through the National Food Authority (NFA). The NFA regulates and administers the issuance of business licenses in the trading and distribution, processing, storage and exportation of grains. These activities are intended to support the grains stabilization program of the government. Through the NFA, the government stabilizes the supply and demand of grains through direct market intervention. Historically, rice has been the major focus of NFA's direct market interventions. The corn stabilization program has been similar to that of rice, but with a much lower resource commitment.

The NFA has a long history of attempting to stabilize corn supply and distribution by defending a procurement floor price. This was actively pursued in the 1970's and early 1980's in support of the corn self-sufficiency program. In recent years, however, NFA has taken a subdued role in corn procurement, acting only as the buyer of last resort and for as long as its budget allows it. On the average, domestic procurement of NFA has been less than three percent of total corn production. In recent years, corn purchase was constrained not only budget limitations but a policy change to limit NFA in the trading of grains, and allow a larger participation by the private sector.

Exchange Rate Policies

Over the past three decades, the GOP has pursued a development strategy centered on an industrial protection system that has negatively affected agriculture. This protection system has defended an overvalued exchange rate which has made the peso value of agricultural tradables fall, with simultaneous increases in the price of manufactured goods purchased by the agricultural sector. The deterioration in the terms of trade in agriculture due to the failure of foreign exchange policies to make short-run corrections in the peso overvaluation has also contributed to making corn-livestock products uncompetitive in international markets. Overvaluation has had negative sectoral and economy-wide effects on agricultural commodities.

Inter-Island Shipping Policies

Improvement in the efficiency of corn and livestock distribution from producing regions to consumption areas would contribute to production efficiencies in feed-grain-livestock subsectors. An efficient inter-island shipping system and port facilities can significantly reduce marketing costs. The relative unprofitability of the shipping industry due to high cost of credit

financing, high tariffs on spare parts, and restrictive government route regulations, among others, has reduced the number of shipping vessels operating among the islands in the Philippines.

Until 1989, government regulation classifying corn as a basic class (lowest class rate) cargo put corn into the domestic liner's list of non-preferred cargoes. In 1989, the Presidential Task Force on inter-island shipping reclassified corn and other agricultural products in the Class C cargo category. The same force is currently studying policy alternatives to improve the efficiency of the inter-island shipping industry.

Corn Production Programs

The first corn production program of the GOP was originally patterned after the rice production program of the 1970's. It was conceived with the following objectives: to support the expansion of the commercial livestock subsector by reducing feed input costs; to save foreign exchange by eliminating mounting imports and become corn exporter; to provide an adequate supply of food to the corn eating population; and to improve the farm incomes of corn producers.

Since its inception in the early seventies, the corn production program of the Philippines has taken several structural configurations. It started in 1969 with the launching of the National White Corn and Feedgrains Program under the National Food and Agriculture Council (NFAC). This program stressed the production of white corn for food to compliment the food self-sufficiency program of government during the period. Until 1973, this program was centered on the major corn producing/consuming regions of the Philippines. Operating under different program emphasis, it was named the Masaganang Maisan, Maisan 77, the Maisagana Program, and the Expanded Yellow Corn Production Assistance Program. All of these programs had the major objective of attaining corn productivity and self-sufficiency. The programs have had limited success.

As compared to previous programs, the current corn program, Corn Productivity Enhancement Program (CPEP), is more modest in its production target (an aggregate 5 percent increase per year) and centers its assistance on the use and distribution of two vital inputs in corn production, fertilizer and seeds. The program appears to have achieved some success in improving yields in target areas. However, the extent to which these apparent yield increases can be achieved on a cost-effective basis if the program expanded is not assured. Considerable additional analysis would be required to assess the contribution and cost-effectiveness of CPEP to these yield differentials.

3. THE ECONOMICS OF CORN PRODUCTION IN THE PHILIPPINES

Economic Incentives in Corn Production

A wide range of government policies has affected the economic incentives in the production of corn. Price and subsidy policies, import and export policies and more general macroeconomic policies, such as exchange rate and interest rates, may affect relative incentives in agriculture. Impacts of these policies on relative incentives are measured in the study by using nominal and effective protection rates. The nominal protection rate (NPR) is the ratio of the domestic price of an output to its border price expressed in local currency usually at the official exchange rate. Sector-specific and economy-wide policies influence agricultural prices. Hence three levels of nominal protection rate are analyzed here: direct nominal protection measures the impact of sector-specific policies on levels of protection; indirect nominal protection measures the effect of foreign exchange rate distortions on protection; and total nominal protection rate is the sum of the direct and indirect effects.

