

THE IMPACT OF ECONOMIC CRISIS ON LIVESTOCK INDUSTRY IN INDONESIA¹⁾

Tahlim Sudaryanto², I Wayan Rusastra³ and Tjeppy D. Soedjana⁴

Paper presented at the annual meetings of the International Agricultural Trade Research Consortium (IATRC), Auckland, New Zealand, January 18-19, 2001.

¹ The authors wish to thank Yusmichad Yusdja, Pantjar Simatupang and Prajogo U. Hadi of the Center for Agro-socioeconomic Research for their helpful comments. Appreciation is also extended to Venture Trust New Zealand International Agricultural Trade Research Consortium (IATRC) and Prof. Alan Rae, Massey University for generous financial support.

² Director, Center for Agro-Socio Economic Research (CASER), Ministry of Agriculture, Indonesia
³ Agricultural Economist, Center for Agro-Socio Economic Research, Ministry of Agriculture, Indonesia.

⁴ Agricultural Economist at the Central Research Institute for Animal Science and Director of the Center for Agricultural Library and Technology Dissemination, Ministry of Agriculture, Indonesia

Abstract

Livestock sub-sector plays an important role in Indonesia economy in term of GDP contribution, employment opportunity, source of income, foreign exchange saving, and providing valuable animal protein and nutrition rich food for human consumption. Since the economic crisis started in mid 1997, serious negative impacts influenced the production and demand side of the livestock commodities and input factor industries, such as feedmills and breeding farms. The industries experiencing substantial negative impacts include poultry industry, feedlot, and dairy farm which is highly dependent on tradable input factors. The negative impact of economic crisis on the livestock agribusiness system is mainly caused by the structural weaknesses of the respective industry. Despite the current economic problem, there are wide opportunities of livestock development, once the current problems are resolved. In order to achieve these opportunities, the following long-term vision of livestock development should be considered: (a) Fostering livestock development in the region with less animal density and abundant feed materials; (b) The provision of credit and development of an integrated livestock development centers; (c) Selection and improvement of domestic livestock breed through better breeding program; (d) Continuation and improvement of institutional arrangement of livestock NES program; (e) The reorientation of livestock trade regime from import substitution in the short run to export promotion in the medium and long run period; and (f) Human resource development in the whole segments of livestock agribusiness system.

Key words : economic crises, livestock agribusiness, livestock development

A. Introduction

After performing a remarkable trend, since mid 1997 Indonesian economy has experienced macro economic distress, which was poorly anticipated and has appeared as a great shock for majority of business managers, policy makers, and economic observers. Starting by the end of 1986 Indonesia government introduced a more flexible exchange rate policy in line with the trend toward liberalization in Indonesia monetary policy. Since then, rupiah exchange rates moves upward, and on August 1997 the rupiah has experienced a dramatic depreciation that plunged the economy into crisis. After failure to intervene the market, the Central Bank (BI) had decided to let the market force rules the situation. The rupiah continued to fall after BI withdrew from the market. As an illustration, the exchange rate of rupiah against US dollar fell considerably from Rp 1,649 (1986) to Rp 2,385 (1996), Rp 5,700 (December 1997), a sudden drop to Rp 13,518 in January 1998, and reached it lowest figure of Rp 15,160 in late June of 1998, before re-appreciated to Rp 8,000 in January 1999.

Livestock sub-sector plays an important role in Indonesia economy in term of GDP contribution, employment opportunity, source of income, foreign exchange saving, and providing valuable animal protein and nutrition rich food for human consumption. The subsector was considered as one of sources of growth because of its high forward and backward linkages to the economy. Direct government interventions are relatively limited in terms of direct protection and subsidy to livestock industry. While agribusiness system of the respective industry such as layer and broiler production, feddlotters, and dairy cattle industry are relatively developed, government effort is particularly focused on the development of smallholder livestock farming systems.

Up until the advent of economic crisis in mid 1997, there are some remarkable progresses contributed by the livestock economy. The steady increasing per capita income and strong population growth have driven a rapid increase in livestock products consumption, though from an extremely low base. The private sector had responded this promising

phenomenon through enlarging the capacity of production especially on poultry industry, dairy product processing, and feedlot beef cattle fattening. The government put in place policies to encourage feeder cattle import to facilitate the fattening cattle industry. Considerable investment took place in a large-scale company of the respective industry and in the respective supporting industry such as, feedmill, breeding farm, input factor industry, processing facilities, etc. Most of the industries were highly dependent on tradable inputs. The crisis has warned us on the weakness of this strategy, which place heavy reliance on import component and called into question the profitability of extensive private investment and the infrastructure needed to support the respective livestock industry.

Based on the above background, the objective of this paper are as follows: (a) To describe the impact of economic crisis on GDP contribution, number of heads and production of livestock sub-sector; (b) To analyze the impact of the crisis on financial and economic feasibility of livestock farming system; (c) To discuss the crisis' impacts on household expenditure and consumption of livestock commodities; (d) To evaluate the impact of economic crisis on price and trade of livestock products; and (e) To draw conclusion and policy implication based on the finding of the respective intensive literature review.

B. National Economic Structure, Number of Heads, and Production of Livestock Commodities

In 1996, Indonesia's GDP growth rate was 8.0%, which then declined in 1997 to 4.6%. The effect of crisis was most severe in 1998 when GDP declined by 13.7% (Warr, 1999). In 1999, the economy grew at 0,31 % and the signal of economic recovery is observed in 2000 when national economic growth rate was recorded at 4.5%, and in year 2001 the growth is predicted to be 4.0% up to 5%. In general, agricultural sector still give positive contribution indicated by positive growth rate during 1998, i.e. 0.16% and increased to 2.08% in 1999 (Table 1). Within agricultural sector, high positive contributions

were given by the estate crops, fisheries, and forestry sub-sectors despite they were weaken when value of rupiah strengthen in 1999. The sub-sector' dependency on tradable inputs were relatively lower when rupiah depreciation generate substantial increase on its export revenue. In addition, given the productivity and efficiency unchanged, while rupiah value improves, the growth rate should decreases.

Livestock and food crops sub-sectors, which highly dependent on tradable inputs, its growth rate are deteriorate. During the severe economic crisis especially in 1998, the growth rate of livestock sub-sector decreased by 1.59% and food crops by 0.68%. In 1999, the two sub-sectors have provided positive contribution as indicated by positive growth rate of 0.004% and 1.75%, respectively (Table 1). Due to economic crisis GDP contribution of livestock sub-sector decreased from 11.2% (1996) to 10.9% in 1998 and 10.6% in 1999. Its position was equal to forestry in 1998 and a bit lower than fisheries in 1999, which experiencing booming during the economic crisis. All of those evidences revealed that economic activity which highly dependent on import of tradable input as well as having low productivity and efficiency will not be able to compete in the global market and its growth rate will not be sustainable in the long run.

