

IMPROVING LIVESTOCK PRODUCTIVITY IN PAKISTAN

Country Paper Presented at

SAARC Meeting of Counterpart Scientists on
Livestock Improvement at Savar, Bangladesh
18th to 19th December, 1989

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1989

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INTRODUCTION

The livestock sector in Pakistan constitutes about 28 percent of GDP in agriculture, contributes about 15 percent to the total export earnings, and remains still, the principal source of farm power for land leveling, cultivation and rural transport. The increases in total production of livestock products (milk, mutton, beef) except poultry over the past several years have resulted mainly from increase in livestock inventory rather than increase in production per animal. In recent years, milk production has lagged behind demand for growing human population. Meat production has grown at a higher rate largely because of poultry and goats, but beef production has grown at a negligible rate and is mainly a by-product.

In Pakistan livestock has played a pivotal role in nation's economy. More than 96 million heads of livestock are providing milk and meat to the human population, hide and skin, wool and hair, and other things for the business and for export purpose. Beside this, if draft power and dung/urine is included, than the contribution for the livestock may be much more higher i.e. upto 50% of the GDP of the agriculture (18 million tonnes of dry dung which contains more than 300,000 tonnes of Nitrogen. It is worth to mention here that according to economic survey

of Pakistan (1988) Pakistan exported hide and skin and other related products worth Rs. 2597 million, wool and related products Rs. 3007 million (Asian Development Bank 1987). Livestock provides more than 75% energy on the farms in shape of tillage, irrigation and carting of products. This energy is derived from more than 6 million work animals. In Pakistan 3/4 land mass is range land which can be used for grazing of livestock. This sector is main source of livelihood and provides employment to 65 percent population which includes rural landless, marginal farmers and rural women.

For the improvement of livestock, government of Pakistan allocated Rs. 1145 million during Sixth Five Year Plan (1983-88). Out of this, Rs. 1020 million were given to Provincial Governments whereas 125 million rupees were allocated to the departments in Federal Government. Seventh Five Year Plan was initiated in 1988 and will be completed in 1993. During this period, Rs. 560 and 1929 million will be spent for improvement of livestock/poultry by the federal and provincial Governments respectively. Similarly, it has been proposed that in total Rs. 3400 million will be spent during 8th Five Year Plan (Table 1). After spending this much money, it is expected that growth rate of beef, mutton and milk in Pakistan will be 3.3, 5.2 and 5.0 percent respectively (7th Five Year Plan 1988-93).

LIVESTOCK RESOURCES:

There are eight cattle, two buffalo, 28 sheep and 25 goat recognized breeds in Pakistan (Fig.-1). These are famous for milk, meat, draft, mutton and wool purpose. At present, these breeds, due to crossbreeding and mixing, are losing their individual identity. There are more than 53 (beside Military Farms) livestock farms in public sector for buffalo, cattle, sheep and goat in the country where pure breed animals of that province are maintained but these are without any impact in the field. Red Sindhi cattle farm at Tando Muhammad Khan, Kundi buffalo farm at Rohri, Livestock Experiment Station at Qadirabad, District Sahiwal and others are good examples but these are only like zoo where animals can be seen.

Pakistan Agricultural Research Council (PARC 1988) has initiated following programmes which directly or indirectly help in the conservation and improvement of pure bred animals in the country.

- Establishment of Embryo Transfer Technology.
- Coordinated Research Project on Improvement of Sheep and Wool.
- Coordinated Research Project on Improvement of Goat.

- Purification of Bovine Follicle Stimulating Hormone (FSH) for Superovulation in Cattle and Buffaloes.

Amongst Pakistan's endowments is a large livestock resource that holds considerable potential for development. The NILI-RAVI buffalo in the Punjab and KUNDI breed in Sindh are world-famous for their dairying qualities. Likewise SAHIWAL and RED SINDHI breeds of cattle rank among the best dairy breeds of the tropics well adapted to hot and humid climates, their tolerance to diseases and ability to convert roughage into milk and meat. Likewise Pakistan has excellent breeds of sheep, goats, camels but research and development on these species has received marginal attention.