The study shows that corn pricing and trade policy (particularly tariff and non-tariff barriers to trade) have provided high positive protection to corn production. During the crop year 1989/90, the direct nominal protection rates for corn were very high, 39 percent at the wholesale level and 27-41 percent at the farm level, based on the US border price of corn, and even higher relative to Thai border prices. Because of overvaluation of the peso the indirect NPR is negative, so the total nominal protection rate was lower than direct NPR, but still strongly positive.

Nominal protection rates measure only the impact of sectoral and economy-wide policy on output incentives, but not on inputs. Effective protection rates measure the net effects of government intervention on both input and output, as reflected in value added. Effective protection rates for corn are even higher, 38-77 percent, than nominal rates, confirming that government policies and market distortions on both the output and input markets artificially protect corn production, encouraging inefficient high-cost corn production. The results point out the desirability of pursuing a domestic pricing policy consistent with long run economic prices of corn, and a foreign exchange rate that equates the long term supply and demand for foreign exchange.

Comparative Advantage in Corn

Comparative advantage in the production of a given commodity system for a particular country or province is measured by comparing the social or economic opportunity costs of producing, processing, transporting, handling and marketing an incremental unit of the commodity with its border price. If the opportunity costs are less than the border price, then

that country has a comparative advantage in the production of that particular crop. This study utilizes a domestic resource cost analysis to assess comparative advantage.

The domestic resource cost (DRC) of foreign exchange earned or saved from a particular production activity can be expressed as the ratio of the domestic factor costs in shadow prices per unit of output to the difference between the border price (expressed in foreign currency) of output and foreign (tradable) costs (also expressed in foreign currency). DRC measures the social opportunity cost of domestic resources employed in earning or saving a marginal unit of foreign exchange. An activity is economically competitive, or displays comparative advantage, if the opportunity cost of earning or saving an incremental unit of foreign exchange is less than the shadow exchange rate.

The domestic resource cost analysis shows that domestic corn production is efficient as a saver of foreign exchange in the domestic production of corn for import substitution. However, there is no comparative advantage in exporting corn. A major reason is the current underdevelopment in the marketing and distribution system.

Infrastructure and Support Services

The high levels of protection on corn have also contributed to inefficient corn marketing and distribution system, by reducing the incentives for provision of efficient marketing services. Lack of infrastructure facilities, particularly quality roads, bridges, ports, bulk handling and shipping facilities constrain the distribution of corn. Trading and distribution costs account for 35 percent of total corn production cost from farm to Manila's wholesale market. Freight (trucking, shipping) is a major component (35-42 percent) of total trading costs.

Given that the domestic costs of trading and marketing are quite high, improvement in the domestic distribution of corn would contribute to the productivity of the corn subsector. Increased efficiency in cargo handling services from open competition, accompanied by investments in the port facilities, including the ready supply and availability of inter-island vessels to transport corn, would reduce trading and distribution costs. In the long-run, government policy should pursue an integrated distribution system not only for corn but for other agricultural commodities as well, to minimize trading and distribution costs.

4. THE ECONOMICS OF HOG AND POULTRY PRODUCTION

The economic analysis of the non-ruminant livestock subsector brings out several policy issues which can serve as a basis for future policy dialogue. Among these are the strong linkage between corn and livestock production, trade and foreign exchange rate policies, and comparative advantage in livestock trade.

Corn-Livestock Linkage

The analysis of non-ruminant livestock production showed that feed costs contributed 65 to 87 percent of total farm production costs. In hog production, the proportion of feed costs to farm production costs was highest in the medium and large commercial farms, averaging above 80 percent. In layer farms, the proportion of feed costs to the costs of farm production ranged from 67 percent (backyard and semi-commercial) to 78 percent (large commercial). On the average, the broiler farms had the highest proportion of feed costs to total farm production costs, above 83 percent.