Among livestock commodities, layer, broiler and dairy cattle are considered to be more highly dependent on import of tradable input, in addition to a small part of beef cattle farming system (feedlot system) and intensive swine/pig farming system. Around 22.8% of total beef production in 1996 is from feedlot (imported feeder cattle) and the rest (77.2%) are from local cattle (Hadi et al., 1999). Table 2 showed that economic crisis was seriously affect the number of layer, broiler and dairy cattle especially in 1998, indicating by decreasing trend of 50.6%, 53.2%, and 7.5%, respectively, compared to 1996's figure (before crisis) of the respective animal. Its impact on beef cattle number is relatively small by decreasing trend of 1.54%. For swine (pig) number, there is a decreasing growth rate from 8.4% in 1997 to just only 2.7% in 1998. Apfindo (1999) as cited by Soedjana et al (2000) showed that imported feeder cattle from its members from

January 1998 to January 1999 just only 8.4% (27,253 head) compared to 325,000 head in 1996. These evidences indicated severe impact of crisis on intensive cattle farming system (feedlot system).

The impact of crisis on production of meat, egg, and milk are described on Table 3. There is strong relationship between the change on animal heads and production of layer, broiler, dairy cattle as well as beef. In 1998, during the peak of crisis, downward production change of layer's egg, broiler, milk, and beef are 46.7%, 52.9%, 14.9%, and 1.2%, respectively. All of those are contributing to a substantial impact on total egg and meat production change, which decreasing by amount of 32.1% and 24.7% respectively, compared to production of 1996 as a basis. Until 1999 there is not yet strong indication of an improvement of the Indonesian livestock industry. It is interesting to discuss the negative production change of pork by 28.9%, while number of swine increased by 2.7% for the same time. This indicates the important role of intensive swine farming system on production side, but its number growth was mostly determined by the increasing number of traditional swine farming system.

In addition to total production change of meat, egg, as well as milk, the capacity to import of the industry decreased considerably, ending up the substantial change of supply due to economic crisis (Table 4). The capacity to import meat decreased by 51.7% in 1998 and 1999 compared to meat import of 29 thousand metric ton in 1996. As a result total meat supply decreased by 25.2% on 1998 and 19.5% in 1999. The volume of beef import alone, during the period of January to August 1998 decreased by 27.6% of the 1997 import (Hadi *et al.*, 1999). Import of beef over the period was 6.4 thousand metric ton at an average price of US \$ 1.07/kg. This amount is equal to 45.7% of total meat import in 1998. About 97% of the imported beef was frozen boneless beef at an average price of US \$ 1.06/kg. It is clear that the economic crisis has resulted in a dramatic reduction in import of meat, especially for beef.

At the current averages income, Indonesia has achieved its self-sufficiency on egg production. There was no import record during economic crisis. The egg supply during the crisis was fully determined by negative production change of 32.6% and 30.5% in 1998 and 1999, respectively. Rupiah depreciation also seriously affecting the capacity of industry to import milk due to increasing import price and reduction purchasing power of domestic demand. Compared to milk import of 1997 being 82.9% higher than import on 1996 (379 thousand metric ton), then import change in 1998 and 1999 are just 39.1% higher than the basis year of 1996. It is expected that rupiah depreciation will encourage the milk processing to use more domestic milk production instead of import, but its production has decreased considerably due to decreasing incentive for the producer. As a result milk supply decreased by amount of 25.1% on 1998 and 24.4% in 1999.

The negative impact of economic crisis on the number of animal heads, production, and import resulting on negative supply change, indicating the structural weaknesses of the respective livestock industry as follow: (a) The poultry industry was highly dependent on tradable input factors such as feed stuffs, biological technology (Grant Parent Stock), medicine/ vaccine, imported equipment, etc.; (b) Lack of diversification program on the development of poultry industry being biased toward layer and broiler production, and less attention on village chicken, duck, and other poultry domestic origin; (c) Beef production has become heavily dependent on imported live cattle, the lack of an effective domestic cattle breeding program, high social and economic cost of feedlot company because of the requirement to allocate imported feeder cattle to smallholder, and the scarcity of breeding female constraining domestic beef production; and (d) Dairy cattle production are also highly dependent on imported breed, lack of domestic breeding program, unsuitable institutional arrangement within the industry (farmers, cooperative, and milk processing), and highly dependent on imported input factors.

C. Financial and Economic Feasibility of Livestock Farming System

Inter-temporal dimension of financial and economic feasibility of livestock farming system are essential in formulating and determining the appropriate policy options in order to improve the competitiveness in the respective economic activities. Study conducted by Kasryno et al (1989) showed some important information as follow (Table 5):

- (a) Except for milk production, livestock production (beef, pork, broiler, and layer) have considerable comparative advantage for import substitution trade regime, indicated by Domestic Resource Cost Ratio (DRCR) less than one and positive Net Economic Benefit (NEB).
- (b) Traditional beef production farming system (free grazing and tied system) have higher comparative advantage than intensive farming system (fattening system both household and corporate), due to using less of tradable factor;
- (c) Comparative advantage for broiler and layer are varied accross regions due to their differences on productivity and efficiency;
- (d) Cross-breed dairy cattle have higher performance compared to imported one, both for household and corporate farming system, due to better climate adaptation in addition to efficiency consideration;
- (e) In general, except for milk production, livestock farming system did not receive protection from the economy (government) for both output and input factor, indicated by negative value of Effective Protection Rate (EPR);
- (f) In this regard the protection are bias toward the consumer, except for dairy cattle, which benefited the producer, especially milk processor.

A comparative advantage study, by considering the condition of before and after economic crisis for broiler industry in Bogor, West Java had been conducted by Saptana and Rusastra (2000). Interesting evidence regarding financial and economic feasibility of the said industry are presented on Table 6, as follow: (a) Financially and economically the profitability of broiler industry are seriously affected by the economic crisis for all type of farming systems under consideration; (b) Before economic crisis, Smallholder Agribusiness Model have lower performance compared to other model of broiler development; (c) After crisis, economically Smallholder Agribusiness Model have better profitability compared to other models.

Comparative advantage and incentive structure of broiler industry before economic crisis presented on Table 7. During this period (1996/97) broiler industry had comparative advantage, financially and economically, indicated by the value of Private Cost Ratio (PCR) and Domestic Resource Cost Ratio (DRCR) less than one for all broiler model development. In order to have one unit value added over tradable input, the industry used domestic factor less than the amount of the respective value added. The competitiveness of smallholder agribusiness model (SAM) is better than other broiler development model under consideration.

In general, broiler industry received protection for output price but disincentive for tradable input factor, shown by NPCO (Nominal Protection Coefficient on Output) and NPCI (Nominal Protection Coefficient on Tradable Input) greater than one, respectively. For instance, Broiler NES (Nucleus Estate Smallholder) received output price 14% higher than its parity price, but paid tradable factor 6% higher than competitive market. By considering tradable input, the industry still benefited from the incentive system indicated by the value of EPC (Effective Protection Coefficient) greater than one. For the case of Broiler NES, the industry received the value added over tradable input 20% higher than competitive market. By considering both tradable and domestic factor, Broiler NES enjoyed profit 19% higher, indicated by the value of PC (Profitability Coefficient) greater

than one (1.19). In general, it can be said that eventhough broiler industry paid tradable input higher than its parity price, but the industry enjoyed incentive and profit over tradable and domestic factor.