TRENDS OF PRODUCTION:

The production trends of livestock during 1977-78 and 1987-88 are given in table 2. According to livestock census (1987-88) Pakistan's livestock wealth comprises 17.1, 14.0, 27.4, 33.0, 1.0, 3.1, 0.5 and 0.07 millions heads of cattle, buffaloes, sheep, goats, camels, donkeys, horses and mules respectively. If we compare these figures with the year 1977-78 then it is clear that there is a reasonable growth rate in livestock population but overall it is not appreciable as compared to human population. In Pakistan,

human population is growing at the rate of 2.9 percent per year, whereas overall livestock growth is somewhere 2.5 percent per year. Table 3 shows the products derived from above mentioned inventory in the country. If we compare net value added for 12 major crops and 18 minor crops, then in Pakistan at all constant factor costs there was a contribution of 13,686 million rupees from these crops. Whereas only livestock contributed the products worth Rs. 37,524 million. Commodity wise we got 12.9 million tonnes of milk, 1.2 million tonnes of meat, 40 million number hides and skins. The production trends of livestock products indicate that there was 48.2, 53.0 and 78.1 percent increase in milk, beef and mutton production respectively. Similarly an appreciable increase was also noticed in the production of hides, skins, wool, hair, bones, fat and blood (Table 4).

Beef is a by-product of dairy production and draft power, while mutton is produced through low technology, usage of rangeland and stubble grazing. The country has large potential for increasing its meat production. Two raw materials available in abundance are:

- i) 2.5 million male buffalo calves and 1.5 million aged and unproductive cattle and
- ii) large reservoirs (60 million tonnes) of crop residues and other animal wastes.

Buffalo calves and small ruminants (sheep and goats) are undernourished, so their growth and development is stunted. Exploiting surplus male buffalo calves by feeding and fattening on crop residues and other by-products it is estimated that country could increase its beef production by 100 percent. The increases in mutton production could come from efficient rearing and fattening of young kids and lambs.

In order to harness this potential, a vigorous research programme on animal nutrition has been initiated in the country. The policy to develop and utilize agro-industrial by-products as animal feed represents a vital component in the national strategy for enhanced milk and meat production.

The technologies developed by animal nutritionists for complete formula feeds and urea-molasses block manufacturing, processing and detoxification of feedstuffs etc. are being used by private entrepreneurs. Industry based on such technology

worth Rs. 100 million has already been set up using crop residues and sugar mill by-products. Projects worth Rs. 1 billion are under process with money lending institutions. Using these technologies livestock productivity is expected to increase by about 40 percent (FAO, 1987).

AVAILABILITY OF MILK AND MEAT:

The average per capita availability of milk in Pakistan is around 56 kg per person per year and it is the highest in the Asia-Pacific Region (Table 5). But milk is unevenly consumed by rural and the urban populations due to lack of organized facilities for milk collection, processing and marketing, while the country produces large quantities of milk and has the potential to increase it by 6 percent per annum, however contradiction on the imports of dairy products prevails in the sector. Although these imported dairy products constitute only 5 percent of the national production of over 12 million metric tonnes, yet some precious foreign exchange (US \$ 70 million and rising) is spent on imports of dairy products (Economic Survey of Pakistan 1988). These imports, that are avoidable and are largely the result of problems in transfer of technology, constitute a twin menace. Firstly the expense of imports, but more importantly their depressing effect on the development of domestic dairy industry.

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There has been, in the recent past, an upsurge in the private sector about investment for milk processing in the form of establishment of UHT milk plants. The problems, however, are far more complex and the situation cannot be improved without systematic research in the field of dairy technology. Pakistan is endowed with rich animal wealth of good quality and has the essential components required for building a strong and viable dairy sector. The per capita consumption of milk in rural areas was 257 gm per head per day as compared to 114 gm per head per day in urban areas (National Nutritional Survey 1988).

Unlike where large milksheds exist in Pakistan, meat production in Pakistan is essentially a side-line enterprise. The percaput availability of meat was 13 Kg per year (Table 5) which is low and does not meet the demand. The average consumption of meat in rural and urban areas were 26 and 42 gm per head per day respectively (National Nutrition Survey, 1988).

CONSTRAINTS:

Following are the major constraints which have hampered the improvement of livestock:

Shortage and poor quality of livestock feed, forage and fodder, poor management, poor quality and low efficacy

of livestock vaccines, disorganized marketing system, lack of price structure in the country, inadequate facilities in veterinary hospitals, the limited use of modern technology, lack of organization for the collection of reliable livestock statistics, lack of a mechanism to transfer the existing technology from laboratory research stations to fields and shortage of trained manpower.