Costs of production in livestock non-ruminants thus show the strong linkage between the feedgrain-livestock subsectors. This linkage further implies that full efficiency cannot be realized in the domestic production of livestock non-ruminants unless efficiency in the domestic production of corn is achieved. The feedgrain-livestock subsectors should be viewed as an integrated whole.

Trade and Foreign Exchange Policies

The analysis showed that there is a large negative indirect effect on economic incentives in livestock production due to the overvaluation of the peso. Unless this negative bias is removed, expansion and competitiveness of the feedgrain livestock subsectors will be constrained. In addition, the tariff on feedgrain and livestock products should be gradually removed and domestic pricing policies should be directed towards equalization of domestic with long-run world prices.

Economic Incentives and Comparative Advantage in Livestock Production

Analysis of economic incentives and comparative advantage for livestock also utilized nominal and effective protection rates and domestic resource cost methodology. Direct nominal protection rates for hogs were low, and with negative indirect protection due to peso overvaluation, total nominal protection was negative. Given the tariff protection on pork, it was expected that the direct nominal protection rates for hogs would be highly positive. A possible explanation for the apparent low level of direct nominal protection is a quality effect. The Philippines is endemic with foot and mouth disease (FMD), reducing the quality and value of Philippine pork in the international market. Full discounting of the price of Philippine pork to reflect quality differentials would likely result in a higher estimated level of protection.

Direct nominal protection rates for egg and chicken production were high. NPRs for egg production averaged 46 percent across producing areas. The major reason for this was the very high domestic producers price induced by high tariffs (50 percent) on eggs, which have

encouraged inefficient production. Accounting for the negative indirect effects, the total nominal protection rates were still high, averaging 25 percent across producing areas.

The direct nominal protection rates for broilers were also high, averaging 54 percent across producing areas. Given the negative indirect effect of exchange rate misalignment, the total nominal protection rates due to overvaluation averaged 33 percent (Table 4.22). At the wholesale level the patterns of nominal protection rates were of similar magnitude to the producers level. Effective protection rates for eggs and broilers were even higher than nominal rates of protection.

The domestic resource cost analysis shows that there is a comparative advantage in the domestic production of hogs, egg, and broiler as import substitutes. The potential for exporting eggs and broilers appears marginal, but the analysis showed a strong comparative advantage in the export of hogs. Realization of this comparative advantage would require the elimination of FMD in the Philippines, which is a major constraint to export.

The eradication of FMD would not only be beneficial for potential hog exports but would help in maintaining a healthy population of the ruminant animals (beef and carabao) as well. It would be desirable therefore to strengthen further the current program of the Department of Agriculture in the complete eradication of the FMD. Hog-producing regions identified by the Bureau of Animal Industry as FMD-free zones should be used as an initial basis for negotiations in obtaining international certification of export worthiness in pork. Also, bilateral government agreements between the Philippines and Asian importers of pork should be pursued more vigorously.

5. MARKETING OF CORN IN THE PHILIPPINES: MARKET INTEGRATION AND DYNAMICS OF PRICE FORMATION

The general objective of this chapter is to determine the patterns of price formation for corn in the Philippines and the effect and magnitude of impact of price formation patterns on market integration. The dynamic process of price formation and market integration of corn was analyzed using the results obtained from field survey conducted by IFPRI in March 1990 to July 1990 of corn farmers, traders, shippers, livestock/poultry raisers, and corn processors from five sample provinces. Results of the survey are supplemented by results obtained from the estimation of econometric time series models.

Corn prices are discovered by the interaction of farmers and traders, and the price discovery process for corn in the Philippines is complex. In buying, corn traders contact as many as 10 or more farmers from two or more municipalities. Most of these traders have contracts with wholesalers to deliver large volumes of corn. On the other hand, farmers usually contact two or more traders of the many buying and selling corn within their municipalities.

The presence of many buyers trading within a limited geographic area and the need to fulfill the volume required in their contracts with other corn buyers imply a high degree of competition for a relatively small volume of corn available at the farm.