The impact of economic crisis on comparative advantage and incentive structure of broiler industry presented on Table 8. Economic crisis substantially affect the competitiveness of the said industry indicated by PCR and DRCR approaching to one. The higher the DRCR, the less the economic competitiveness of the industry. There is no significant difference of the economic feasibility among broiler development model. In general, broiler producer enjoyed output price protection around 2-8%, but paid tradable input factor almost equal to its parity price. By considering tradable input, the industry enjoyed incentive around 5-16% higher than competitive market. If both tradable and domestic factor are taken into account, the PC as a proxy for the net policy transfer indicated that the financial profit received by the producer range from 10% (contract farming) up to 71% (Broiler NESS) of the economic profit. This evidence clearly indicated a disincentive for the producer.

It is interesting to discuss the competitiveness status of Indonesia's egg production by considering three indicators, i.e. cost of production, output price, and price margin as presented on Table 9. Based on the analysis conducted by Geoff Fairhurs (Sutawi, 2000) by using MACRO method for 46 countries around the world, Indonesian layer industry get the rank of the top five countries having high competitiveness with total score of 100, i.e. equal to total score of the United States. The Indonesian egg price was considered as the cheapest in the world and with the lowest cost of production. The output price is 52.4% lower than the average world egg price. Because of low output's price, than the price margin received by the farmers is very low, i.e. 6.52 cent US\$/kg, around 78.2% below the average price margin of 29.86 cent US\$/kg. The price structure is not conducive for the producer to expand the industry. The evidence indicates the limitation of domestic potential demand and low accessibility to export the product to the world market.

Impact of economic crisis on dairy cattle farming system in upland and lowland area by considering three categories of farm size presented on Table 10 and Table 11. The finding of the study show some interesting evidence as follows: (a) There is no clear evidence that agro-ecological zone (upland and lowland area) affecting the performance of dairy cattle farming system; (b) Economic crisis gives higher benefit for all area and farm size, despite substantial increased of production cost of dairy cattle farming; (c) The bigger the farm size, the higher benefit received by the farmer; (d) There is no clear evidence that the higher the farm size will be followed by the improvement of capital efficiency (B/C ratio); (e) The economic crisis reduced the magnitude of capital efficiency, indicated by lower B/C ratio for all agro-ecological zone and farm size.

Economic feasibility analysis of dairy farm (farm size of 6.0 head/hh) conducted by Swastika *et al.* (2000) showed that dairy farmers are benefited from economic crisis, indicated by the value of DRCR less than one, i.e. 0.33 on the upland and 0.34 on the lowland area (Table 12). The dairy farmers received output price around 58.5% of the parity price, and paid tradable input factor around 63.0% of its price in competitive market. In other word dairy farmer enjoyed tradable input price subsidy, but not for output price. Over tradable input factor, the industry did not receive protection from the economy as indicated by the value of EPC of 0.56 up to 0.57, in which the financial value added just only 56.5% of the economic value added. The real factor determining the improvement of economic efficiency of the dairy farm is rupiah depreciation. If the exchange rate decreased by 33.6%, from Rp 8,579 to Rp 5,700/US\$, then the economic feasibility will be breakeven.

Investment feasibility of dairy cattle farming system by using three investment criteria (NPV, PBP, and IRR) show some interesting findings as follows (Table 13): (a) The performance of investment feasibility of dairy farm on upland area was more better than lowland area; (b) The reduction of interest rate from 18% to 12% (equal to subsidized interest rate of food crop credit program) will substantially

improve the NPV of dairy farm, by the magnitude of 71% and 124% in upland and lowland area, respectively; (c) If the interest rate increased beyond 24.8%, the dairy farm on upland area still generate profit, but not for the lowland area. This finding clearly indicates that the best place for dairy farm is on upland area, in addition to better breeding, feeding, and management, which will generate higher income, shorter payback period of the investment, and higher internal rate of return. It is important to note that subsidized interest rate is an important policy instrument to improve dairy farmers' income.

D. Household Expenditure and Consumption of Livestock Commodities

This section will use two main sources of data, i.e. Food Balance Sheet being basically aggregate – time series data, and National Socio Economic Survey (Susenas) which is cross section data. The first one will be useful in determining the aggregate nature of consumption and the second one will describe more detail the behavior of livestock consumption. The consumption behavior will be reflected or indicated by the rate of consumption and its participation by group of income, region (rural and urban area), as well as primary source of income.

Impact of economic crisis on livestock commodities and protein consumption using food balance sheet data presented on Table 14. Its impact has been started in 1997 and severe impacts still continue up to 1999. The consumption change of livestock commodities are the highest for meat, then followed by egg and milk. Meat is the luxurious and the expensive one, egg is the common and wide commodity consumed by the people, and milk mainly consumed by the middle and high income group, in addition to family having children under five years. Due to decreasing livestock commodity consumption, then total animal protein consumption reduced substantially on 1998 and 1999 by the rate of change of 28.3% and 21.1%, respectively. The contribution of meat on protein consumption is the highest and its consumption decreasing by 25.9% on 1998 and 22.2% on 1999. Egg being consumed by the majority of the people its protein consumption decreasing by 34.2% in 1998 and 33.3% in 1999. All of this evidence

indicates that economic crisis substantially affect the quality of food intake of the majority of the people, especially for the children under five years, young generation, and pregnant mothers.

Impact of crisis on food expenditure using Susenas data presented on Table 15. As widely known, most of household expenditure in developing countries attributed to food and economic crisis seem to be seriously affect the proportion and the welfare of the people. Due to crisis, in general total household expenditure increase remarkably especially in rural area, low and moderate income group, and the people which primary income source in agriculture. For these groups of people, food expenditure change due to crisis are substantial, i.e. 23.1% in rural area, 19.9% for low-income group and 20.3% for people engage in agriculture. Their food expenditure share are the highest compared to others, i.e. 65.5%, 70.9%, and 65.3% in 1999, respectively. This evidence indicated that most of their income attributed to food, then very few available to fulfill their need for better living.

Participation and consumption rate of livestock commodities are low in developing country, and its magnitude are decreasing further due to crisis. In general, participation and consumption rate are higher in urban area compared to rural area, and the most common commodity demanded are fresh fish, egg, and chicken meat. The nature of crisis impact is different by region, where in urban area the most affected are chicken meat, beef, egg, and milk (Table 16). The most affected in rural area are chicken meat, egg, and milk, while beef participation rate is relatively constant. For the peoples who still consumed livestock commodities, the rate of their consumption reduced substantially. For instance in rural area, chicken meat consumption decreased by 54.9%, egg 33.6%, and milk 23.6%. In urban area, the negative changing of their consumption are 51.6%, 32.9%, and 23.4%, respectively.

The participation and consumption rate of livestock commodities are different by primary source of income (Table 17). The people who engage on activity related with service and others have the highest performance, then followed by industry and trade, and the lowest participation and consumption rate of any kind of livestock product are people with main source of income on agriculture. Except for beef the impact of crisis on participation and consumption rate are relatively the same. For instance, participation rate of chicken meat decreased by 43.4% (agriculture) to 45.9% (services and others); egg by 14.5% (industry and trade) up to 17.3% (agriculture), and for milk the range is 23.2% up to 25.9%. On the other hand, the change of beef participation rate is quite different by source of income, i.e. 26.7% for service and others, 23.3% for industry and trade, and the lowest for the people engage on agriculture, i.e. 10.0%. The pattern of consumption change due to crisis is relatively the same, but their magnitude is relatively higher. As an illustration, the range of chicken meat consumption decrease is 50.8% – 54.3%, egg 31.4% – 34.5%, and milk 17.8% - 24.6%.

