DEMAND AND SUPPLY PROJECTIONS FOR MAJOR LIVESTOCK PRODUCTS FOR THE YEAR 2000 AND NEW POLICY OPTIONS

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Population of Pakistan is increasing at a burgeoning rate of 3% per annum but the performance of livestock sector is very poor. The present growth rate of livestock products is insufficient to meet even the moderate level of demand and thus we are likely to face severe shortfalls in almost all the livestock products especially milk and meat in the future years. The present paper reviews the perspective demand and supply situation.

INTRODUCTION

Livestock is an important subsector of agriculture. Its products account for about 30% of the national household expenditure on food. It is a significant source of income and draft power for small and landless farmers as well as a rich source of much needed proteins having high biological value. The outputs of meat and milk are increasing only at an annual rate of 5.5% and 3.4% respectively. These growth rates are incapable of meeting even the moderate level of demand. Relatively low level of per capita consumption of animal protein, rapid increase in the domestic prices of meat (mutton, beef, chicken) and milk and heavy import bills especially for dried milk and milk products all point to the excess demand over the domestic supply of livestock products. With the present population growth rate, the gap is likely to accentuate further (FAO, 1987). Projected economic development accompanied with high income elasticities for meat and milk is likely to exert a considerable pressure on the livestock sector in the future. To meet their increasing demand, the production of livestock products must increase much faster than what has been the case. Such a rapid increase in the supply of the livestock products can be achieved by simultaneously increasing both the population and productivity of the livestock (Akhtar and Forest, 1990). Will the livestock sector with its present pace of growth be able to satisfy the future demand for its products? This paper attempts to answer this question.

METHODOLOGY AND DATA BASE

The lack of reliable data makes it rather difficult to know how the production of livestock products occurs and how the consumer demand is met. However, the latest data regarding the production of meat and milk and their domestic consumption demand for the year 1988-89 published in the Economic Survey, 1989-90 are used as a basis to project their future demand in 1999-2000. There is a lack of uniformity among various sources with respect to data regarding per capita availability of meat and milk, therefore, the estimates for per capita availability of these products in the base year have been worked out by dividing total pro-

duction plus imports, if any, with the total population.

The projection of the future demand for milk and meat is attempted by taking the following steps:

1. Projections of GNP and population are made up to 1999-2000 using their existing published average growth rates.
2. Derivation of the future increase in per capita income.
3. Estimation of per capita consumption in the terminal years on the basis of income elasticities (as given in Appendix I).
4. Computation of total meat and milk in 1999-2000 with reference to projected population and income elasticies.

RESULTS AND DISCUSSION

For visualizing the future situation regarding production and consumption of meat and milk, the production system and consumption pattern of both of these products have to be kept in view as is discussed in the preceeding paragraphs.

Production system: The domestic livestock

Appendix 1. Detailed calculations for projection of demand and production of meat up to the year 1999-2000

Asumption

Projection of demand of meat has been carried out for moderate demand and high demand scenarios on the following basis:

	Moderate growth (%)	High growth (%)
GDP growth rate (per annum)	5.5	6.5
Pop growth rate (per annum)	2.5	3.1
Growth in per capita income (per annum)	3.0	3.4

Income elasticity has been assumed 1.4 for moderate and 1.7 for high demand.

Calculations

Particulars	1988-89	1999-2000	
		Moderate	High
Population (million numbers)	107.04	140.45	149.76
Growth in PCI by 1999-2000 (%)	-	38	44
Income elasticity	-	1.40	1.70
Income effect in 1999-2000 (%)	-	53.20	74.80
Per capita demand (kg)	13.15	20.15	22.99
Total demand (million tonne)	1.41	2.83	3.44
Total production (million tonne)	1.41	2.53	2.53
Shortfall (million tonne)	-	0.30	0.91

sector is dominated by rural small holders with less than five head of buffaloes and cattle and a few sheep and goats. Most of sheep and goats are kept by the small holders in NWFP, Balochistan and Southern Punjab. All the ruminant production systems depend heavily on grazing either of rangelands or wastelands and fallows or feeding on the farms.