In pricing corn, informal sources are commonly used as sources of market information. Farmers rely on traders for price information. Traders, on the other hand, use other traders as sources of information. Very few farmers and traders utilized publicly reported information. Because of concern over the possibility of price manipulation by traders, policy makers have been worried over the use of informal sources as sources of market information. The findings of the study, however, indicate that price manipulation is unlikely. According to farmers, they talk to an average of two or more traders before selling, and the "prevailing market price" is important in making their pricing decision of corn, suggesting an awareness of the level of selling price in the market. Also, to fulfill their contracts with other buyers and ensure a regular source of corn supply in the next seasons, corn buyers are likely to match the offer price of other buyers. Underpricing would erode a buyer's market share, and therefore would be unprofitable in the long run. Thus, prices within a geographic market are likely to be uniform and price deviations, if any, are also likely to minimal.

The activity of buying in low price markets and selling in high price markets (arbitrage) links separated markets and communicates information about prices prevailing in these markets. By definition, markets are integrated if price changes in one market are transmitted in another market. Results of tests of spatial integration strongly indicate that the arbitrage activities of profit seeking traders link the major regional corn markets in the Philippines. Cross long-run multipliers (LRM), a measure of market integration, are statistically significant.

However, the extent of spatial integration is imperfect. Estimates of cross LRM are less than unitary and positive, indicating that price adjustments between spatial markets to new information occur in the same direction but the magnitude of response is inelastic. Price adjustments between regions also occur rather slowly, further indicating imperfect spatial integration. Markets situated in close proximity tend to respond to new information quicker than markets situated farther apart. High costs of transportation, inadequate transportation facilities, and poor farm-to-market roads impede the rapid flow of corn and the complete transmission of information between markets.

The results from tests of market integration and from the field survey are consistent. While available information about market conditions in several competing markets is used in the pricing of corn, structural rigidities in the market arising from poor physical farm-to-market linkages, inadequate transportation, and high costs of arbitrage exist that impair the full, complete, and rapid price adjustments between markets and their efficient integration.

The empirical findings suggest that there are benefits to developing better physical infrastructure to effectively link production points to market centers and in formulating incentive

packages to encourage private investments in transportation, storage, and other necessary marketing facilities. There are also benefits to improving current public market information services to ensure the timely dissemination of accurate and reliable information. An expansion and improvement in the capability of the existing marketing system is imperative to ensure the efficient distribution, from the farmers to the feedmillers, of increments in corn production needed to meet the requirements of an anticipated expansion in the livestock/poultry sector. Marketing costs are expected to decline and farm profits are expected to rise with improvements in the corn marketing system, providing the incentives necessary to augment current levels of production to levels needed for the sustained growth in the livestock/poultry industry.

6. COMPARATIVE ANALYSIS OF PRODUCTION AND MARKETING OF CORN IN THE PHILIPPINES AND THAILAND

This chapter compares the costs of production and marketing of corn between Thailand and the Philippines. Possible sources of constraints in corn production and marketing in the Philippines, where policy interventions may lower costs, are identified.

Most of the corn produced in the Philippines and Thailand is the open-pollinated, yellow corn variety, although the use of hybrid corn is increasing more rapidly in the Philippines. Due to the high costs of fertilizers and inadequate availability of irrigation, very little hybrid corn variety is grown in Thailand. Expansion in demand of yellow corn for feeds has stimulated rapid increases in corn production in both countries.

On average, corn farms in Thailand are larger and tend to be more clustered than those in the Philippines. Because agricultural land in the Philippines is relatively scarce and land rent is high, increments in corn yield in the Philippines have come primarily from increased intensity in cultivation over the past few years. In comparison, the opening of relatively abundant new lands to corn cultivation has accounted for most of the increases in corn production in Thailand, though there has been some increase in intensity in cropping in recent years.

Production Costs

The study estimates show that the on-farm cost of producing hybrid corn and open-pollinated corn is 44 percent and 34 percent higher, respectively, in the Philippines than in Thailand. High interest costs, high levels of application of fertilizer, and larger rental expense account for the largest portion of total corn production expenses in the Philippines. A considerable portion of the differential cost of corn cultivation, however, could be eliminated by devaluation of the overvalued peso.