According to NCA report (1986), dry matter available for livestock was 89.1 million tonnes which has been estimated to be sufficient for the livestock whereas available TDN was insufficient (9.4 million tonnes). Currently 47.3 million tonnes TDN is available whereas demand is 56.7 million tonnes. Similarly, we are insufficient in case of DP. If we calculate DM, TDN and DP supply at the rate of 3 percent increase, then in the year 2000, we will be having 16.1 million tonnes over supply in case of DM. By the introduction of high yielding varieties of various fodder crops, rate of increase may be upto 4 percent. In this way country will not only be self sufficient in DP but also be having over supply in case of DM and TDN (Table 6).

There is a good net-work of veterinary hospitals, insemination centres and veterinary centres. At union council level, which is the smallest administrative unit in the country,

veterinary centres have been established. These Centres provide medicines for treatment but its main job is to perform vaccination against various livestock diseases. In the country there are 5 veterinary/animal husbandry faculties where education upto Ph.D. level is given to local as well as foreign students. From these five faculties, every year 300 students are completing their education. Presently there are 11765 technical personnel working in animal husbandry and veterinary profession. To look after 8760 animals, one trained person is available which is not sufficient (Table 7).

There are many research organizations at Federal as well as Provincial level in the country. These are tackling field oriented problems and various research projects have been completed in these laboratories. Although good results are coming up but still there is a lack of mechanism to transfer the existing technology from laboratories/research stations to the farmer.

FUTURE PLANS FOR IMPROVEMENT:

To tackle the constraints, various measures will be taken during the Seventh Five Year Plan (1988-1993) to develop and improve the livestock.

The Seventh Plan strategy will be to increase the productivity of livestock by giving emphasis on quality rather than numbers to produce more healthy and well-nourished livestock. Availability of adequate feed will be given highest priority. The major thrust will be on breed improvement through cross-breeding, artificial insemination and embryo transfer technology. Emphasis will be given to fodder research particularly combinations of fodder that fit into existing farming systems and provide year-round supplies of green matter. Research will be intensified on the utilization of agricultural wastes, industrial by-products and crop residues as animal feed.

The gross domestic production of milk is targeted to increase to 16.470 million tonnes while net production available for consumption will be 13.323 million tonnes in 1992-93. The meat production target is 1.435 million tonnes for the same period (Table 8).

The import of dried powder milk is expected to increase due to an increase in population. Since milk is a perishable commodity, its distribution will be streamlined on a scientific basis. Milk collection centres and chilling units will be established which will help in a marketability of milk and increase its shelf-life.

In the 7th Plan, the availability of livestock is proposed to be increased through scientific production and feeding of animals. Several projects of livestock development and feed-lot fattening will be initiated.

CROSSBREEDING (DAIRY CATTLE):

With the exception of a few dairy breeds, most of Pakistan's bovine population is composed of non-descript, low producing cows. In order to cope with feed shortages, and increasing demands for livestock products, genetic improvement of cattle and buffaloes is highly imperative. Crossbreeding local cattle with exotic semen and progeny selection in buffaloes are the two strategies for genetic improvement that are being pursued for on-station research at various research institutes in the country. For this purpose nucleus herds of exotic breeds (Friesian and Jersey) are being maintained for performance evaluation under local conditions, as well as for the production of superior germ plasm for cross-breeding programmes. Experimental cross-breeding between Jersey and non-descript cattle in Islamabad district has yielded promising results. Similar research programme is under way in the Punjab (Bhunaik, Bahadurnagar) and in Baluchistan where research results have shown that the age of first calving in cross-bred cows can be reduced from 36 months to 22 months, calving interval reduced from 24 to 18 months, and milk yield increased by 50 percent.

BUFFALO RESEARCH AND DEVELOPMENT:

Buffalo is Pakistan's premier dairy animal. About 75 percent of the country's total milk produced is derived from buffalo. Despite its high genetic potential, buffalo suffers from several factors for its low productivity. Notable among these are late maturity, high age at first calving, longer calving interval, silent heat, repeat breeding and marked seasonal variation in breeding. Pakistani buffalo takes around 4-5 years before first freshening, and the calving interval ranges from 18-23 months. These two problems alone cause huge economic losses to the livestock economy. According to a survey 24 billion rupees are lost every year due to late freshening and 26 billion rupees from long calving interval (Usmani 1986). By lowering the age at first calving to 28 months and shortening the calving interval to 13 months, two additional lactations from an individual buffalo can be taken by the age of 11 years. Some basic research conducted through a Nationally Coordinated Research Project, with network of Units in all provinces of the country, has established that these targets can be achieved by applying modern practices of productive management and feeding in adult buffaloes.