The rate of participation and consumption of livestock commodity by group of income clearly indicated that their magnitudes for high and moderate income are significantly higher than low-income group for all kind of livestock product (Table 18). The economic crisis affected all groups of income, but the impact is worst for low and moderate income, and its impact on consumption rate is higher than participation rate. As an illustration, due to crisis the participation and consumption rate of chicken meat decreased by 54.1% and 57.3%, and for egg decreased by 19.9% and 27.4% for low income group, respectively. For the case of high-income group, the negative change of participation and consumption rate for chicken meat is 32.7% and 46.2%, and for egg is 10.1% and 32.8%, respectively. It is clear that the impact of crisis on the capacity of people to prepare luxurious livestock product on their daily menu decreased tremendously, and their consumption rate even decreased much greater.

The impact of crisis on the proportion of people under energy and protein deficit presented on Table 19. The people on this group are those who consumed either energy or protein under 80% of normal requirement standard of calories of 2150 k.cal/capita/day and protein of 46.5 gram/capita/day (Ariani *et al*, 2000). The evidence of energy and protein deficit by region, income group, as well as source of income, due to crisis, give some interesting information as follow: (a) In general, the proportion of energy deficit is higher than protein deficit both before and after crisis; (b) People experiencing deficit protein are more severe on rural area, low income group, and who engage on agriculture sector; (c) For the case of energy deficit are more severe on low income group, but there is no significant difference within region and source of income; (d) The impact of crisis on protein deficit is higher than energy deficit for all categories (region, income group, as well as source of income).

E. The Trend on Price and Trade of Livestock Product

Economic crisis represented by high depreciation of rupiah against US dollar yield substantial impact on domestic retail price of live animal, livestock commodities, and input factor as presented on Table 20. The impact of crisis on prices has been starting on 1997, but its real impact is on 1998 and beyond. In 1998, its impact on increasing price of live animal ranging from 37.7% (pig) up to 56.0% for live broiler. The impacts on livestock commodities, for the same year, are ranging from 19.8% for milk up to 100.2% for layer egg. The remarkable impact of crisis is on price of poultry feed (layer and broiler) which increased by 153.0%, while price of DOC's broiler and layer increase by 23.2% and 54.1%, respectively. It is clear that input factor price increase, especially feed which play dominant role on cost structure, is much higher than output price change, which weaken financial profitability and sustainability of poultry industry.

More detail information regarding impact of economic crisis on price of livestock commodities (beef and layer's egg) in relation with the changing of rupiah exchange rate presented on Table 21 and Table 22. Except for 1998 and 2000, the growth of monthly beef price tend to be

stable. During the severe of economic crisis in 1998, where rupiah depreciated more than 70% compared to previous year (1997), monthly beef price change considerably by 5.27%/month from Rp 11,434 on January to Rp 20,362/kg on December 1998. In general, up to 1998 the increase of rupiah exchange rate was followed by the increase of average monthly beef price, but when the exchange rate decreased in 1999 (2.7%) the beef price still increase by 46.6% from Rp 15,676 to Rp 22,818/kg. It seems that the price change did not solely determine by the exchange rate, but other factors such as the nature of supply and demand as well as marketing and trade of the respective commodity.

The nature of monthly price change of layer egg is relatively similar with the beef price. In 1998, the growth rate of monthly price was the highest, i.e. 7.11%/month, and the average price was still increase by 49.4% in 1999, even though the exchange rate decreased from Rp 8,025/US\$ to Rp 7,809/US\$ (Table 22). In addition to rupiah exchange rate, the production change of layer egg of 1998 and 1999 was still negative (compared to 1996), i.e. 46.7% and 45.1% respectively. The recovery of layer industry in 2000 determined the decreasing trend of monthly price by 2.11%/month, even though the exchange rate increased from 7,809 to Rp 8,384/US\$ during the period of 1999-2000.

Rupiah depreciation will improve the competitiveness of livestock product to export, but conversely for importation, as presented in Table 23. Total export value increased substantially by 80.6% from US\$ 61.8 million (1996) to US\$ 111.6 million on 1998. The impressive export change was mainly the contribution of traditional livestock commodities such as leather, bone, and horn being increased by 143.6%, while the potential commodities (material food and non-material food) just increased by 7.0% for the same period of time. On the other hand total import value, consisting of livestock and livestock product, decreased tremendously by 47.5% from US\$ 663.6 million to US\$ 348.5 million. As the consequences, livestock trade deficit reduced from US\$ 601.8 million to US\$ 237.9 million, or 60.5% for the period of 1996-1998.

In addition to livestock and livestock products, the other imported input factors are feed ingredient (soybean meal, fish meal, white pollard), medicine, feed additive, and GPS (Grant Parent Stock) for breeding farm. Due to economic crisis, the feedmill utilized less than 60.0% of the industry' capacities, because of less feed demand and selling related problem. Feed industry prefers to sell feed on cash basis instead of credit to avoid further possible bad debt when farmers cannot afford to pay (Tangendjaja and Soedjana, 1999). Many breeding companies decided to reduced number of GPS import due to price high in local currency and less demand. In 1998, imported GPS was only 50% from previous year. It is predicted that only 5 strain of broiler breeder are in operation and only 2-3 strains from brown layer. Many parent stock farms have been rented out or converted the facilities to a commercial broiler or layer farms. All of this indicated that relative price change due to crisis not just affect livestock production side but also input-factor industry (feed mill and breeding farm), or affected the whole livestock agribusiness system.

F. Conclusion and Policy Implication

Economic crisis, as the consequences of severe rupiah depreciation, yield serious negative impact on the employment, purchasing power, and the whole livestock agribusiness system. The seriously affected livestock industries are those highly dependent on tradable input factors such as layer and broiler industry, feedlot cattle company, and intensive dairy cattle farm. The crisis is not just affecting the production and demand side of the livestock commodities, but also input factor industry such as feedmill and breeding farm. All of those are due to high price of tradable inputs, less domestic demand for livestock products, and the nature of import substitution of the respective industry.

The negative impact of economic crisis on the livestock production side mainly caused by the structural weaknesses of the respective industry. The industry is highly dependent on tradable inputs (biological technology, main raw material of feed, medicine, farm equipment, etc.), the lack of an effective domestic breeding program, and lack of diversification program,

especially better attention to the development program of domestic origin of livestock breed. The others structural problem are related to coordination and consolidation among sector and program, as well as unsuitable institutional arrangement within the actors' on livestock agribusiness system.

Despite the current economic problem, there is a wide opportunity of livestock development, once the current problem are resolved. This will happen, because of the rapid decline in consumption and high-income elasticity of demand for livestock product. When income of people recover rapidly, the purchasing power increase, and demand for livestock product eventually increases. In order to capture those opportunities, it is important that a vision be formulated for the longer term development of the livestock industry, by considering some precondition or supporting factor as follow: (a) Fostering livestock production in region with lower population density and as a source of raw feed material; (b) The provision of credit at appropriate terms for encouraging private investment; (c) Development of an integrated livestock production center (industry production chain) including, livestock production, feed requirement, processing, marketing facilities, etc.; (d) Selection and improvement of the best available genetic resources of domestic livestock breed; (e) Control of the domestic livestock slaughtering rate (especially for beef and dairy cattle) where appropriate; (f) Continuation and improvement of institutional arrangement of Poultry NES, Beef NES, Dairy Cattle NES scheme for the benefit of all; and (g) Human resources development throughout the value chain (production, processing, and marketing).

