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ISLAMIC REPUBLIC OF PAKISTAN

BALOCHISTAN NEEDS ASSESSMENT

DEVELOPMENT ISSUES AND PROSPECTS

PART II - *LIVESTOCK*

JANUARY 2013

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EXECUTIVE SUMMARY

1. The study entitled "Balochistan Economic Report-Livestock and Farm Fisheries Sector" was conducted with the objective to provide detailed assessment of the current situation in the livestock and farm fisheries sectors, what should be changed, way forward and actions needed.

2. Livestock sector contributes 33 percent in agricultural GDP while its share is about 8 percent of the total GDP of the province. It also provides economic source of livelihood of about 73 percent of the total population of the province.

3. The provincial population of livestock resources; cattle, buffalo, goat, sheep and camel is 2.25, 0.31, 12.80, 11.78 and 0.38 million, respectively. Contribution of small ruminants is nearly 35.1 percent in the national small ruminant population. The major livestock ruminant production systems are nomadic, transhumant and sedentary and these production systems contribute 30, 58.5 and 11.5 percent, respectively. Commercial peri-urban dairy production system is rapidly expanding in and around the big cities as the demand for milk and its products is growing vertically. Dairy units under this system are generally comprised of high yielding buffalo, pure Friesian and crossbred cattle with reasonably high milk production. These animals are fed on the required quantity of ration though needs balancing.

4. Nearly 93 percent of the total area of Balochistan is considered as rangelands, which is being used for grazing of small ruminants and camel. However, these rangelands are overgrazed and deteriorated due to frequent droughts and the tragedy of the commons.

5. Nutrition is the most limiting factor to achieve an economical and sustainable livestock production. Inadequate and imbalanced biomass is largely responsible for not optimizing the production and health status of animals.

6. Absence or inadequate stock water facilities for grazing animals is hampering their production as water is the most critical nutrient to perform various vital body functions. The importance of water is substantially increased in drought conditions.

7. In the province, livestock markets are not well organized and sale of animals on commercial basis is generally absent. By and large these markets are without any facilities such as sheds, provision of feeding and water mangers, weighting scales and market information systems. The market supply chain is generally dominated by middle men, who make the maximum profits and the producers are hardly having any bargaining opportunity.

8. Major issues and constraints faced by the livestock sub-sector are identified as: inadequate and imbalanced nutrition, improper management practices, insufficient breed improvement program and health coverage. Furthermore, inefficient livestock marketing systems, lack of stock water facilities, absence of drought forecasting system, its preparedness and mitigation program, weaker institutional capacity for vertical expansion of livestock production, lack of support for research and development, inadequate human resource development and insufficient budgetary allocation.

9. Trends of livestock population growth rates indicated mixed trends among different species and time periods (1986-2006). AGR of cattle, buffalo and goats have shown reasonable growth rates, whereas sheep and camel have relatively stable growth rate. Taking the growth rate of livestock and human population into account, it can be safely concluded that livestock/human ratio is declining thus income generation opportunity for rural population is expected to be reduced.

10. Trends in land use pattern suggested that more and more rangelands are being converted into cultivated land. Furthermore, livestock population is progressively increasing. The declining grazing resources and increasing pressure on the rangeland is creating potential threat to decrease the productivity of rangeland and ultimately the livestock production.

11. There are strong evidences that if both the government and the community do not put the appropriate actions in place now it will result in rangeland degradation and this will then be non-reversible or will be very expensive to rehabilitate and thus livestock productivity will be low and the economic opportunity for farmers will be decreased.

12. Keeping in view the above stated facts, an action plan has been prepared and its brief is presented as follows:

- "Maximization of Meat production on Public Private Partnership (PPP) Approach" with an estimated budget of PKR 2000 million and to be implemented by Provincial Livestock and Dairy Development Department and Planning and Development Department.
- "Development of Milk Production, Collection and Marketing With Community Participation" with an estimated budget of PKR 1000 million and to be implemented by Provincial Livestock and Dairy Development Department and Planning and Development Department.
- "Establishment of Services Based Livestock Market" with the estimated budget of PKR 1000 million and to be implemented by Provincial Livestock and Dairy Development Department and Local Government Department.
- "Creation of Livestock And Dairy Development Board" with an estimated budget of PKR 2000 million and to be implemented by Provincial Livestock and Dairy Development Department and Planning and Development Department.
- "Drought Management and Mitigation Program" with the estimated budget of PKR 500 million and to be implemented by Provincial Livestock and Dairy Development Department, Planning and Development Department and Local Government Department.
- "Development of Farm Fisheries Project" with the estimated budget of PKR 500 million and to be implemented by Fisheries Department and Planning and Development Department.

1. INTRODUCTION

1.1. Livestock is an important and integral sub-sector of agriculture sector and the national reliance on livestock is evident from its contribution to both the macro and micro economies. Livestock contribution accounts for approximately 55.10 percent of agricultural value added and 11.5 percent in total GDP during 2010-11. At the macro level, nearly 35 million people living in rural areas rely on livestock and earn approximately 30-40 percent of their income.

1.2. The livestock sector in Balochistan had 33.0 percent stake in the agricultural GDP, while its contribution in the total GDP of the province was about 8.0 percent (in 2010). There is a decline in the contribution of livestock in the agricultural GDP of the province. Rearing livestock is one of the major activities and economic source of livelihood of about 75 percent of the total population of the province. Livestock production activity is an important source of income especially for the rural poor as it enables poor and landless farmers to earn income using communal rangelands. Besides playing a vital function in rural economy, the livestock provide animal protein sources such as milk and meat. It also provides cushion to producers against crop failures and other adversities. It is a readily marketable and hence can provide cash to meet farmers' needs and social obligations. In some cases it also provides the sole source of farm power and transport.

1.3. The livestock resources are cattle, buffaloes, goats, sheep, camels, pack animals and poultry. As per Livestock Census 2006, the national population of cattle, buffaloes, goats and sheep were 29.5, 27.3, 53.7 and 26.4 million, respectively. The percentage share of Balochistan in the national pool of these livestock species was 7.62, 1.17, 21.90 and 48.34 percent for cattle, buffaloes, goats and sheep, respectively. The contribution of small ruminants of the province is nearly 35.1 percent in its national population. This significantly higher number of small ruminants is mainly due to the suitability for bio physical environment and availability of vast grazing lands in the province.

1.4. Livestock production systems have the variability with ecological conditions, social systems and feed availability. There are broadly three major small ruminant production systems i.e., nomadic, transhumant and sedentary. About 58.5 percent of the animals are kept under transhumant production system, whereas, 30 percent and 11.5 percent are kept under nomadic and sedentary production system, respectively.

1.5. Nearly 93 percent of the total area of the province is considered as rangelands which are crucial for rearing significant majority of small ruminants and camels. However, these rangelands are subjected to continuous degradation and deterioration mainly because of two factors i.e., frequent drought and tragedy of the commons (communal rights for grazing of rangelands). Drought is a common feature and it is cyclic in nature in the arid and hyper arid areas of Balochistan. Droughts not only adversely affect the livestock feed resources but also decreases the livestock productivity.