EMBRYO TRANSFER:

Productivity of valuable female cattle and buffaloes can be increased to a great extent by superovulation and

subsequent transfer of embryos to low producing recipients. In this way, there is a scope for more intense selection, accelerated genetic improvement and rapid multiplication of superior stock.

In many parts of the world where embryo transfer technology (ET) has been used, 10-12 calves have been obtained per year from one elite cow. Using this technology with a nucleus Jersey stock as donor, and scrub local cows as recipient surrogate mother, PARC has played a pioneering role in producing 6 calves. Buffalo embryos have been successfully frozen and after thawing, were transplanted in recipient buffalo in this way. Pregnancy has also been achieved in buffaloes. Further work is in progress. Elite specimens from renowned dairy breeds of Pakistan like Sahiwal and Red Sindhi and buffaloes can be multiplied rapidly through application of ET.

The poor reproductive efficiency of buffaloes due to long calving interval and late age at maturity are well known. To overcome this problem ET work has already been commenced at various research stations in the country. This work would allow progeny from elite and high yielding animals to be spread at a rapid rate to replace low producing buffaloes. It will also increase understanding of the reproductive physiology of this species.

Measures will be adopted to provide improved disease control by controlling the herd infection and contagious diseases through appropriate prophylactic measures. Emphasis will be given to increase the production of quality vaccine as well as research on obscure diseases. During the 6th Plan period the private sector started the production of meat at commercial levels under feed-lot-system. Although various incentives have been provided by the government in this regard, there are still many constraints hindering the developing of meat industry in the country.

CONCLUSION:

For the improvement of livestock various measures have been suggested in the paper based upon present status of livestock, constraints in the country, future plans and the financial resources available for this purpose. Sizeable budget have been allocated in the 7th Five-Year Plan and realistic targets have been fixed based upon the experience gained during 6th Five-Year Plan. Feed and fodder resources have to be developed so that available livestock may get requisite share for production. Due to unplanned crossbreeding in cattle, pure breeds are deminishing in the country. Measures have to be adopted to conserve different breeds particularly milch cattle breeds. Management practices have to be based upon different ecological regions in the country.

Various vaccines for livestock are to be improved so that their efficacy may be brought to the desired point. Animal husbandry and veterinary education is to be modified so that new challenges may be based realistically. Keeping in view various targets fixed in the 7th Five-Year Plan experts have to be produced so that shortage of manpower may be brought down. Furthermore, following are some realistic and important recommendations which can be adopted for the improvement of livestock in SAARC member countries:-

1. An independent desk be created in SAARC Secretariat to deal with cooperation in the areas of livestock production and health. Initially it will get prepared through the SAARC information centre.
 - a) A directory of livestock scientists, institutions with infrastructure and training facilities available, and major research programmes being implemented by them and,
 - b) Prepare catalogues on animal genetic resources.
2. Free flow of scientific information and periodicals in the member countries through the SAARC Secretariat.
3. Provide suitable extension personnel in the department of Animal Husbandry.
4. SAARC should encourage visit of progressive livestock breeders to other member countries where new livestock production innovations have been adopted by the farmers.

5. A regional reference laboratory for making available specialized disease diagnostic facilities be developed in each of the member countries.
6. A group of educationists involved in Veterinary Animal Science and dairy education from the member countries may meet to review the curricula with a view to improve the standards of education.

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TABLE 1 PROPOSED PUBLIC SECTOR AGRICULTURAL INVESTMENT PROGRAMME

(MILLION RUPEES)

SUB SECTOR	ALLOCATION 6TH PLAN (1983-88)			PROPOSED 7TH PLAN (1988-93)			PROPOSED 8TH PLAN (1993-98)		
	TOTAL	FED.	PROV.	TOTAL	FED.	PROV.	TOTAL	FED.	PROV.
EDUCATION (AGRI)	325	25	300	860	360	500	1500	500	1000
EXTENSION (AGRI)	600	100	500	1925	325	1600	2500	250	2250
RESEARCH (AGRI)	1560	1360	200	2750	1250	1500	4000	1200	2800
LIVESTOCK/POULTRY	1145	125	1020	2480	560	1920	3400	400	3000
FISHERIES	759	400	359	1200	500	700	1500	400	1100