Based on those opportunity and new vision of livestock development, it is necessary to change the orientation of livestock trade regime from import substitution in the short run to export promotion in the medium and long run period. This new trade orientation is based on the comparative and competitive advantage of livestock product (especially layer, broiler, and beef), together with cheap and abundant labor force as well as an appropriate exchange rate of rupiah against US dollar, can make Indonesia become important exporter of livestock product to other countries. Availability of corn grown locally as feed ingredient together with huge amount and cheap rice bran make feed production become cost effective. In

addition to all of those supporting factors, the role and government support in term of research and development (R & D), public investment, a conducive policy environment as well as its implementation are a mandatory for the success of livestock development.

References

- Ariani, M., H.P. Saliem, S.H. Suhartini, Wahida, M.H. Sawit. 2000. Dampak Krisis Ekonomi Terhadap Konsumsi Pangan Rumah Tangga. Pusat Penelitian Sosial Ekonomi Pertanian, Bogor.
- Hadi, P.U., D. Vincent, and N. Ilham. 1999. The Impact of Economic Crisis on Indonesia's Beef Sector: Challenges and Opportunity. Indonesia's Economic Crisis: Effects on Agriculture and Policy Responses (Ed. P. Simatupang *et al.*, 1999). CASER, Bogor and CIES, Univ. of Adelaide, Australia.
- Kasryno, F., P. Simatupang, I W. Rusastra, A. Djatiharti, and B. Irawan. 1989. Government Policies and Economic Analysis of the Livestock Commodity System. *Jurnal Agro Ekonomi (JAE)*, Vol.8. No.1, Mei 1989. Pusat Penelitian Sosial Ekonomi Pertanian, Bogor.
- Saptana dan I W. Rusastra. 2000. Dampak Krisis Moneter dan Kebijakan Pemerintah Terhadap Daya Saing Agribisnis Ayam Ras Pedaging di Jawa Barat. Pusat Penelitian Sosial Ekonomi Pertanian, Bogor.
- Soedjana, T.D., B. Tangendjaja, dan I. Sumarno. 2000. Reorientasi Kebijakan Pembangunan Peternakan Pasca Krisis Ekonomi. Widyakarya Nasional Pangan dan Gizi VII. Lembaga Ilmu Pengetahuan Indonesia, LIPI, Jakarta.
- Sutawi. 2000. Perbandingan Harga Ttelnur Internasional. *Poultry Indonesia*. Majalah Ekonomi, Industri dan Teknik Perunggasan Populer. No.245, 25 September – 24 Oktober 2000, Jakarta.
- Swastika, D.K.S., N. Ilham, dan T.B. Purwantini. 2000. Analisis Kelayakan Finansial Usaha Ternak Sapi Perah Pada Pra dan Paska Krisis Ekonomi di Indonesia. Seminar Nasional Sektor Pertanian Tahun 2001: Kendala, Tantangan, dan Prospek, 7-8 Nopember 2000, Pusat Penelitian Sosial Ekonomi Pertanian, Bogor.
- Rachman, B., S.H. Susilowati, H. Malian, dan K. Kariyasa. 2000. Dinamika dan Prospek Harga dan Perdagangan Komoditas Pertanian. Paper disampaikan pada Seminar Nasional Sektor Pertanian 2001: Kendala, Tantangan dan Prospek, 7-8 Nopember 2000. Pusat Penelitian Sosial Ekonomi Pertanian, Bogor.
- Tangendjaja, B. and T.D. Soedjana. 1999. The Impact of the Economic Crisis on Poultry Industry of the Livestock Subsector: Challenges and Opportunities. Indonesia's Economic Crisis: Effects on Agriculture and Policy Responses (Ed. P. Simatupang *et al.*, 1999). CASER, Bogor and CIES, Univ. of Adelaide, Australia.

Warr, P.G. 1999. Indonesia's Crisis and the Agricultural Sector. Indonesia's Economic Crisis: Effects on Agriculture and Policy Responses (Ed. P. Simatupang et al., 1999). CASER, Bogor and CIES, Univ. of Adelaide, Australia.

Table 1. Structural Change and Growth of Agricultural GDP in Indonesia, 1990 – 1999¹⁾

Agricultural sector	Structure and Growth of Agricultural' GDP (%)			
	1990	1996	1998	1999
1. Food crops	60.6 (3.43)	52.8 (2.36)	51.8 (-0.68)	51.7 (1.75)
2. Estate crops	16.7 (5.36)	16.2 (4.47)	17.5 (3.69)	17.02 (3.26)
3. Livestock	10.4 (4.06)	11.2 (4.93)	10.9 (-1.59)	10.63 (0.004)
4. Fisheries	7.8 (5.30)	9.8 (5.26)	10.7 (4.94)	10.8 (2.9)
5. Forestry	4.5 (0.12)	10.0 (0.61)	10.9 (4.93)	9.9 (-8.2)
6. Total agriculture	21.5 (3.40)	15.4 (2.90)	17.2 (0.16)	17.36 (2.08)

1) Figures in parenthesis are the growth rate of the respective agricultural GDP by sub-sector.

Source: Central Bureau of Statistic (CBS), Jakarta.

Table 2. Trend of Livestock Heads in Indonesia, 1996-1999

Description	Beef Cattle	Dairy Cattle	Pig	Layer	Broiler
1. Population (1000 head)					
1996	11,816	348	7,597	78,706	755,956
1997	11,939	334	8,233	70,623	641,374
1998	11,634	322	7,798	38,861	354,004
1999	12,103	334	9,353	41,967	418,941
2. Population change (%)					
1997	1.04	-4.02	8.37	-10.27	-15.16
1998	-1.54	-7.47	2.65	-50.63	-53.17
1999	2.43	-4.02	23.11	-46.68	-44.58

Source: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta.

Table 3. Trend of Livestock Commodities Production in Indonesia, 1996-1999

Description	Meat				Egg		Milk
	Beef	Pork	Broiler	Total	Layer	Total	
1. Production (1000 ton)							
1996	347	190	605	1,632	501	780	441
1997	354	147	515	1,559	483	765	424
1998	343	135	285	1,229	267	530	375
1999	354	138	337	1,323	275	546	384
2. Production change (%)							
1997	2.02	-22.63	-14.87	-4.72	-3.59	-1.92	-3.85
1998	-1.15	-28.95	-52.89	-24.69	-46.71	-32.05	-14.97
1999	2.02	-27.37	-44.30	-18.93	-45.11	-30.00	-12.93

Source: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta.

Table 4. Trend of Production, Import, and Supply of Meat, Egg, and Milk in Indonesia, 1996-1999

Description	Volume (000 ton)				Change (%)		
	1996	1997	1998	1999	1997	1998	1999
1. Meat							
• Production	1632	1555	1229	1323	-4.72	-24.69	-18.93
• Import	29	33	14	14	13.79	-51.72	-51.72
• Supply	1661	1588	1243	1337	-4.39	-25.17	-19.51
2. Egg							
• Production	688	692	464	478	0.58	-32.56	-30.52
• Import	0	0	0	0	0	0	0
• Supply	688	692	464	478	0.58	-32.56	-30.52
3. Milk							
• Production	386	357	316	324	-7.51	-18.13	-16.06
• Import	379	693	527	527	82.85	39.05	39.05
• Supply	1125	1050	843	851	-6.67	-25.07	-24.36

Source: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta.