1.6. Nutrition is a serious limiting factor to achieve an economical and sustainable livestock production. The small ruminants survive mainly on the traditional livestock feeding on depleted and over grazed rangelands. Feed availability from rangelands is usually deficient (in biomass, protein, energy and minerals) during the greater part of the year and hence a major limiting

factor in small ruminant production system. Inadequate range biomass availability and its poor nutritional value are generally responsible for still births, low birth rate and higher infant mortality rate immediately after the birth. Moreover, inadequate and imbalance feeding results in low body weight gain, reproductive inefficiency and proneness to diseases.

1.7. There is a general perception that due to population growth, increase in per capita income and socio-economic behavior, there is a gradual change in dietary pattern particularly in favor of livestock products in Pakistan. Rosegrant et al (1995) and Vercosa (1997) suggested that South Asia will consume more animal protein and these countries may face deficiency of the animal products and hence efforts should be made to produce more animal products either through expanded or increased production.

1.8. Keeping in view the importance of livestock and farm fisheries sub-sector and weakened economic growth record, worst infrastructure, lowest human development, weakest government institutes and high poverty rates this report will address the following: present situation and main issue of livestock and farm fisheries; what should the situation be changed to; what must Balochistan do to change the situation and on the basis of these, preparation of action plan for these sub-sectors.

2. LIVESTOCK SECTOR

2.1. Livestock Population and Trends

2.1.1. Livestock Resources and Population

2.1. Balochistan is endowed with diversified domesticated farm animal genetic resources (FAnGR), which are referred as livestock. These livestock resources are cattle, buffalo, sheep, goats, camels and pack animals (horses, donkey, and mules). As per Livestock Census of Pakistan (2006), the national population of cattle, buffalo, sheep, goat, camels and pack animals was 29.56, 27.33, 26.49, 53.79, 0.92 and 4.77 million, respectively. The livestock population of the province in the same year was 2.25, 0.31, 11.78, 12.8, 0.38 and 0.54 for cattle, buffalo, sheep, goat, camels and pack animals, respectively. Livestock population of Balochistan in the years of 1976, 1986, 1996 and 2006 is given in the table 1:

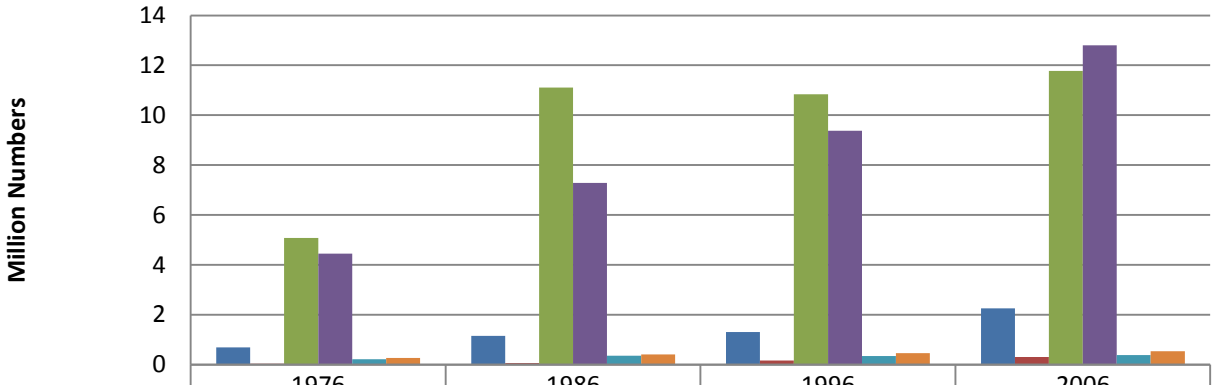
2.1.2. Livestock Population Growth Trends

2.2. The annual growth rates of livestock species from 1976 to 1985, 1986 to 1995 and 1996-2005 are illustrated in table 2:

2.3. AGR for cattle during 1976 to 85 was 6.915 which was slowed down to 1.236 in 1986 to 95 and subsequently increased to 7.305 in 1996 to 2005, indicating a reasonably good growth rate. As far as AGR for buffalo is concerned the figures were 9.091, 15.556 and 9.255 for years of 1976 to 85, 1986 to 1995 and 1996 to 2005. Sheep AGR for the year 1976 to 85 was 11.896 which significantly dropped to -0.242 during 1986 to 95 and thereafter has shown the minimal growth rate of 0.86 during 1996 to 2005. This might be due to shifting of Afghan refugees flow back to their country along with their animals. AGR for goats was very encouraging during 1976 to 85 and then during the subsequent two decades remained between 2.85 to 3.662, which is

considered to be little sluggish. In case of camel, AGR was observed to be having mixed trends. Goats performed better compared to sheep during the reported decades and this can be attributed to their better adaptability and suitability in arid rangelands of Balochistan and also increasing demand for goat meat.

Table 1. Balochistan Livestock Population



	1976	1986	1996	2006
Cattle	0.684	1.157	1.3	2.25
Buffalo	0.033	0.063	0.161	0.31
Sheep	5.074	11.11	10.841	11.78
Goats	4.442	7.29	9.369	12.8
Camels	0.212	0.349	0.339	0.379
Pack Animals	0.269	0.403	0.456	0.538

Source: Livestock Census of Pakistan 1976, 1986, 1996 and 2006.

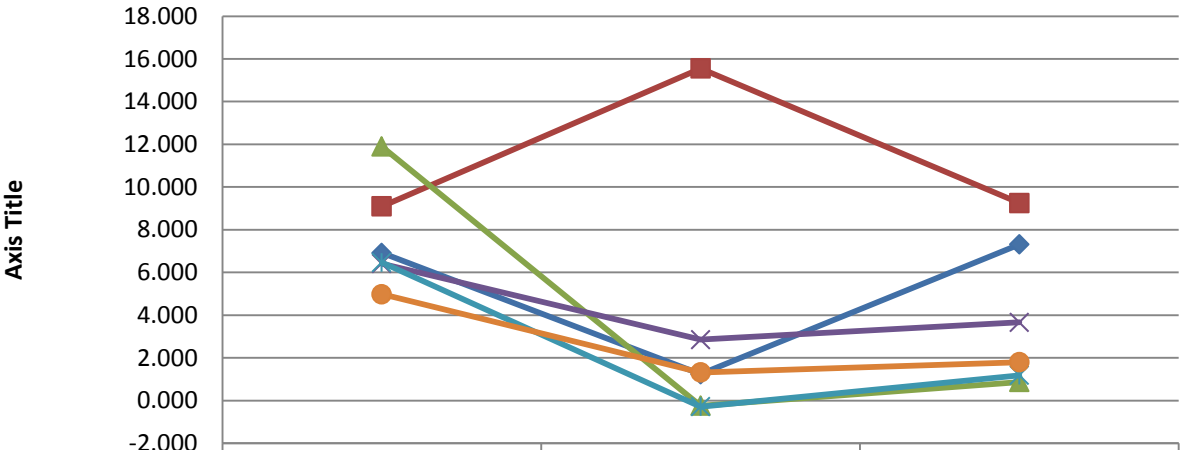
2.1.3. Contribution to National Livestock Pool

2.4. During 2006, the percentage share of cattle, buffalo, goats, sheep, camels and pack animals of Balochistan in national livestock population was found to be 7.6, 1.2, 21.9, 48.3, 41.2 and 11.3 percent, respectively.

