

## (2) Model

In order to assess the influence of the mixed feed cluster on the production of raw materials, the number of workers and exports, we made a rough simulation in Table 6, assuming that they produce 100,000 tons of chicken and pork respectively and export all of them. 10,000 tons of meat for exporting is a criteria, which was determined by taking past export records of small agrarian and ranching countries such as Denmark, Holland, New Zealand and Taiwan into account. Gross value added ratio, which was used as the base for estimation, was 80 %. The amount of money, which was found by deducing original expenses for the mixed feed cluster (the cost for fertilizer, agro-chemicals, fuel, electricity, packing materials and so on) from exports, was taken as the gross value added, and its ratio to the total exports is called gross value added ratio.

According to this table, exports of 100,000 tons of chicken would increase Paraguay's GDP by 1.6% and exports of 100,000 tons of pork would increase it by 3.8%. In terms of the number of workers, exports of chicken and pork would create jobs for 34,000 people and 80,000 people respectively. These figures are the estimates of direct effect alone. If indirect effects on the transportation industry, farm equipment repair industry and other industries were included, the figures would be much higher.

**Table 6 Model of Mixed Feed Cluster**

Exports		Chicken 100,000 tons	Pork 100,000 tons	The Base of Calculation
Export Amount		US\$ 170 million	US\$ 400 million	FOB unit price : chicken \$1,700, pork \$4,000
Contribution to GDP		US\$ 136 million	US\$ 320 million	Assumes that the gross value added ratio is 80 %.
Raw Material	Corn	240,000 tons	390,000 tons	The amount of feed required to produce 1 ton of meat is 4.4 tons for chicken and 7.1 tons for pork. Component Ratio Assumed: corn 55%, soybean lees 25%, bran or /and sorghum 20%
	Soybean pellet	110,000 tons	180,000 tons	
	Bran or/and Sorghum	90,000 tons	140,000 tons	
	Total	440,000 tons	710,000 tons	
Farming are for raw materials	Corn	60,000 ha	98,000 tons	Yielding 4t/ha
	Soybean	51,000 ha	83,000 ha	Yielding 2.7t/ha, yield rate 80%
	Wheat Sorghum	(180,000 ha) (60,000 ha)	(280,000 ha) (93,000ha)	Yielding 2t/ha, yield rate for bran 25%, yielding 1.5t/ha
	Total	291,000 ha 171,000 ha	461,000ha 274,000 ha	Upper: using bran Lower: using sorghum
	Agricultural sector	25,000 people	58,000 people	Gross value added amount was divided into agricultural sector and manufacturing sector, and annual value added amount per capita was assumed to be \$2,741 and \$7,357 respectively. (based on data of 1997)
	Industrial sector	9,000 people	22,000 people	
	Total	34,000 people	80,000 people	

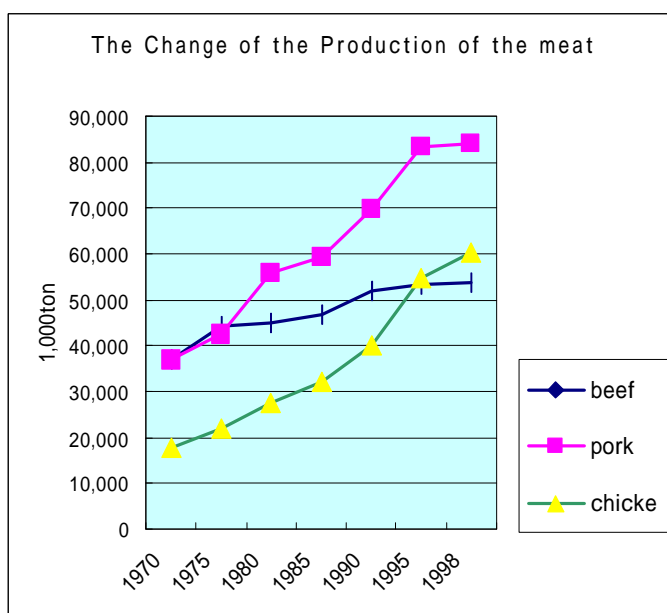
Raw materials for feed that is required for the production of about 100,000 tons of meat can be covered by the domestic production by consuming exported materials domestically. If the production increased the quantitative bottleneck would be corn. Bran and sorgum can be substituted for corn. Increasing the production of corn will be a major task in order to expand this cluster.

### (3) Potential market

#### 1) Future outlook of the market

In order to forecast the potential of this cluster's end products (chicken, pork), we compared the growth of chicken and meat over the past three decades with that of beef in the following figure (meat production). Although beef is common in Latin America, the production of beef is less than pork and chicken throughout the world, and the growth of beef has slowed down in the 1990s. In contrast, the production of chicken and pork is increasing rapidly; the growth of chicken, in particular, has accelerated in the 1990s.

**Figure 2 Change in Production of Meat**



Hindus do not eat beef, while Muslims and Jews do not eat pork. However, eating chicken is not prohibited by any religion. In this respect, chicken seems to be favored all over the world. Since chicken can be produced efficiently with smaller amount of feed and low cost, its consumption is expanding rapidly in developing countries where income level are just starting to rise. In countries such as the USA, where income level has been high and beef has been consumed largely, the consumption of beef is declining due to people's health-consciousness and chicken consumption is increasing. With these reasons, we can say that the potential of chicken is high. When we see the production of chicken in a breakdown by district, it is growing sharply in Asia and North and South America.