Table 5. Comparative Advantage and Incentive Structure of Livestock Industry in Indonesia, 1989¹⁾

Technology/Commodities	Incentive Structure			Comparative Advantage	
	NPR	IT	EPR	DRCR	NEB
1. <u>Beef production</u>					
- Free grazing (household)	-52.38	19.82	-48.11	0.3075	319,425
- Tied system (household)	-52.38	19.82	-48.10	0.2835	336,189
- Fattening (household)	-24.89	67.92	-46.17	0.4828	187,052
- Fattening (corporate)	-20.41	66.27	-76.55	0.5917	109,230
2. <u>Pork production</u>					
- Non-intensive (household)	-39.40	71.77	-63.17	0.5700	141,976
- Intensive (household)	-39.40	40.71	-53.15	0.2500	239,575
- Intensive (corporate)	-32.12	-10.38	-42.15	0.5900	105,543
3. <u>Broiler meat</u>					
- Intensive (Lampung)	-42.34	13.17	-19.99	0.3290	109,257
- Intensive (Tasikmalaya)	-38.04	13.18	-90.00	0.1940	141,933
- Intensive (Bogor)	-38.04	12.48	-83.03	0.1944	151,243
4. <u>Layer production</u>					
- Intensive (Lampung)	24.28	19.40	23.20	0.1925	59,892
- Intensive (Tasikmalaya)	-23.78	18.79	-114.00	0.4239	25,085
- Intensive (Bogor)	-23.78	19.75	-132.96	0.3689	22,271
5. <u>Milk production</u>					
- Cross breed (household)	148.32	6.43	70.48	1.4500	-115
- Imported (household)	148.32	5.42	220.11	2.4000	-127
- Cross breed (corporate)	148.32	2.65	102.48	1.7000	-142
- Imported (corporate)	148.32	4.78	226.60	2.8800	-150

Source: Kasryno, et.al. (1989).

Table 6. Financial and Economic Profitability of Smallholder Broiler Farm, Before and After Crisis, in Bogor, West Java, 1996/97 – 1997/98 (Rp/kg broiler carcass)

Model of Development	Before crisis		After crisis	
	Financial	Economic	Financial	Economic
1. Smallholder Agribusiness Model (5,000 head)	1,639	1,336	992	2,286
2. Broilers NES (6,000 head)	2,997	2,515	1,231	1,728
3. Self-help Model (8,000 head)	3,185	2,327	256	1,394
4. Contract farming (30,000 head)	2,352	2,111	133	1,336

Source: Saptana and Rusastra (2000)

Table 7. Incentive Structure and Comparative Advantage of Smallholerr Broiler Farm Before Economic Crisis in Bogor, West Java, 1996/97

Model of Development	Incentive Structure				Comparative Advantage	
	NPCO	NPCI	EPC	PC	PCR	DRCR
1. Smallholder Agribusiness Model (5,000 had)	1.071	0.998	1.133	1.226	0.846	0.843
2. Broiler NES (6,000 head)	1.139	1.056	1.197	1.191	0.753	0.752
3. Self-help Model (8,000 head)	1.132	1.032	1.213	1.310	0.764	0.781
4. Contract Farming (30,000 head)	1.017	1.017	1.089	1.114	0.792	0.797

Source: Saptana and Rusastra (2000)

Table 8. Incentive Structure and Comparative Advantage of Smallholer Broiler Farm Due to Crisis in Bogor, West Java, 1997/98

Model of Development	Incentive Structure				Comparative Advantage	
	NPCO	NPCI	EPC	PC	PCR	DRCR
1. Smallholder Agribusiness Model (5,000 had)	1.033	0.956	1.100	0.434	0.943	0.855
2. Broiler NES (6,000 head)	1.086	1.005	1.155	0.713	0.933	0.891
3. Self-help Model (8,000 head)	1.053	0.994	1.110	0.183	0.986	0.917
4. Contract Farming (30,000 head)	1.021	1.021	1.049	0.100	0.992	0.921

Source: Saptana and Rusastra (2000)

Table 9. The Status of Competitiveness of Indonesian's Egg Production Compared to Other Competing Countries in the World, January 1998

Country ¹⁾	Value (Cent US\$/kg)			Score				Rank
	Product ion Cost	Outputs price	Price margin	Cost of Product ion	Out-puts price	Price margin	To Tal	
1. Canada	46.57	102.52	55.95	43	19	43	105	1
2. Brazilia	45.94	90.11	44.17	44	25	35	104	2
3. Ukraina	48.61	98.79	50.18	42	20	41	103	3
4. United State	43.56	58.35	14.79	45	43	12	100	4
5. <u>Indonesia</u>	<u>38.68</u>	<u>45.20</u>	<u>6.52</u>	<u>46</u>	<u>46</u>	<u>8</u>	<u>100</u>	<u>4</u>
6. Hongaria	49.73	87.86	38.13	41	26	26	93	6
7. Cezchnia	56.54	103.32	46.78	37	18	36	91	7
8. India	52.95	53.97	1.02	40	44	5	89	8
9. Mexico	56.29	78.68	22.39	38	33	18	89	8
10. France	55.83	77.19	21.36	39	34	16	89	8
11. Thailand	57.22	67.60	10.38	35	39	11	85	12
12. Malaysia	67.52	75.57	8.05	19	35	10	64	28
13. Philippines	75.65	84.12	18.47	8	22	15	45	40
14. Japan	90.69	130.90	40.21	2	5	30	37	45
Average	65.04	94.92	29.86	-	-	-	-	-

1) Countries under consideration in this analysis is 46 countries around the world.

Source: Poultry International, January 1999.

Table 10. Profitability of Smallholder Dairy Farm in Upland Area, Indonesia, 1996-1999 (Rp/hh/year)

Description	Farm Size (head/hh)			Aggregate
	2-4	5-7	>8	
<u>Before crisis (1996)</u>				
1. Revenue	9,014,610	18,081,383	29,404,984	13,379,216
2. Cost of production	5,308,216	9,945,996	19,320,108	7,859,167
3. Benefit	3,706,394	8,135,388	10,084,876	5,520,050
B/C ratio	0.70	0.82	0.52	0.70
<u>After Crisis (1999)</u>				
1. Revenue	15,846,352	32,071,768	52,343,274	23,657,677
2. Cost of production	10,103,874	19,055,988	34,899,682	14,827,800
3. Benefit	5,742,478	13,015,780	17,443,592	8,829,877
B/C ratio	0.57	0.68	0.50	0.60

Source: Swastika *et al* (2000)

Table 11. Profitability of Smallholder Dairy Farm in Lowland Area, Indonesia, 1996-1999 (Rp/hh/year)