2.5. A time series data from 1986 to 2006 for the contribution of livestock species of Balochistan in the national livestock species pool is given in the table 3.

2.6. A perusal of table 3 revealed that the contribution of provincial cattle, buffalo, goat, sheep, camel and pack animals population in the national pool has increased from 6.6 to 7.6, 0.4 to 1.2, 24.3 to 21.9, 47.7 to 48.3 and 34.0 to 41.2 percent, respectively. It is further revealed that the provincial contribution is significantly higher in case of small ruminants (35 percent) and camel (41.2 percent). Since Balochistan is basically a rangeland province and these are mainly utilized for grazing of the animals, therefore, small ruminants thrive well and their performance on rangeland is satisfactory.

Table 2. Annual Growth Rate of Balochistan Livestock Population



	1976-1985	1986-1995	1996-2005
Cattle	6.915	1.236	7.308
Buffalo	9.091	15.556	9.255
Sheep	11.896	-0.242	0.866
Goats	6.412	2.852	3.662
Camels	6.462	-0.287	1.180
Pack Animals	4.981	1.315	1.798

AGR is in percentage

AGR =$((N_{current}-N_{previous})*100/N_{previous})/(Number\ of\ Years)$

Table 3. Contribution of Balochistan In National Livestock Pool

Species	1986			1996			2006		
	Pakistan	Balochistan	%age	Pakistan	Balochistan	%age	Pakistan	Balochistan	%age
Cattle	17.54	1.15	6.6	20.4	1.34	6.6	29.56	2.25	7.6
Buffalo	15.7	0.06	0.4	20.3	0.16	0.8	27.33	0.32	1.2
Goats	29.94	7.29	24.3	41.2	9.37	22.7	53.79	11.78	21.9
Sheep	23.28	11.11	47.7	23.5	10.84	46.1	26.49	12.80	48.3
Camel	1.0	0.34	34.0	0.8	0.33	41.3	0.92	0.38	41.2
Pack Animals	3.5	0.4	11.4	4	0.42	10.5	4.77	0.54	11.3

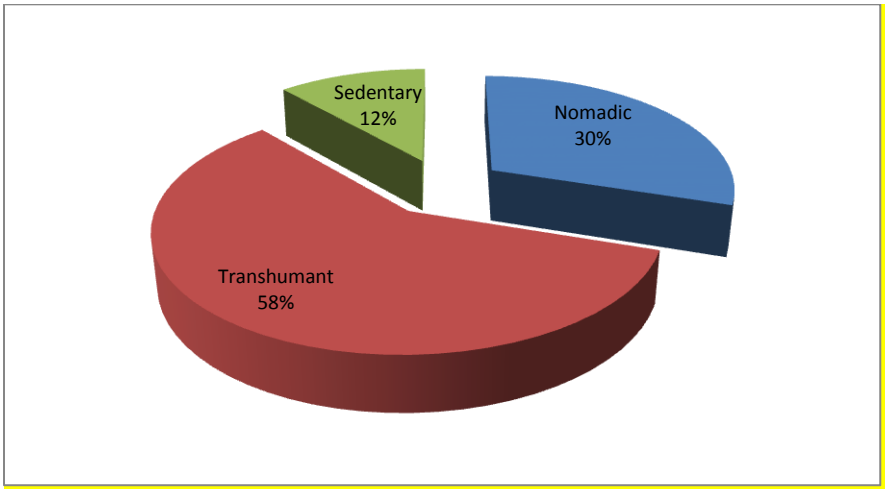
Source: Livestock Census of Pakistan 1986, 1996, 2006.

2.2. Livestock Production Systems

2.2.1. Small Ruminant Production System

2.7. Small ruminant production systems differ with ecological conditions, social systems and availability of feed. There are three categories of ownership and production systems in the province i.e. nomadic, transhumant and sedentary. The two migratory systems i.e., transhumant and nomadic systems together account for almost 80 percent of small ruminant population in Balochistan. The percentage contribution of each system is presented in figure 1:

Figure 1. Share of Small Ruminants in Different Production Systems



Source: FAO, 1983.

Nomadic Production System

2.8. This class of production system includes those people who do not stay at any one place but migrate throughout Balochistan. Sometime they even cross the international boundary with Afghanistan. Almost 30% of the total sheep and goat population of the province belongs to these people who own big flocks averaging 100–150 heads per flock. Actual figures however, vary from area to area with farmers traveling from north to south having flocks ranging from 100–200 heads. They migrate from uplands to lowlands in winter and vice versa in the summer season. Their migration takes place through strategic areas where they have contact with the communities who provide grazing facilities and animal feed and in return the nomads sell their animals, their by-products and provide labor.

Transhumant Production System

2.9. In this category, farmers are very close to sedentary farmers but differ from the nomads in a way that they mostly have their permanent homes but also migrate in search of feed and water. During winter they migrate along with their big flocks consisting of variable flock size, particularly sheep and goats. They travel mostly by trucks from highlands to lowlands in Sibi and Kacchi plains, where they have the opportunity to get feed for their animals and to work on agricultural land, owned by themselves or by other farmers. In summer, they go back to their

homes. Their way of trade is similar to nomads. In time of need, they exchange their livestock and livestock commodities with the local people to meet animal and human food requirements.

Sedentary Production System

2.10. Sedentary farmers are primarily agriculturists and grow crops, fruits, and vegetables besides rearing livestock to add to their livelihood. Women are mostly responsible for the rearing and feeding the animals. Besides they also convert animal products into useful food and other items like yogurt, cheese, butter, buttermilk, dry meat, rugs and carpets for income generation.

2.2.2. Dairy Production System

2.11. Dairy production system is dominated by the village based local cattle production system and animals are normally low producing and their population is scattered which is reared on traditional system. In certain irrigated areas the artificial insemination practices have been intensified and cross bred cattle are produced with moderate milk production capabilities. This trend of producing crossbred cattle is multiplying in the irrigated areas where fodder can be cultivated to meet their basic feed requirement. Buffalo population is increasing day by day and these are brought from Punjab and Sindh in the peri-urban areas of big cities. With the advent of peri-urban dairy production system the commercial touch of dairy farming is seen in Balochistan.

Commercial Peri-urban Dairy Production Systems

2.12. In Balochistan, dairy milk production units are concentrated in and around big cities. The milk producers of these units rear buffaloes and dairy cattle, mainly pure Holstein and Friesian as well as crossbred animals. The size of the herds within the cities ranges from 30 to 80 animals with a predominance of buffaloes, while on the outskirts it varies from 150 to 300 animals again mainly the buffaloes. All the buffaloes are brought from Sindh or Punjab. The reason for the association of buffaloes with crossbred cattle is: buffaloes produce milk rich in fat, while crossbred cows produce more milk. Animals under this system are fed on concentrate feed commonly farm mixed or commercial feed with green fodder and wheat straw. The herds are usually vaccinated against epidemic diseases.