Marketing and Distribution Costs

The cost of marketing and distribution of corn in the Philippines is 70% higher than in Thailand. Part of this differential is due to natural agroclimatic reasons: because corn farms in the Philippines are small and geographically dispersed, and marketed volume small, per unit costs of marketing will tend to be somewhat lower than in Thailand. However, other sources of the difference in the cost of marketing could be eliminated through appropriate investments in infrastructure and market development. Although Filipino corn farmers are located closer to a local market or a buyer than Thai farmers, better rural infrastructure in Thailand enables the latter to have easier access to alternative markets. On average, Filipino farmers are located about 14 kilometers to the nearest market outlet and Thai farmers, about 40-70 kilometers, but the better Thai road system and innovations in marketing and transportation significantly reduce the unit costs of marketing. A key innovation in corn marketing and distribution in Thailand is the use of bulk handling even from small regional markets, which significantly reduces the costs of marketing. The comparative analysis of Thailand and the Philippines reinforces the findings in Chapters 3 and 5 that appropriate investments in infrastructure and marketing can reduce the costs of marketing and improve the efficiency of movement of corn from the farm level to the consumption centers.

7. SUPPLY RESPONSE IN THE PHILIPPINE LIVESTOCK INDUSTRY

In this chapter, the supply response of hogs and poultry in the Philippines is estimated at the backyard, commercial and aggregate levels. The study used annual production data, 1970 to 1989, compiled by the Policy Analysis Division (PAD) of the Philippine Department of Agriculture, Food and Agriculture Organization (FAO) of the United Nations and the United States Department of Agriculture (USDA) from basic data collected by the Bureau of Agricultural Statistics. In the estimating equations, meat production was expressed as a function of lagged production; lagged deflated prices of output, corn and soybeans; and a time trend variable representing technology.

The supply response equations were initially estimated using ordinary least squares (OLS). However, to allow for correlation among the error terms of the backyard, commercial and aggregate level production, the equations for the three production levels were estimated by generalized least squares (GLS) using restricted and unrestricted seemingly unrelated regressions (SUR) estimators. Correction for autocorrelation was performed for all equations. The SUR estimation provided more efficient estimates.

Price elasticities were evaluated at the variable means and elasticity estimates for more recent years were obtained using the average of 1987 and 1988 values. Backyard, commercial and aggregate poultry production responded to the explanatory variables in the expected

directions. There is a greater response to output than to input price changes. Commercial production is considerably more responsive to price changes relative to the backyard production. Based on the estimations using FAO and PAD production data, aggregate level elasticities at the 1987/88 means were 0.95, -0.59 and -0.30 for broiler price, corn price, and soybean price, respectively. These response levels fall between the corresponding average elasticity estimates for the commercial sector of 1.43, -0.92 and -0.34 and for the backyard sector of 0.66, -0.40 and -0.19.

A negative response of commercial level hog production to output prices was consistently observed in estimations using any of the three data sets. This prevented a comparison of the relative responsiveness of the backyard and commercial hog sectors. However, the three data sets provided reasonably close price elasticity estimates for total hog supply. Based on averages from the estimations, the long-run elasticities of aggregate hog production were 1.09, -0.54 and -0.28 for pork price, corn price, and soybean price respectively.

The estimates show that supply response of livestock to output and input prices is very large, indicating that government policies which affect livestock and corn prices, such as import tariffs and trade restrictions, will have powerful effects on livestock production. The estimated livestock supply elasticities from this analysis are used in the model described in Chapter 9, together with the estimated demand parameters from Chapter 8 to analyze the relative effects of a particular government policy on these sectors.

8. FOOD DEMAND ELASTICITIES BY INCOME GROUP BY URBAN AND RURAL POPULATIONS FOR THE PHILIPPINES

This chapter presents food demand elasticity estimates for the Philippines by urban and rural populations and by income quartile for twelve food groups. Income and price elasticities are estimated using a new food demand estimation technique based on demand for characteristics. This new technique requires far less data than the usual econometric approaches and so may be implemented relatively quickly and cost-effectively. However, the resulting demand elasticity estimates depend directly on strong *a priori* assumptions made concerning food demand behavior, but assumptions which do <u>not</u> depend on assumptions of weak or strong separability. Rather quite the opposite assumption is made -- that the marginal rate of substitution between two foods depends directly on the levels of consumption of <u>all</u> other foods.