Description	Farm Size (head/hh)			Aggregate
	2-4	5-7	>8	
<u>Before crisis (1996)</u>				
4. Revenue	8,987,012	15,483,611	27,157,193	13,984,540
5. Cost of production	5,733,356	8,808,172	14,788,884	8,234,835
6. Benefit	3,244,656	6,675,439	12,368,309	5,749,704
B/C ratio	0.57	0.76	0.84	0.70
<u>After Crisis (1999)</u>				
4. Revenue	15,979,095	27,161,122	47,121,192	24,567,283
5. Cost of production	10,545,749	16,361,090	28,739,310	15,489,919
6. Benefit	5,433,346	10,800,032	18,381,882	9,077,364
B/C ratio	0.52	0.66	0.64	0.56

Source: Swastika *et al* (2000)

Table 12. Economic Feasibility of Smallholder Dairy Farm in Indonesia, 1998/99¹⁾

Economic Indicators	Upland area	Lowland area
1. NPCO	0.59	0.58
2. NPCI	0.70	0.56
3. EPC	0.57	0.56
4. DR _{CR} ²⁾	0.33	0.34

1) Basis data are as follows: Official exchange rate = Rp 8,579/US\$; CIF's price of milk (equal to fresh milk) = 0.2227 US\$/liter, and financial prices at factory level = Rp 1,300/liter

2) Exchange rate for DR_{CR} equal to one (Breakeven point) is Rp 5,700/US\$.

Source: Swastika *et al* (2000)

Table 13. Investment Feasibility of Smallholder Dairy Farm for Farm Size of 6 head/hh in Indonesia, 1998/99

Description	NPV (Rp. million)	PBP (years)	IRR (%)
1. <u>Upland Area</u>			
- Discount factor of 18%	23.3	4.0	31.7
- Discount factor of 12%	39.7	4.0	31.7
- Growth rate of income (%)	16.4 (71%)	-	-
2. <u>Lowland Area</u>			
- Discount factor of 18%	10.6	4.5	24.8
- Discount factor of 12%	23.7	4.5	24.8
- Growth rate of income (%)	13.1 (124%)	-	-

Source: Swastika *et al* (2000)

Table 14. Trend of Consumption of Livestock Commodities and Animal Protein Origin, in Indonesia, 1996-1999

Description	Consumption (capita/year)				Consumption change (%)		
	1996	1997	1998	1999	1997	1998	1999
1. Commodity consumption (kg)							
- Meat	8.41	7.95	4.24	4.45	-5.47	-49.58	-47.09
- Egg	3.49	3.46	2.29	2.32	-0.86	-34.38	-33.52
- Milk	5.72	5.25	4.16	4.13	-8.22	-27.27	-27.80
2. Protein consumption (gram)							
- Meat	2.70	2.57	2.00	2.10	-4.81	-25.93	-22.22
- Egg	1.11	1.10	0.73	0.74	-0.90	-34.23	-33.33
- Milk	0.50	0.46	0.36	0.36	-8.00	-28.00	-28.00
- Total	4.31	4.13	3.09	3.40	-4.18	-28.31	-21.11

Source: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta.

Table 15. The change on Food Expenditure by Region, Income Group, and Main Source of Income in Indonesia, 1996-1999

Description	Total Expenditure (Rp/cap/month)			Food Expenditure (%)		
	1996	1999	Change	1996	1999	Change
1. Region						
• Urban	88,731	196,631	121.60	44.9	54.9	22.27
• Rural	48,641	124,290	155.53	52.8	65.0	23.11
2. Income group						
• Low	36,448	111,206	205.11	59.1	70.9	19.97
• Moderate	58,686	241,190	310.98	55.5	63.2	13.87
• High	142,766	269,676	88.89	36.7	47.0	28.07
3. Main Source of Income						
• Agriculture	44,276	126,693	186.14	54.3	65.3	20.26
• Trade/Industry	75,026	173,033	130.63	47.2	58.1	23.09
• Service	88,628	191,388	115.95	45.0	56.0	24.44

Source: National Socio-Economic Survey, Susenas, CBS, Jakarta.

Table 16. The change on Participation and Consumption Rate of Food as Animal Protein Sources in Urban and Rural Area, Indonesia, 1996-1999

Description	Participation Rate (%)			Consumption Rate (kg/cap./year)		
	1996	1999	Change	1996	1999	Change (%)
1. Urban						
- Egg	79.7	66.9	-16.0	7.4	5.0	-32.9
- Chicken meat	40.0	22.0	-45.0	5.2	2.5	-51.6
- Beef	17.8	12.9	-27.0	1.2	0.8	-37.1
- Fresh fish	84.9	80.0	-5.7	19.0	14.8	-22.3
- Processed fish	43.4	40.1	-7.6	1.7	1.4	-16.2
- Milk	40.9	30.6	-25.1	2.0	1.5	-23.4
2. Rural						
- Egg	64.0	53.0	-17.2	4.6	3.1	-33.6
- Chicken meat	20.0	10.8	-45.9	2.7	1.2	-54.9
- Beef	4.3	4.1	-4.0	0.3	0.3	-6.67
- Fresh fish	73.7	72.8	-1.1	14.6	12.2	-16.6
- Processed fish	53.1	50.3	-5.3	2.8	2.4	-15.6
- Milk	17.4	12.8	-26.6	0.6	0.4	-23.6

Source: National Socio-Economic Survey, Susenas, CBS, Jakarta.

Table 17. The change on Participation and Consumption Rate of Food as Animal Protein Source by Primary Source of Income in Indonesia, 1996-1999

Primary source of Income	Participation Rate (%)			Consumption Rate (kg/cap/year)		
	1996	1999	Change	1996	1999	Change
Agriculture						
- Egg	61.2	51.4	-17.3	4.0	2.7	-33.0
- Chicken meat	17.9	10.1	-43.4	2.1	1.0	-53.1
- Beef	4.4	4.0	-10.0	0.2	0.2	5.0
- Fresh fish	72.9	72.6	-0.5	14.8	12.1	-18.4
- Processed fish	53.1	50.9	-4.2	2.9	2.4	-17.7
- Milk	13.8	10.6	-23.2	0.3	0.3	
Industry & Trade						
- Egg	75.2	64.4	-14.5	6.2	4.3	-31.4
- Chicken meat	34.4	19.3	-43.8	4.3	2.1	-50.8
- Beef	14.0	10.7	-23.3	0.9	0.6	-32.6
- Fresh fish	82.6	80.0	-3.2	15.7	12.6	-20.0
- Processed fish	46.9	44.1	-6.0	2.0	1.8	-12.3
- Milk	33.2	25.0	-24.7	1.4	1.1	-21.9
Service & others						
- Egg	79.6	66.9	-16.0	7.5	5.0	-34.0
- Chicken meat	38.8	21.0	-45.9	5.2	2.4	-54.3
- Beef	15.6	11.4	-26.7	1.1	0.7	-33.0
- Fresh fish	83.5	78.6	-5.9	19.2	14.7	-23.4
- Processed fish	45.2	42.7	-5.4	2.0	1.7	-15.4
- Milk	41.1	30.5	-25.9	2.0	1.5	-24.6

Sources: National Socio-Economic Survey, Susenas, CBS, Jakarta.