In terms of volume and retail value, milk is an important product of dairy animals. The production of milk is characterized by considerable seasonal variations. Production reaches maximum during the winter months and minimum during the summer when high temperature is accompanied by shortage of fodder supply. Total milk production from all sources in 1988-89 was 13.7 million tonnes. Buffaloes and cows respectively contribute about 70 and 22% and the remaining 8% comes from other minor sources as goats, sheep, camel, etc. Milk production is increasing at an annual rate of 3.4% (Table 1).

Table 1. Meat and milk production and consumption growth rates between 1971-72 and 1988-89

	(000 tonnes)		
Product	1971-72	1988-89	Growth rate (%)
Beef	346	626	3.55
Mutton	208	610	6.53
Poultry meat	14	172	15.89
Total meat	568	1408	5.48
Milk	7800	13708	3.37

Source: Economic Survey, 1989-90.

The sources of meat production include buffaloes, cows, sheep, goats and poultry. Total mutton supply in 1988-89 was 0.610 million tonnes which has increased at an annual growth rate of 6.53%. Presently, beef is produced as a byproduct of dairy and draft animals. Generally, animals which are unfit for breeding, milking or work are slaughtered for beef production. Total beef production in the country in 1988-89 was 0.6 million tonnes which has increased at a rate of 3.6% per annum. The total beef and mutton production is increasing at the rate of 4.8% which is very low for an adequate fulfillment of consumption needs. This low rate of growth has, however, greatly been compensated by rapid increase in poultry products which augmented at the rate of 15.89% per annum. The total meat production from all sources in 1988-89 was thus 1.41 million tonnes growing at an annual rate of 5.48% (Table 1).

Consumption pattern: Domestic consumption of agricultural products, or for that matter any product, depends on their prices, size of population, prices of related commodities and income. However, the income and population are expected to exert dominant influence on the consumption especially meat, milk and eggs which are regarded superior food items. The income elasticity of demand for meat is estimated to be 1.4 (for moderate demand) and 1.7 (for high demand) which is greater than the income elasticity of any other food item. The income elasticity of demand for milk is 0.66 (for moderate demand) and 0.80 (for high demand) (NCA, 1988). The comparison of household expenditure by food items in 1971-72 as given in Table 2 shows that the meat and eggs accounted for 11.5% of the total expenditure in 1984-85 compared to 8% in 1971-72. The share of milk and milk products, however, stayed at the same level.

The per capita consumption of milk is considerably higher in rural areas than in urban areas. It is estimated that about 75%

of all milk produced is consumed in rural areas. To meet the entire consumption requirements about 30,000 tonnes of powdered milk are imported annually. As such, the per capita availability based on domestic production and imports was estimated in 1988-89 as 128.8 kg per annum. This seasonal variation in consumption of milk is opposite to that of its seasonal production. Generally, the demand for milk is higher in summer than in winter.

Table 2. Distribution of expenditure on food in 1971-72 and 1984-85

	1971-72 (%)	1984-85 (%)
Cereals	38.8	28.7
Pulses	3.7	4.4
Milk and milk products	27.9	27.5
Vegetable ghee and oil	5.5	7.8
Meat and eggs	8.0	11.5
Fruits and vegetables	8.2	12.2
Sweetners	7.9	8.0

Source: Household Income and Expenditure Survey, 1971-72 and 1984-85.

The distribution of poultry meat and mutton consumption is largely skewed towards higher income groups while beef is mostly consumed by middle and lower income groups (Anonymous, 1989-90). The per capita availability of meat in Pakistan is estimated at 13.15 kg per annum.

Projection of demand and production: As mentioned earlier, there exists a gap between the production and consumption of milk which is being filled through imports. However, the per capita availability of milk in 1988-89 worked out to be 128.84 kg per annum.