2.3. Livestock Feeding Systems

2.13. Nutrition is a single most limiting factor in achieving a sustainable and economical livestock production in Balochistan. The livestock survive mostly on the traditional livestock feeding on rangelands as it is very difficult to persuade the farmers to feed purchased concentrates. Feed availability from rangelands is generally deficient (biomass, protein, energy, minerals and vitamins) during the greater part of the year and thus a major factor limiting sheep and goat production. Poor nutrition is generally blamed for low birth rates and high mortality immediately after lambing/kidding. Feed supply and quality are particularly poor during the cold winter months and before the monsoon rains in July and August. In southern zones, feed is scarce for almost 10 months of the year which is interrupted only by forage growth following winter rains. During the year, abundant feed is available from April to July, while moderate feed is available from August to November leading to the scarcity period from December through March.

2.14. Most of the feed sources are range biomass (grasses and shrubs), crop residues, stubbles, orchard leaves and fallen fruits for small ruminants. In addition to these, cultivated fodder (lucerne, sorghum, millets and maize), grains, oilseed cake and bran, in the form of single ingredient or home mixed are fed only to lactating animals. Straw or stover as dry roughages is fed to the animals during winter months when they are at home

2.4. Impact of Drought on Livestock

2.15. Drought is a common in the arid and hyper arid Balochistan. The last drought which persisted almost eight years adversely affected the livestock resources and their productivity. Rangeland resources were degraded and deteriorated and the biomass-feed availability reduced significantly. According to FAO estimates, prolonged drought (1998-2004) has affected approximately 40 percent (9.32 million) of livestock out of which 20 percent died and other 20 percent suffered with production and health loses. This also led to financial losses of PKR 3522 million comprising of PKR 476 million direct and PKR 3046 million production loses. Drought mitigation strategy carried out by government and NGO's which included the distribution of concentrate feed and multi-nutrient block among the livestock owners along with veterinary treatment and vaccination. However, keeping in view the severe shortage of water during drought specially tailored feed and multi-nutrient blocks should be prepared because of their physiological status.

3. RANGE LAND RESOURCES OF BALOCHISTAN

3.1 In Balochistan, nearly 93.03 percent of the total area (34.72 million ha) is covered by rangelands. These rangelands consists of about 21 million ha graze lands producing medium to good grazing, while 9.8 million ha is unproductive. Also 1.6 million ha is considered inaccessible (FAO, 1983[1]). Rangelands are supporting most of the livestock of province particularly sheep, goats and camels. These rangelands provide the bulk requirement of feed for the small ruminants and fuel wood requirement of the rural communities. According to FAO, 1983, these rangelands are broadly divided into northern zones and southern zone. The former receives higher precipitation and supports 76.5 percent of the total livestock, while the later receives less precipitation and thus support only 26.5 percent of the livestock.

3.2 Rangelands vegetation mostly includes the dwarf shrubs such as *Artemisia, Astragalus. Prunus eburnean* and perennial grasses, such as *Panicum, Penisetuim, Cymbopogon* and *Chrysopogon* species. The trees include Pistacia, Oleas, Wild Ash, Pinus gerardiana and Pinus walliciana.

3.3 The estimated productivity of the rangeland varies from less than 30kg/ha/year. However the potential productivity ranges from 1 to 1.25 tons/ha/year (UN, 1994). Accordingly the overall carrying capacity of the rangelands is from 2 to 3 ha/ewe.

3.4 There is a decreasing trend in the productivity of rangelands due to overgrazing and uprooting of shrubs. Degradation of rangelands reduced the bio-diversity of flora and changes the vegetative composition. Increased competition for grazing affects wild herbivore population

[1] Report of the assistance to rangeland and livestock development survey in Balochistan. Technical Cooperation Program, TCP/PAK/0107, Islamabad, Pakistan, FAO, 1983

which in turn results in reduced prey based; consequently affecting the population of predators. Furthermore, prolonged droughts, transfer of nomadic to village based production system and increase in density of livestock (large flock sizes) has also significantly dropped the productivity of rangelands.

3.1. Land Utilization Pattern

3.5 Land utilization data for Balochistan for the years 1994-95, 2006-07, and 2009-10 (last fifteen years is presented in table 4.

Table 4. Land Utilization Pattern of Balochistan

Category	1994-1995	2006-07	2009-10	Percentage Change
Geographical Area	34.72	34.72	34.72	-
Total Reported area	18.6	17.18	17.18	-7.63
Forest Area	1.08	1.36	1.36	25.92
Not available for cultivation	11.17	9.83	9.83	-11.99
Culturable waste	4.68	4.00	3.93	-16.02
Cultivated area	1.67	1.93	2.06	23.35
Current Fellow	0.78	0.91	0.98	25.64
Net area sown	0.91	1.02	1.08	18.68
Total Cropped area	0.91	1.09	1.12	23.07

Source: Agricultural Statistics of Pakistan 2009-10.

3.6 During the last fifteen years, the forest area of the province increased by 25.92 percent, whereas the area not available for cultivation has decreased by 11.99 percent indicating that this area has been converted into cultivated area. Similarly culturable waste has also decreased by 16.02 percent and this area has been converted into agricultural land. Total cultivated area in the province increased by 25.64 percent and this increase in cultivated area now represents the agricultural land. In totality, total cropped area has been increased significantly by 23.0 percent. From the above facts, it can be concluded that the provincial rangelands are decreasing and the opportunity of rearing ruminants is shrinking day by day and hence posing a challenge for livestock production.

3.2. Rangeland property regimes

3.7 Balochistan rangelands fall under two types of property regimes: common property rangelands and open access rangelands. Tribes traditionally own common property rangelands, with customary institutional arrangements for their sustainability and management. In contrast with this, there is no restriction on open access rangelands, resulting in their degradation. Distribution of rangeland within different landscapes is presented in table 5.

3.3. Biomass availability and carrying capacity

3.8 The amount of biomass provided by total Balochistan rangelands is close to 3 million tons of dry matter, which should sustain around 9.7 million Equivalent Ewe (EE). The average

stocking rate for the whole Balochistan is 2.6 ha per EE with a great variation among the district rangelands.

Table 5. Distribution of Rangelands Within Different Landscape Units

Precipitation Range (mm)	200-450	Percent of Total	100-200	Percent of Total	<50-100	Percent of Total
Mountains 2000-2500m	29602	9	3021	1	1326	1
Uplands (<2000m)	28359	8	-	-	38185	11
Piedmont	87159	25	11000	3	21853	6
Desert		-	-	-	46836	3
Flood Plain	27771	8	20612 13203	6 4	5819	2
Coastal Plain	-	-	12540	4	-	-
	172891	50	60376	18	114019	32

Source: FAO 1983.

3.4. Comparison of rangelands availability and livestock population demand

3.9 In normal climatic year and without adjustment for inaccessible grazing areas, rangelands offer does not meet grazing livestock requirements in the proportion mentioned in different reports. The total grazing livestock demand is 17,119,152 EE while the availability is only 9,691,203. The deficit to cover is 7,427,949 EE. In terms of tons of dry matter, the deficit 2,228,335,00.

4. STOCK WATER REQUIREMENT

4.1 Water is one of the foremost critical nutrients for the livestock as the body is composed of about 85 percent of water. Stock water development is a vital component for livestock grazing on rangelands; however, no serious effort has been undertaken for the development of stock water facilities in the province. Furthermore, no effort has been made to determine the livestock water requirement which can be used while planning to develop the stock water facilities.