Table 18. The change on Participation and Consumption Rate of Food as Animal Protein Sources by Group of Income in Indonesia, 1996-1999

Group of income	Participation Rate (%)			Consumption Rate (kg/cap/year)		
	1996	1999	Change	1996	1999	Change
Low						
- Egg	56.8	45.5	-19.9	4.1	2.9	-27.4
- Chicken meat	13.1	6.0	-54.1	1.6	0.6	-57.3
- Beef	2.7	1.9	-28.3	0.2	0.1	-13.3
- Fresh fish	69.5	66.1	-4.9	13.4	10.8	-19.3
- Processed fish	49.9	43.7	-12.5	2.7	2.1	-21.0
- Milk	8.9	7.6	-14.1	0.3	0.3	6.7
Moderate						
- Egg	76.2	63.7	-16.5	6.0	3.8	-36.2
- Chicken meat	32.0	16.0	-50.2	3.9	1.7	-56.3
- Beef	9.1	6.8	-25.1	0.6	0.4	-23.6
- Fresh fish	82.2	80.3	-2.3	16.9	13.5	-20.2
- Processed fish	50.4	48.4	-4.1	2.3	2.0	-13.7
- Milk	30.1	21.3	-29.0	1.0	0.8	-19.2
High						
- Egg	87.0	78.1	-10.1	8.6	5.8	-32.8
- Chicken meat	53.7	36.1	-32.7	7.4	4.0	-46.2
- Beef	27.3	21.2	-22.2	2.0	1.4	-30.6
- Fresh fish	88.2	86.9	-1.5	21.3	17.8	-16.7
- Processed fish	45.5	46.4	1.9	2.0	1.8	-11.1
- Milk	58.8	45.0	-23.5	3.0	2.1	-29.3

Sources: National Socio-Economic Survey, Susenas, CBS, Jakarta.

Table 19. The change on the Proportion of Energy's and Protein Deficit by Region, Group of Income, and Primary Source of Income in Indonesia, 1996-1999 (%)

Description	Energy Deficit			Protein Deficit		
	1996	1999	Change	1996	1999	Change
Region						
- Urban	14.0	22.0	57.14	3.0	8.0	166.67
- Rural	12.0	22.0	83.33	7.0	12.0	71.43
Income Group						
- Low	17.0	29.0	70.59	9.0	16.4	82.22
- Moderate	12.0	19.0	58.33	3.1	7.3	135.48
- High	7.0	12.0	71.43	1.1	2.7	145.45
Sources of income						
- Agriculture	13.0	21.0	61.54	7.0	12.9	84.29
- Trade/industry	14.0	23.0	6.29	3.8	8.5	123.68
- Services & others	12.0	21.0	75.00	3.0	7.5	150.00

Sources: National Socio-Economic Survey, Susenas, CBS, Jakarta.

Table 20. Trend of Retail Domestic Price of Live Animal, Livestock Commodities, and Input Factor in Indonesia, 1996-1998

Description	Price (Rp/unit)			Change (%) ¹⁾	
	1996	1997	1998	1997	1998
1. Live animal					
- Cattle	4,012	4,053	5,591	1,02	39,36
- Pig	3,724	4,357	5,128	17,00	37,70
- Broiler	3,586	3,471	5,595	-3,21	56,02
2. Livestock commodities					
- Beef	10,991	11,062	15,971	0,65	45,31
- Pork	8,706	9,260	10,946	6,36	25,73
- Broiler meat	4,699	4,696	7,746	-0,06	64,84
- Layer egg	2,884	3,018	5,774	4,65	100,21
- Fresh milk	1,695	1,661	2,031	-2,01	19,82
3. Input factors					
- Layer's feed	816	877	2,067	7,48	153,31
- Broiler's feed	912	964	2,308	5,70	153,07
- DOC's layer	1,234	1,466	1,901	18,80	54,05
- DOC's broiler	1,026	888	1,264	-13,45	23,20

1) Price before crisis (1996) as a basis in determining price change (%).

Sources: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta

Table 21. Average Monthly Retail Price of Beef in 26 Provincial Cities, Indonesia, 1996-2000 (Rp/kg)¹⁾

Month	1996	1997	1998	1999	2000
1. January	10,332	11,146	11,434	22,027	25,126
2. February	10,683	11,424	12,283	22,424	24,679
3. March	10,595	11,110	12,678	22,106	24,863
4. April	10,587	11,181	13,735	22,631	24,701
5. May	10,623	11,007	14,019	22,748	24,731
6. June	10,794	10,991	14,376	22,703	24,902
7. July	10,762	10,998	16,016	22,841	25,175
8. August	10,794	10,986	17,137	22,662	22,371
9. September	10,858	11,015	18,037	23,179	22,527
10. October	10,823	10,987	18,770	23,111	22,681
11. November	10,758	10,953	19,264	23,287	22,833
12. December	10,846	10,991	20,362	24,091	22,984
Average	9,898	11,066	15,676	22,818	23,956
Growth (%/month)	-0.73	-0.24	5.27	-0.01	-2.43
Exchange rate (Rupiah/US\$) ²⁾	2,383	4,650	8,025	7,809	8,384

1) Source: National Logistic Agency, Bulog, Jakarta (Rahman et al, 2000).

2) Weekly Report No.2136, October 23, 2000, Central Bank of Indonesia (BI), Jakarta.

Table 22. Average Monthly Retail Price of Layer's Egg in 26 Provincial Cities, Indonesia, 1996-2000 (Rp/kg)¹⁾

Month	1996	1997	1998	1999	2000
1. January	4,532	3,288	3,468	10,047	9,857
2. February	5,979	3,278	4,522	9,551	8,412
3. March	5,296	2,998	4,694	8,997	8,193
4. April	2,736	2,963	5,377	9,842	7,568
5. May	3,150	3,402	5,239	9,630	7,390
6. June	2,644	2,982	5,135	9,593	7,779
7. July	2,857	3,003	6,247	9,466	7,9093
8. August	2,725	3,106	7,392	9,116	7,163
9. September	2,344	3,085	7,489	8,024	7,207
10. October	2,466	2,967	7,447	7,789	7,249
11. November	2,713	2,890	7,845	8,471	7,291
12. December	3,214	3,032	8,674	9,312	7,333
Average	3,471	3,053	6,127	9,153	7,779
Growth (%/month)	-7.22	-0.65	7.11	0.03	-2.11
Exchange rate (Rupiah/US\$) ²⁾	2,383	4,650	8,025	7,809	8,384

1) Source: National Logistic Agency, Bulog, Jakarta (Rahman et al, 2000).

2) Weekly Report No.2136, October 23, 2000, Central Bank of Indonesia (BI), Jakarta.

Table 23. Trend of Trade of Livestock Commodities in Indonesia, 1996-1998 (000 US\$)

Description ¹⁾	Value of trade (000 US \$)		
	1996	1997	1998
1. <u>Export</u>	<u>61,766</u>	<u>52,012</u>	<u>111,556</u>
- Traditional commodities	32,545	32,626	79,281
- Potential commodities	29,221	25,386	31,275
2. <u>Import</u>	<u>663,602</u>	<u>572,641</u>	<u>348,490</u>
- Livestock	131,651	132,569	24,281
- Livestock product	531,951	440,072	324,209
3. <u>Balance</u>	(601,835)	(514,629)	(237,934)

1) Traditional livestock commodities are leather, bone, and horn. Potential commodities consist of material food (meat, pig, consumption egg, milk, butter and cheese) and non-material-food such as DOC, hatching egg, duck feather, and poultry.

Source: Statistical Book on Livestock, DGLS, Ministry of Agriculture, 1999, Jakarta.