Since meat is not being imported partly on account of religious considerations and partly due to the lack of consumer preference for preserved or frozen meat, it is not possible to know the exact existing demand. Therefore, for the purpose of analysis, the depressed demand in the form of per capita consumption of meat in 1988-89 of 13.15 kg has been taken as benchmark demand for 1988-89. The present growth rates of production of meat (5.84%) and milk (3.37%) have been used to project the benchmark production of 1988-89 up to 1999-2000. The projectins have been worked out in accordance with the procedure laid down earlier. Further, the projections have been made separately for high demand and moderate demand scenarios. Under high demand situation, higher income elasticities have been assumed whereas for moderate demand, moderate rates of growth of GDP and population along with moderate income elasticities have been taken into account.

The following equation has been used for projecting the demand upto 1999-2000:

$$Df = Pf.\,[(Cp) + (Cp\,(Y.E)]$$

where

Df = Projected demand
Pf = Projected population
Cp = Present per capita consumption
Y = Gross increase in per capita income
E = Income elasticity

By putting the values for high demand for meat, we get:

$$Df = Pf.\,[(Cp) + (Cp\,(Y.E)]$$
$$Df = [149.76\,[13.15] + 13.15\,(0.44 \times 1.7)]$$
$$= 149.76 \times 22.99$$
$$= 3.44 \text{ million tonnes.}$$

By putting the values for moderate demand for meat, we get:

Df = Pf. [(Cp) + (Cp (Y.E)]
Df = [140.45] [13.15] + 13.15 (0.38 x 1.4)]
= 2.83 million tonnes.

The same method has been applied for projection of high and moderate demand for milk. The results are summarized in Table 3.

in poultry meat production. Commercial poultry has, in fact,been greatly responsible for giving a boost to the overall growth rate of meat production. It may, however, be kept in view that the current poultry performance has been induced by highly encouraging policy of the Government including tax holidays for this sector. Any discontinuity in this policy is likely to adversely affect its performance.

The analysis also indicates that there is

Table 3. Production and demand projections for meat and milk for high and moderate growth rates up to 1999-2000

	Million tonnes				
		(1999-2000)			
	1988-89	Moderate	G.R. (%)	High	G.R. (%)
Total demand					
Meat	1.41	2.83	6.53	3.44	8.45
Milk	13.79	22.63	4.50	26.09	5.97
Total production					
Meat	1.41	2.53	5.8	2.53	5.84
Milk	13.71	19.74	3.37	19.74	3.37
Shortfall					
Meat	-	0.30		0.91	
Milk	0.08	2.89		6.35	

Policy implications: The above analysis indicates that there would be a shortfall in meat supply up to 0.91 million tonnes based on high demand and of about 0.30 million tonnes based on moderate demand increase in 1999-2000. The shortfall in milk supply in the same period will amount to 6.35 million tonnes based on high demand and 2.89 million tonnes based on moderate demand. These results will hold good only if the production of both these products keeps increasing at stable rates and simultaneously re-enforced by a growth rate of about 15% a need for the production of meat and milk to increase at least at the rate of 6.53% and 4.6%, respectively against the present growth rate of 5.48% and 3.37%. If circumstances on which the high demand estimates are based occur as assumed, then the production of meat and milk should grow at an annual growth rate of 8.45% and 6.02%, respectively. The required growth rates are quite high and seem ambitious in certain ways when viewed with respect to constraints of the livestock sector which inhibit its growth.

REFERENCES

Akhtar, M. and W. Forest. 1990. Pakistan Agriculture: A Description of Pakistan's Agricultural Economy, Islamabad.

Anonymous. 1989-90. Economic Survey. Ministry of Finance and Economic Affairs, Economic Advisors Wing, Govt. of Pakistan, Islamabad.

Anonymous. 1971-72 and 1984-85. Household Income and Expenditure Survey. Islamabad.

FAO. 1987. Fact Finding Mission. Livestock Sector Study, Islamabad.

NCA. 1988. Report of the National Commission on Agriculture. Govt. of Pakistan, Islamabad.