4.2 Most of the water points are either streams or natural catchments of rain; therefore, there is shortage of water for livestock when there is no rain. In order to improve stock watering, it is necessary to build underground tanks. The underground tanks must be built (in concrete) in areas where water can be collected, such as at the bottom of a slope. Dimensions of these underground tanks depend on the livestock water requirements. Capacity of these underground tanks range from 200 m^3 (20 m length, 5 m width, 2 m depth) for small one to 1000 m^3 for big one. Small underground tanks should cover for a flock of 100 heads for a period of 570 days (with assumption that 3.5 liters is a daily average water requirement for one sheep or goat).

4.1. Water Quality

4.3 The suitable water quality parameters for a specific animal depends on different factors like type, age and condition of the animal, climate, composition of pastures, feed, etc. However, the safe threshold levels of salinity for different species of livestock are given in the table 6:

Table 6. Threshold of Total Dissolved Solids (TDS) for Livestock

Serial No.	Species	Total Dissolved Solids (mg/l)
1	Milking Cows	5000
2	Dry cows	7000
3	Horses	7000
4	Beef Cattle	9000
5	Sheep and goat	10000

Source: Environmental Water Management Study for Balochistan, Volume V: Interim-Balochistan Report under the project implemented by Federal Flood Commission, Ministry of Water and Power, Pakistan. AAB Consultant. 2007.

4.4 Irrespective of the salinity of water, specific ions such as fluoride, magnesium, sulphate and bicarbonate, etc. can cause health problems. These relate to the loss of body condition, couring, teeth decay and gastro-intestinal problems.

4.2. Stock Water Requirement

4.5 The water requirement of livestock is largely met through its voluntary consumption. For livestock, daily water consumption is dependent on a number of physiological and environmental factors and some of these are: (a) size and type of animals; (b) physiological status i.e., pregnant, lactating or growing, activity level, type of diet and amount consumed; and (c) climatic condition (air temperature, humidity and water quality).

4.6 The water requirement of livestock is calculated by using the daily water requirement. The water requirement (million m^3) of various species of livestock is presented in table 7**.**

4.7 Total water requirement of all types of livestock in Balochistan was 184.17 million m^3 in 2006. An annual increase in the water requirement of livestock was 3.92 million m^3 per year during the period of 1976-2006. The maximum annual requirement of water was for cattle (57.58 million m^3) followed by goat (51.41 million m^3) and sheep (47.29 million m^3). The other livestock species i.e., camel (11.08 million m^3), buffalo (9.34 million m^3) and pack animals (7.46 million m^3), have significantly less water requirement compared to the above species in the province.

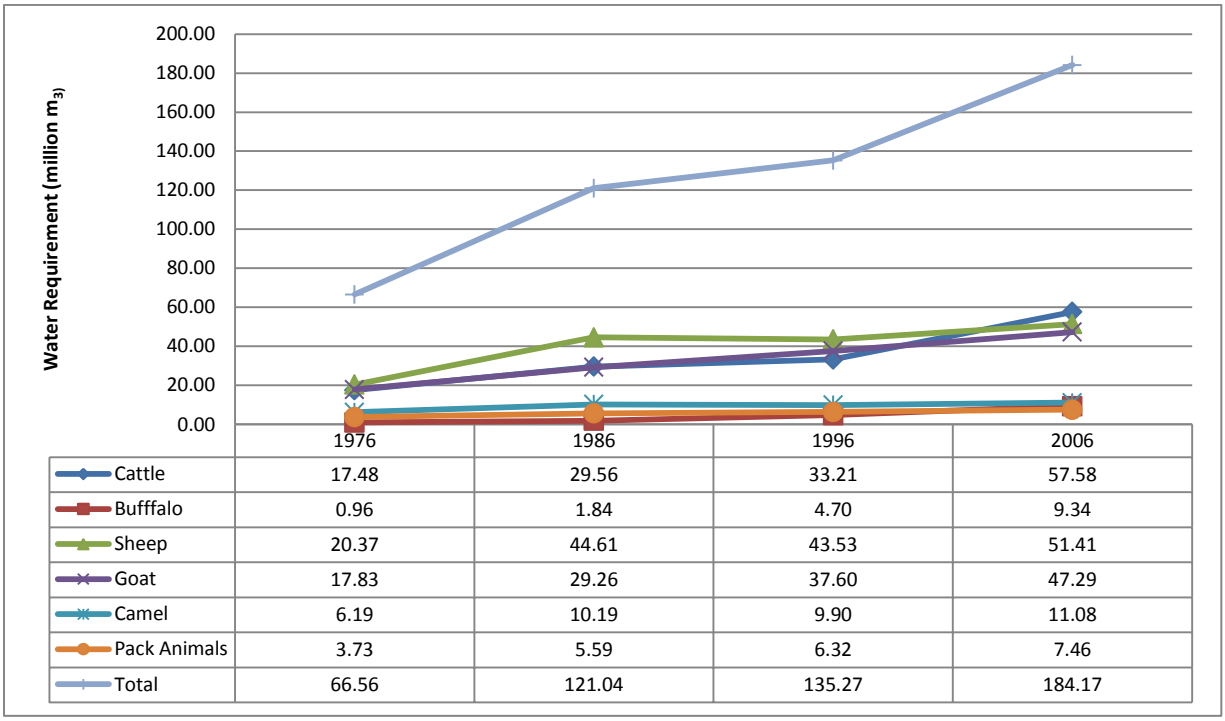
5. LIVESTOCK MARKETING SYSTEMS

5.1 There is an overall consensus that livestock marketing is not well organized and commercial selling of livestock is largely absent in Balochistan. Most of the current marketing system is arranged through a number of intermediaries, who make a wide margin of profit. Animals are sold per head or per group in locations depending on the agents involved in the trade. Livestock marketing system is comprised on the following: producers, wholesalers, commission agents, butchers and consumers.

5.1. Market Supply Chain

5.2 The figure below summarizes the prevalent livestock marketing supply chain in Balochistan:

Table 7. Livestock Water Requirement (million m3)



	1976	1986	1996	2006
Cattle	17.48	29.56	33.21	57.58
Bufffalo	0.96	1.84	4.70	9.34
Sheep	20.37	44.61	43.53	51.41
Goat	17.83	29.26	37.60	47.29
Camel	6.19	10.19	9.90	11.08
Pack Animals	3.73	5.59	6.32	7.46
Total	66.56	121.04	135.27	184.17

Source: Calculated by the consultant WB-BER-Livestock and Inland Fisheries.