The data which are required for undertaking these estimations were provided by the Food and Nutrition Research Institute (FNRI) based on their 1978, 1982, and 1987 nationwide surveys. It is useful to state at the outset that these surveys are an invaluable data resource for food policy analysis in the Philippines. There are two alternative sources of information on food consumption. First, there are several rounds of food expenditure surveys undertaken jointly by the (now defunct) Special Studies Division of the Ministry of Agriculture and the National Food

Authority from the mid-1970s through the early 1980s. Second, the Bureau of Census has conducted income and expenditure surveys at irregular intervals since 1957. However, data from these food expenditure surveys will likely lead to gross overestimates of food and calorie income elasticities, unless "leakage" between foods that higher income households buy, but do not consume themselves (meals provided to guests and hired laborers, food "lent" to poorer relatives/friends, and waste), is carefully monitored in such surveys (Bouis and Haddad, forthcoming). By contrast, food recall techniques (including those used by the FNRI) developed by nutritionists measure foods actually consumed and so avoid this problem.

The estimated income elasticities for staple and non-staple foods are generally in accordance with *a priori* expectations. The cheapest source of calories, corn, has the lowest income elasticity. The rice income elasticity is essentially zero due to the fact that increased calorie consumption is not a priority goal of consumers at the margin. For staple foods, wheat is a relatively expensive source of calories (a "luxury" staple food) and so has a relatively high income elasticity. Meats and dairy products generally have the highest income elasticities. Income elasticities for fish are much lower.

The elasticity estimates developed in this chapter for rice, corn, wheat, pork, chicken, and eggs are used in the rice/corn/livestock model simulations in the following chapter. These eight food demand elasticity matrices may be used by policy analysts for various applications, and in particular those that are concerned with the differential impacts of government policies across income groups and urban and rural populations.

9. POLICY ALTERNATIVES FOR THE CORN LIVESTOCK SECTOR: A SIMULATION ANALYSIS

In this chapter, an agricultural supply/demand model for the Philippines is described, and then utilized to examine the impacts of alternative price and trade policies on the corn/livestock and related sectors, including rice, corn, wheat, pork, chicken, and eggs. In particular, the removal of distortions in price and trade policy, which were identified in earlier chapters as key problems for the sector, were assessed. The main part of the analysis is done by using the agricultural supply/demand model to simulate three alternative price and trade scenarios, including constant price policies maintaining existing levels of price protection; full trade liberalization; and establishment of a 20 percent uniform tariff policy across the six commodities. The simulations project production, consumption, and trade balances for the commodities to the year 2000.

The results confirm that maintaining trade protectionism to keep domestic prices above world prices, such as has been followed in the Philippine corn/livestock sector, imposes significant costs to the economy. Full trade liberalization would sharply increase the value of

domestic production; raise substantially the consumption of cereals, meats, and eggs while reducing consumer expenditures on these items; and maintain or lower the net cost of imports.

Establishment of a moderate uniform tariff across the six commodities, by reducing overall levels of protection, also yields substantial economic gains compared to existing policies. The net cost of imports is cut by more than half and gross domestic value of output increases compared to the first scenario. Changes in food consumption and expenditures compared to the existing price policy scenario, however, are not large, due to continuation of moderate levels of protection. Compared to full trade liberalization, the uniform tariff policy reduces the cost of imports, but the cost is borne by domestic consumers through higher prices, lower consumption, and higher total food expenditures. The gross value of domestic production is also lower than for the trade liberalization scenario.

The analysis also showed that investment and policy reforms to reduce marketing margins can have a strong impact on corn production. By maintaining farmer incentives even with declining wholesale prices of corn, reductions in marketing margins can be a powerful spur to domestic production.

Trade liberalization produces considerable gains to the economy, but the concern may remain that liberalization also opens the economy to excessive fluctuations in world prices, which are directly transmitted to domestic prices. In general, the evidence from existing price stabilization schemes in both developing and developed countries indicates that gains from stabilization of agricultural prices are quite small. However, although the quantifiable benefits of price stabilization may be relatively modest, stabilization is a potentially important complementary policy, particularly if the government moves to liberalize trade in corn and livestock. Effective stabilization of prices would provide assurance against short term disinvestment in corn and livestock during a transitional phase. If a price stabilization policy is adopted, it is crucial that the costs of effective stabilization be minimized. In order to keep the costs of stabilization down, experience in developing countries indicates that variable taxes or levies are preferable to government buffer stock schemes.