SOURCE: NCA REPORT, 1986

TABLE 2 LIVESTOCK RESOURCES OF PAKISTAN

	1977-78 (MILLION HEADS)	1987-88 (MILLION HEADS)	PERCENT INCREASE
CATTLE	15.2	17.1	12.5
BUFFALOES	11.1	14.0	26.1
SHEEP	20.1	27.4	36.3
GOATS	23.2	33.0	42.2
CAMELS	0.8	1.0	25.0
DONKEYS	2.2	3.1	40.9
HORSES	0.4	0.5	25.0
MULES	0.06	0.07	16.7

SOURCE: LIVESTOCK DIVISION, GOVERNMENT OF PAKISTAN, 1989

TABLE 3 CONTRIBUTION OF LIVESTOCK IN AGRICULTURE

(MILLION RUPEES)

NET VALUE ADDED FOR	ALL CONSTANT FACTOR COST			
	1983-84	1984-85	1985-86	1986-87
MAJOR CROPS (12 CROPS)	8,365	9,869	10,600	11,294
MINOR CROPS (18 CROPS)	2,164	2,235	2,311	2,392
TOTAL	10,529	12,104	12,911	13,686
LIVESTOCK	26,078	30,527	33,924	37,524

SOURCE: NCA REPORT, 1986

TABLE 4 PRODUCTION TRENDS OF LIVESTOCK PRODUCTS

(000 TONNES)

PRODUCTS	1977-78	1987-88	PERCENT INCREASE
MILK	8,704	12,900	48.2
BEEF	389	595	53.0
MUTTON	319	570	78.7
HIDES (MILLION No.)	4.7	5.7	21.3
SKINS (MILLION No.)	24.4	34.0	39.4
WOOL	33.7	55.0	63.2
HAIR	4.5	7.8	73.3
BONES	181	229	26.5
FAT	59.9	101.0	68.3
BLOOD	18.8	33.0	75.5

SOURCE: LIVESTOCK DIVISION, GOVERNMENT OF PAKISTAN, 1989

TABLE 5 AVAILABILITY OF MILK AND MEAT

Kg/head/year		
ITEM	1982-83	1987-88
MILK	48	56
BEEF	5.2	5.8
MUTTON	5.0	6.0
MEAT TOTAL	11	13

SOURCE: SEVENTH FIVE YEAR PLAN, 1988-93

TABLE 6

FEED AND FODDER SUPPLY

(MILLION TONNES)

ITEM	YEAR	DM	TDN	DP
CURRENT SUPPLY	1986	89.1	47.3	4.32
CURRENT NEEDS	"	89.1	56.7	5.40
OVER SUPPLY	"	-	(9.4)	(1.08)
FUTURE SUPPLY TRENDS	2000	107.6	58.2	5.82
FUTURE NEEDS (3% INCREASE)	"	91.5	58.2	5.54
OVER SUPPLY	"	16.1	-	(0.26)
FUTURE SUPPLY WITH FODDER DEV.	2000	114.6	62.0	5.60
FUTURE NEEDS (4% INCREASE)	"	92.4	58.8	5.60
OVER SUPPLY	"	22.2	3.2	-

SOURCE: NCA REPORT, 1986

TABLE 7 LIVESTOCK INSTITUTES AND TRAINED MANPOWER
IN PAKISTAN, 1986

ITEM	NUMBER
VETERINARY HOSPITALS/A.I. CENTRES	4638
RESEARCH INSTITUTES	18
LIVESTOCK FARMS	35
VETERINARY/ANIMAL HUSBANDRY FACULTIES	5
MANPOWER	11765
LIVESTOCK POPULATION PER TRAINED PERSON	6760

SOURCE: INFORMATION COLLECTED FROM VARIOUS ANNUAL REPORTS

TABLE 8 PRODUCTION TARGETS FOR LIVESTOCK PRODUCTS

PRODUCT	1987-88 BENCH MARK	1992-93 TARGET	GROWTH RATE* 1988-93
BEEF	595	701	3.3
MUTTON	570	734	5.2
MILK	12,900	16,470	5.0

* PERCENT PER ANNUM

SOURCE: 7TH FIVE YEAR PLAN, 1988-93

FIG. 1.

LIVESTOCK POPULATION AND ESTABLISHMENTS IN PAKISTAN