5.1.1. Producers

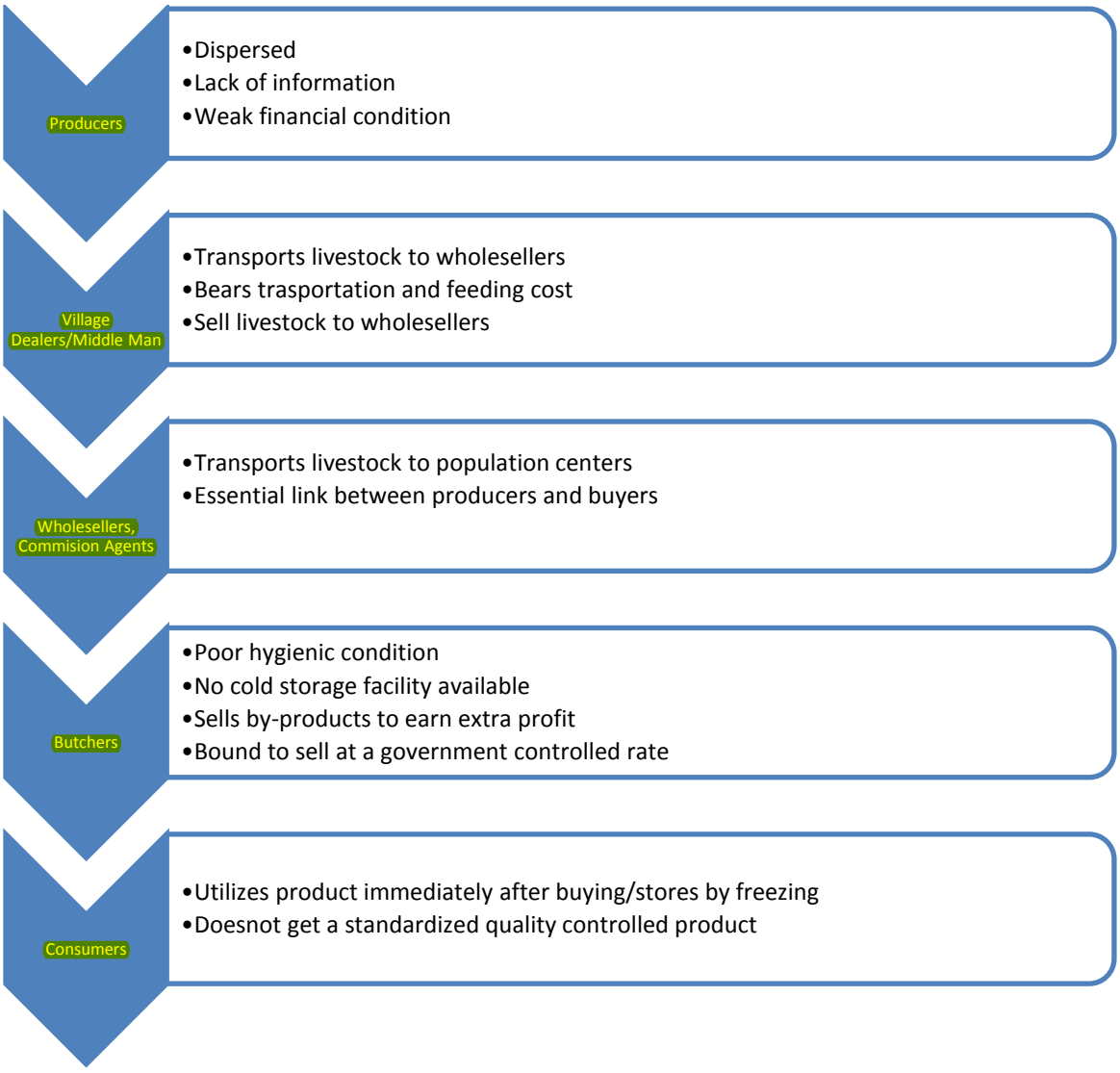
5.3 Producers may have different reasons to decide where and when to sell. Producers sell their animals according to needs. Body condition of the animals sold by the producers depends on rangeland conditions. If the rangeland conditions are poor, animals are sold in poor body conditions. However, if rangeland conditions are good, then animals kept for longer periods before they are sold. Animals are usually sold on hoof and just by visual examination of the animal but not on weight basis using the weight machine. This practice usually goes in favor of the middle man rather than the producer.

5.4 They may sell their animals at the village or at the market. Coordination among producers is absent. Since there is no producer interest group so the bargaining-chip is not available with the producer. These dealers visit villages, bargain and purchase animals and take them to town markets to sell them to wholesalers, commission agents, butchers or consumers.

5.1.2. Village Dealer/Middle Man

5.5 At the market, the village dealers/middle men instantly assess animal prices on criteria such as carcass weight, skin, liver and stomach. Together with producers, they try to reach a consensual price that is lower than the one estimated. In the market, there is no competition between middlemen. A rule of thumb is that a middleman never starts bargaining until the other middleman has finished.

Figure 2. Livestock Market Supply Chain



5.1.3. Wholesalers/Commission agents

5.6 Wholesalers buy animals in town markets and take them to the major consumption centers. They may sell animals through commission agents. The commission agents could either sell animals for wholesale or buy animals with commission for butchers.

5.1.4. Butchers

5.7 Butchers buy animals, either through commission agents or directly from the market. The butchers sometimes send their own commission agents to the villages where they buy and bring them directly to the towns. Bought animals are slaughtered in poorly equipped slaughter houses. Meat is sold fresh since no refrigeration facilities are provided. By-products such as skin, heads, stomach, lung and liver are sold as well.

5.1.5. Consumers

5.8 They buy meat either from butchers or live animals for different reasons (Eid Al Adha, weddings, Haj (pilgrimage) etc.).

5.2. Main livestock markets in Balochistan

5.9 Markets or "Pirrhi" are open places in the vicinity of the cities. "Pirrhi" are held on daily basis in Balochistan compared to other provinces where markets are held on weekly basis. Livestock markets in Balochistan take place from early in the morning to midday. The main livestock markets of Balochistan with other details are summarized in table 8:

Table 8. Main Livestock Markets in Balochistan

Market Location	Destination	Mode of Transport	Species	Source of Supply
South-East Sibi	Karachi, Hyderabad, Sukkur and Parts of Punjab	Road/Rail	Sheep, goats, cattle, camel and pack animals	Balochi, Brahvi, Marri Tribes
South-West Bella, Doreju, Kanraj	Karachi (Sindh)	Road/On hoof	Sheep, goats, cattle	Transhumant grazers from Khuzdar, Awaran and Lasbela
North-East Rakhni	Lahore (Punjab), Faisalabad (Punjab), Multan(Punjab)	Road/On hoof	Sheep and goats	Khetran, Bugti, Marri, Pathan and Musa Khel Tribes
North-West Kuchlak Quetta	Quetta city, Karachi (Sindh)	Road	Sheep, goats and cattle	Pasthun and Brahvi Tribes

Source: Migratory Systems and Livestock Marketing in Balochistan, IMPLAN Project, 1997.

5.3. Market facilities

5.10 There are no required facilities in the market except for some boundary walls for protecting the stock yard. Near the markets, there are some sheds for keeping unsold animals after leaving "Pirrhi". Unsold animals are brought to the market the following day. Some of the sheds belong to middlemen and others are available for rent. Producers do not use these shed facilities because staying up for the night is costly for them (costs of hotel, food, shed). In

addition, they cannot afford to stay because they have to buy goods for their family. Therefore, producers are forced to sell their animals the same day.

5.11 Well organized livestock market should have following facilities:

- Proper shed facilities with feeding and watering facilities
- Provision for livestock services
- Availability of weight scale
- Sale and purchase regulation e.g., price structure etc.