10. CONCLUSION AND SUMMARY OF POLICY IMPLICATIONS

This report has documented the main government policies toward the corn livestock sector in the Philippines and the impacts of these policies on the competitiveness of the sector. Distortions in price and trade policy have been identified as key problems for the sector. Despite these distorted prices, corn, poultry, and pork have a comparative advantage as import substitutes and pork has a high potential to be competitive as an export commodity if sanitary and quality improvements can be made. In addition to correcting price distortions, the competitiveness of these industries would also be enhanced by improvement in structural problems in marketing and distribution. While constraints in research and extension, seed

distribution, and farm level technology do exist, available evidence indicates that the most serious structural problems are in post-harvest technology, transportation and marketing, due to underinvestment and restrictive policies in these areas. Removal of these structural barriers would greatly improve the competitiveness of the corn/livestock sector.

Based on this study, an integrated set of four broad policy reforms affecting the corn-livestock sector would lead to significant economic benefits. The four areas of policy reform are trade liberalization, real exchange rate devaluation, increased public investment in and deregulation of marketing and transportation, and stabilization of corn prices.

Trade Liberalization

Trade protectionism to maintain domestic prices above world prices, such as has been followed in the corn/livestock sector, entails significant costs to the economy. Trade policies which protect some commodities or sectors at the expense of others can cause resources to shift from more efficient production activities to less efficient ones. Protective trade policies also penalize consumers through increased domestic prices. Removal of trade barriers will usually result in more efficient allocation of resources in production, and will provide net welfare gains. These effects were confirmed in the analysis of the impacts of alternative price and trade policies on the corn/livestock and related sectors, including rice, corn, wheat, pork, chicken, and eggs. The removal of distortions in price and trade policy, which have been identified as key problems for the sector, were assessed. The analysis used an agricultural supply/demand model to simulate three alternative price and trade scenarios, including constant price policies maintaining existing levels of price protection; full trade liberalization; and establishment of a 20 percent uniform tariff policy across commodities.

The results confirm that maintaining trade protectionism imposes significant costs to the economy. Full trade liberalization sharply increases the value of domestic production; substantially raises the consumption of cereals, meats, and eggs while reducing consumer expenditures on these items; and maintains or lowers the net cost of imports compared to existing policies. Full trade liberalization generates the largest economic benefits among the three policies.

Establishment of a moderate, uniform tariff across the six commodities, by reducing overall levels of protection, also yields substantial economic gains. The net cost of imports is cut by more than half and gross domestic value of output increases compared to the first scenario. Changes in food consumption and expenditures compared to the existing price policy scenario, however, are not large, due to continuation of moderate levels of protection. Compared to full trade liberalization, the uniform tariff policy reduces the cost of imports, but the cost is borne by domestic consumers through higher prices, lower consumption, and higher total food expenditures. The gross value of domestic production is also lower than for the trade liberalization scenario.

Although the net benefits of a moderate uniform tariff policy are not as high as complete trade liberalization, this policy would provide substantial benefits compared to the existing system of protection. A move toward a uniform tariff policy would preferably be seen as a step toward full trade liberalization in corn and livestock. Such a policy could provide short term protection of the sector while productivity-enhancing and cost-reducing technology development policies and public investment policies in infrastructure are instituted in conjunction with liberalization of other industries which play a critical role in the cost structure of the corn/livestock sector, such as the inter-island shipping industry. Moderate tariff levels could then be reduced as improvements in sectoral efficiency occur.

Real Exchange Rate Devaluation

The relationship between domestic and world prices of commodities has a direct impact on the competitiveness of these commodities on world markets. In addition, competitiveness is also influenced indirectly through government policies that affect the real exchange rate. In the Philippines, the indirect effects of trade and macroeconomic policies have caused overvaluation of the real exchange rate, which in turn lowers the competitiveness of agricultural commodities. As was shown in this analysis, the overvaluation of the exchange rate arising from protection of domestic industry has resulted in substantial negative protection in recent years, reducing the competitiveness of agricultural commodities with imported commodities. The report shows that the overvaluation of the peso has a strong negative impact on the competitiveness of the corn/livestock sector.