6. CONSTRAINTS AND ISSUES OF LIVESTOCK

6.1 There are multiple constraints which limit the livestock productivity in the province. These constraints can broadly be classified as:

- Biological and environmental
- Infrastructural
- Institutional and Policy
- Human Resource Development

6.1. Biological and Environmental

6.2 Biological and environmental constraints include:

- Low livestock productivity
- Inadequate and imbalance feed resources and feeding system
- Improper management system
- Lack of breed improvement program
- In efficient disease control
- Low rangeland productivity
- Prolonged and cyclic drought

6.2. Infrastructural

6.3 Infrastructural constraints are:

- Insufficient stock water facilities
- Absence of marketing facilities

6.3. Institutional and Policy

6.4 Institutional and policy constraints comprise:

- Low public sector investment including annual budget

- Lack of trained manpower for production and extension services
- Inflexible government operating system
- Lack of Research and Development in Livestock Production
- Lack of policy of export of animals which encourages livestock smuggling

6.4. Human Resource

6.5 Human resource constraints include:

- Lack of trained manpower for production and extension services
- Insufficient human resources

7. TRENDS, CONSEQUENCES OF INACTION AND THE WAY FORWARD FOR THE LIVESTOCK SECTOR

7.1. Trends

7.1.1. A Relatively Slow Growing Livestock Population

7.1 A careful perusal of table 2 suggested that the number of cattle, buffalo, goats and sheep has increased from 1976 to 2006. However, there is a mixed trend of annual growth rate among the species and in different decades. The growth rate in case of goats, cattle and buffaloes has shown a reasonably acceptable growth rate. However, the other species such as sheep and camel has relatively static growth rate. These trends suggest that perhaps the livestock carrying capacity of the Balochistan province may now reached to the optimum level or even may have surpassed the capacity for desirable carrying capacity because of the drought and overstocking. Therefore the further increase in livestock number with good production level may be difficult to achieve until the lack of feed and other constraints are addressed properly. The other correlating factor for relatively slow growing livestock population during the last two decades might be due to more opportunities for off farm activities.

7.1.2. Declining Livestock/Human Ratios

7.2 In Balochistan, human population has exceeded thirteen million with an annual growth rate of 6.9% but, the annual growth rates of small ruminants and camel ranged between 0.66 to 1.18 percent during the last decade, which is far less than the annual growth rate of human population. However, if we take the growth rates of ruminants for last two decade into account, these are much less than the previous decades. This clearly indicates that there is a declining trend in livestock/human ratio. If this trend of livestock/human ratio continues, then it can easily be concluded that more farmers will be forced to disassociate from livestock activities due to lower number of animals per farmer and thus will be unemployed and rural poverty will be increased.

7.1.3. Increased Grazing Pressure

7.3 Trends in the land-use pattern of the province suggests that grazing land is being developed for agriculture production and the grazing area is shrinking; overstocking and the grazing pressure on the rangelands is continuously degrading and deteriorating them and ultimately less biomass is available for grazing. Reoccurring drought is mainly responsible for converting the rangelands unproductive. Combination of all the above factors is creating pressure on the grazing lands and making them less productive.

7.2. Consequences of Inaction

7.4 In case the trend of the livestock production continues, it will not be able to keep pace with the growth in the human population. This will have significant implications for the Balochistan province. Not only the amount of milk and meat available per person will decline, but also, the amount of cash generated per person as a result of livestock related sales will decrease. To meet the shortfall of milk and meat, imports from other parts of Pakistan particularly from Punjab and Sindh, can be expected to increase, making the province's food security increasingly dependent on external factors and hence, increasingly vulnerable to disruption. As the dependence on cash economy grows, the proportion of milk and meat in the diets of the poorest can be expected to decrease. With the decrease in intake of livestock products; milk and meat in the diets of people, it can be expected that the incidence of mal nutrition, particularly in most vulnerable groups like children and nursing mothers will increase. Furthermore, the household income will decrease and this lead to unemployment and poverty.

7.5 Unless more effective rangeland management strategies are put into place, rangeland deterioration and degradation will also contribute to this cycle, albeit perhaps in a more insidious and less visible fashion. Declining pasture quality can be expected to lead to poorer livestock nutritional status; this, in turn, will contribute to low production, reduced disease resistance and most importantly adversely affecting the farmer income.

7.6 It is, therefore, crucial to the sustainable development of the Balochistan that efforts to enhance livestock production and improve rangeland management be intensified. The experience from other parts of the world shows that the deferral of effective rangeland management frequently results in such severe deterioration that major, systematic rehabilitation programs are subsequently required to restore productivity.

7.7 Therefore, in case of Balochistan an immediate livestock rangeland integrated developmental project should be implemented with an overall focus to increase the productivity of range livestock sector.

7.3. The Way Forward

7.8 Keeping in view ever increasing number of livestock and gradual deteriorating conditions of rangelands, adversities of droughts and change in land use pattern, it seems logical and practical that sustainable development of livestock and rangeland essentially required strategic interventions mainly in two broad areas.

- Livestock Production

- Range management

7.9 Improvements for livestock production will require better management of livestock practices including feeding systems, stock water management, breeding program, production of fodders and forages, health control and marketing system. Interventions in the area of livestock breeding are likely to rely primarily on the introduction of breed improvement of both small and large ruminants and improvement in rangeland, in order to meet the increasing demand for milk and meat. Improvements in rangeland will require the introduction of grazing controls and de stocking of grazing animals.

7.10 These areas will need to be addressed if the livestock sector is to fulfill its potential contribution to the sustainable development of Balochistan. However, the introduction of improved breeds and better feeding and management is both capital-intensive and time consuming. Therefore, in the short to medium term the core objective of the livestock and range sector should be to improve the management of existing livestock-range systems and expand the production of feed resources.

7.11 To promote and develop the livestock and range production on sustainable and cost effective basis coupled with environment friendly approaches; investment has to be made immediately to prepare result oriented livestock, range and other development projects. Development projects on livestock and rangelands have been identified and their salient features are presented in order of priority in the preceding chapter on Action Plan.

8. ACTION PLAN

8.1 The importance of livestock sector can be realized from the fact that it contributes 33 percent of agricultural GDP, while in the total GDP of the province its contribution was 8.0 percent. In spite of its huge potentiality, this sector has not been given its due share as there is hardly any mega scale project in function in the province. Consequently, this sector's growth rate is far less than the target growth rate mentioned in medium term development frame work (MTDFW). The prolonged drought 1998-2004 has deteriorated this situation by negatively affecting livestock and rangeland production. Taken into account the need to improve the current production scenario, there is a necessity to take immediate and proper measures to address the issues and to increase livestock-rangeland productivity along-with creation of employment and economic opportunities. To achieve the targeted livestock production, it is imperative to make public sector investment in projects for research and development in livestock-rangelands, following public-private-partnership approach.

8.1. Interventions

8.2 Interventions in the livestock-rangeland sector have been identified and presented in order of priority in table 9 for increasing livestock productivity, increasing income, generating employment, reducing poverty and to maintain environment friendly eco system.

8.2. Policy

8.1 In spite of huge availability of vast rangelands and reasonably good numbers of livestock particularly the small ruminants in the province, the production of livestock is far less than their genetic potential. Further to this during the last drought period productivity of range livestock has further decreased significantly. One of the major constraints for poor livestock performance is the inadequacy of the feed resources, drought and low allocation of funds for the development of livestock and rangelands. Livestock farmers are poorest of the poor and hence their purchasing capacity of feed stock is extremely low and thus the livestock are reared on low and imbalance nutritional inputs. This adversely affects both the body weight gain, health status and ultimately the farmer income. Sheep and goat breeds present in Balochistan are of medium size and fed on range biomass, have high demand in the gulf countries, if properly vaccinated and fattened under feedlot program. Therefore, there is a strong need that the government should make the policy interventions and promote farmer friendly policies by launching the project on production through feedlot fattening program of male sheep and goats prime mutton production. This activity will significantly increase the performance of the animal, quality of mutton and income of livestock farmers. The usefulness of the fattening program has already been exhibited by a project launched by the Federal Government and executed in all the provinces including Balochistan. This project was carried out with active participation of the farming community. The Government of Punjab has already launched a similar program under the umbrella of Livestock and Dairy Development Board Punjab and Punjab Meat Company. Similarly the other livestock projects particularly on milk and livestock market should be prepared and launched by the Government of Balochistan. Furthermore, the budget of Livestock and Dairy Department must be increased.

8.3. Research and Development

8.2 Continuous and focused research and development is the backbone of the overall development of any sector particularly the livestock in Balochistan. Research and development in livestock health is being effectively carried out by the Livestock and Dairy Development Department which has a network of veterinary hospitals and dispensaries throughout the province where livestock health extension activities are undertaken regularly, particularly the vaccination. Recently a vaccine production research laboratory has been established which is meeting the need of the province and in addition it is also supplying the vaccines to other provinces. However, there is a paucity of qualified scientists in this discipline, which needs to be addressed.

8.3 Research and development on livestock production is lagging behind the livestock health as the current focus of the department does not match with the requirement of the livestock production activities. In the absence of research and development on livestock production particularly breeding, nutrition and management, animal performance cannot be optimized. Therefore the overall biological performance particularly of small ruminants is relatively less compared to their current potential, consequently the income of the livestock farmer is low and they are the poorest of the poor in spite of having reasonable size of the flock.

8.4 Livestock is heavily dependent on the depleted and overgrazed rangelands to meet its nutritional requirement. This leads to poor production performance particularly the body weight

gain and thus the slaughter-able weight of the animals is usually less, which results in the low return to the farmers. Research and development to develop balanced and cost effective feeding strategies could be used as a tool to gear up their overall production performance and increase farmers income. Fattening of the sheep and goats seems to be a promising activity in livestock sector and R&D should be undertaken to develop the most feasible and economical feeding system for prime mutton production. In addition research on the identification of each promising breed of suitable age of sheep and goats for fattening should be determined along with their fattening potential.

8.5 It is significantly important that the Government of Balochistan may create an autonomous private led company preferably Livestock and Dairy Development Board Balochistan to carry out the mega projects on livestock.

8.4 Workshop Proceedings[2]

8.6 The important aspects discussed in the workshop are listed below:

- Suggestion was made by the participants that experiences of Punjab in the projects related to value added meat be utilized for the proposed priority action.
- Suggestion was made by the participants that experiences of Punjab in the projects related to milk production, collection and marketing i.e. Halla Milk and Adara-e-Kissan be utilized for the implementation of the action area. This would also include the cooperative-corporate culture introduced by the Halla Milk and Adara-e-Kissan.
- The need for strengthening the existing markets and provision of market information to the farmers was highlighted. This is already part of the private sector involvement policy and be further strengthened after the development of Policy and suggest changes in the Marketing Act. Private sector has to be encouraged for the provision of marketing facilities and information.
- Based on the macro-economic assessment it was suggested that protocols be signed between the Departments for having formal linkages for joint planning and implementation. This Protocol may also suggest the shift of Range discipline from Forestry Department to Livestock Department for the purpose of interventions. However, lands may continue with the control of Forest Department. Livestock Department does not have any problem to work on the community rangelands. The issue of fodders should be also discussed with Agriculture Department.
- It became clear that restructuring should be made through reducing the support staff and re-orientation of staff for improving performance of the existing institutions through the use of less number of well qualified and trained staff with ratio of professional to staff of 1:2. The surplus staff should be reoriented for the restructured mandate. There should not be any burden on the non-development budget.

[2] A technical workshop to discuss the findings of the Balochistan report and the sectoral assessments was held in September 2012 in Islamabad with the participation of Balochistan Government officials and Bank staff and consultants.

Table 9. Action Plan Livestock and Dairy Development (post-Workshop Version)

Priority Action/ Intervention	Description	Unit of Measure	Time Span			Estimated Costs (US$ in million)	Implementing Institutions	Expected Changes/benefits resulting from action
			Short Term (<2 years)	Medium Term (>2 & <5 years)	Long Term (>5 years)			
Value Added Meat Production	Mutton, beef and camel meat through: Feedlot fattening farms by farmers Slaughter house and butcheries by private sector Capacity building of LLD: Research and technology transfer Staff education	Quality of mean produced in tons, weight of animals		X	X	21	LLD, private sector	Enhanced income to livestock farmers, increased exports of meat, private sector developed
Development of Milk Production, Collection and Marketing through Farmers' Participation	Demonstrations for: Fattening and genetic improvement Private sector linkages for milk collection, chilling etc. For districts of Pishin, Qilla Abdullah, Naseerabad and Jaffarabad	Increase in production of milk, reduction in wastage of milk in excess period, price of milk		X	X	11	LLD, private sector	Reduced wastage of milk, increased in come to livestock farmers, private sector developed

Development of Marketing Platform and Services to Livestock Farmers	Development of marketing platform with services like stockwater, veterinary services, stay of farmers, drinking water. Linkages with private sector Linkages with other projects like USAID-FAO	Marketing platform, type of services offered by public and private sectors, price of marketed animals		X	X	11	LLD, private sector	Better prices of animals, increased income of livestock farmers
Stock water, Veterinary Services and Rest Areas for Livestock	Provision of stockwater of standard quality Veterinary facilities of livestock Rest areas for farmers and animals	Number of facilities developed, quality of stockwater, type and quality of veterinary services		X	X	5	LLD, private sector	Enhanced productivity, better price of animals, increased income of livestock farmers
Policy and Institutional Reforms and Strengthening	Formulation of signing of protocol between Livestock, Agriculture, Forestry, Irrigation Departments and University of Balochistan	protocol signed	X			-	Livestock, Agriculture, Forestry, Irrigation University of Balochistan	All the major farming systems including small and large ruminants are addressed and agreement on joint planning and implementation

	Reform existing Institutions through: Training and education, career structure and cadre, strengthening disease surveillance, diagnostic and reporting facilities and instrumentation of labs	Number of trainees, number of staff educated in higher degrees, equipment purchased, diagnostics conducted and reported		X	X	5	LLD, private sector	Improved implementation of development schemes, less turnover of staff
Total Cost						**53.0**		