In order to maintain the competitiveness of the corn/livestock sector if full trade liberalization is adopted, the real exchange rate should be adjusted to the long term equilibrium level as prices in the corn livestock sector are adjusted toward world price levels. If the real exchange rate remains overvalued, nominal equality of domestic and world prices will leave the corn/livestock sector at a disadvantage relative to world prices.

Public Investment and Policy in Marketing and Transportation

This report has shown that Philippine corn markets are relatively competitive and well-integrated, but that structural problems persist. Structural rigidities in the market arise from poor physical farm-to-market linkages, inadequate transportation, and high costs of arbitrage that impair complete and rapid price adjustments between markets and efficient integration of markets.

The findings of the study suggest that there are benefits to developing better physical infrastructure to effectively link production points to market centers and in formulating incentive packages to encourage private investments in transportation, storage, and other necessary marketing facilities. The analysis also showed that investment and policy reforms to reduce marketing margins can have a strong positive impact on corn production and can significantly

reduce corn imports. By maintaining farmer incentives even with declining wholesale prices of corn, reductions in marketing margins can be a powerful spur to domestic production. There are also benefits to improving current public market information services to ensure the timely dissemination of accurate and reliable information.

Increased efficiency in cargo handling services from open competition, accompanied by investments in the port facilities, including the ready supply and availability of inter-island vessels to transport corn, can sharply reduce trading and distribution costs. Deregulation in ports and shipping, already underway, should be vigorously pursued. The results indicate that investment and policy reforms to reduce marketing margins can have a strong impact on corn production.

Another area where public investment could have a major payoff is in the control or eradication of foot and mouth disease. The eradication of FMD is not only beneficial for potential hog exports but in maintaining healthy population of the ruminant animals (beef and carabao) as well. It would be desirable therefore to strengthen further the current program of the Department of Agriculture for the eradication of the FMD. Hog-producing regions identified by the Bureau of Animal Industry as FMD-free zones should be used as an initial basis for negotiations in obtaining international certification of export worthiness in pork. Bilateral government agreements between the Philippines and Asian importers of pork should be pursued more vigorously.

Price Stabilization

While trade liberalization produces considerable gains to the economy, the concern remains that liberalization also opens the economy to excessive fluctuations in world prices, which are then directly transmitted to domestic prices. The quantifiable benefits of price stabilization may not be as high as the other policy areas described above, but stabilization is a potentially important complementary policy, particularly if the government moves to liberalize trade in corn and livestock. Effective stabilization of prices would provide assurance against short term disinvestment in corn and livestock during a transitional phase toward liberalization.

The evidence from existing price stabilization schemes in both developing and developed countries indicates that gains from stabilization of agricultural prices are quite small. The main impacts are distributional, with shifts in benefits from producers to consumers, or vice versa, depending on the design of the stabilization schemes employed, probability distributions of prices, and other factors. Nevertheless, the government may prefer to stabilize prices if a movement toward trade liberalization is contemplated, in order to maintain confidence in the stability of prices during the period of transition toward trade liberalization. If a price stabilization policy is adopted, it is crucial that the costs of effective stabilization be minimized. In order to keep the costs of stabilization down, experience in developing countries indicates that variable taxes or levies are preferable to government buffer stock schemes.

Analysis of existing stabilization schemes also shows that attempts to stabilize prices using governmental agencies to manage buffer stock schemes have been extremely costly, in terms of both the government's budget and the efficient operation of the economy. Recent studies of the operations of the National Food Authority have essentially agreed with these general findings, arguing that the operations of NFA have reduced the profitability of private sector marketing activities to the extent that investments in milling, storage, handling, and transport are discouraged, contributing to inefficiency and high costs in marketing. The experiences of most countries indicate that, for the stabilization of the price of traded goods, variable levy policies represent effective and less costly alternatives to marketing agencies. Design and implementation of an appropriate variable levy system for corn and livestock should be considered in an integrated fashion with trade liberalization policies.