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**ANIMAL RAISING IN HIGHLAND BALOCHISTAN:
A SOCIO-ECONOMIC PERSPECTIVE**

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A SOCIO-ECONOMIC PERSPECTIVE

by

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INTRODUCTION

1. Animal Production in the Highland Rainfed Areas of Balochistan

Balochistan constitutes about 45 percent of Pakistan's total geographical area, but has a small population (only 5 percent of the nation's total) living in dispersed settlements. Topographically it is an extension of the Iranian plateau and most of it is comprised of rugged, unproductive mountain ranges interspersed with narrow valleys where mainly rainfed agriculture is practiced. The rainfall is very low and variable averaging between 50 mm and 400 mm. Because of the topographical and climatic conditions, in most areas crop raising on a large scale cannot be economically undertaken. Yet, almost the entire province, except a few western desert regions, is capable of producing natural range vegetation to support animals and provide a subsistence living to nomadic and semi-nomadic animal raisers. However, the rangelands of Balochistan are rapidly being depleted as a resource and are currently characterized by a very low grazing capacity (FAO, 1983). The grazing capacity of these rangelands has, however, never been very high and the Baloch herders have had to adjust to the prevailing environmental conditions and adopt such farming systems and strategies that ensured an optimum, and in most cases sustainable, utilization of the meager available resources.

Although not given the political and economic attention that it deserves, animal production, mainly sheep and goats, remains the mainstay of the Balochistan population. The province has 11.1 million sheep and 7.3 million goats, constituting, respectively, 47.6 and 24.4 percent of the total population of sheep and goats in Pakistan. Between 1955 and 1986, while the annual sheep and goat population growth rate in Pakistan as a whole was 3.4 and 4.4 percent, respectively, the corresponding rates in Balochistan were 7.2 percent and 7.6 percent. Since most animal raising in Balochistan is done in remote often inaccessible areas of the province, it is likely that the census figures underestimate the animal population and its contribution to Balochistan's gross domestic product. According to available statistics, the livestock sector constitutes about 30 percent of the total GDP share contributed by agriculture.

Except the southern coastal belt and small areas of Nasirabad and Sibi Divisions bordering Sind, most of Balochistan can be classified as highlands. MART/AZR research activities, however, have been limited to the central and northeastern districts of Quetta, Kalat, Loralai, Zhob, Kachhi, Pishin and Khuzdar in Balochistan. The areas defined as highlands within these districts are

those lying over 1000 meters. The studies on which this report is based, were conducted in Khuzdar (1150m), Dasht (1800m), Kalat (1600m), Tomagh, Loralai (1700 m), Zarchi, Kalat (1800m) and Kovak, Kalat (2000m). The following table shows estimates of livestock population in the highland rainfed areas of the above districts.

Table 1. Animal Population in the Highland Rainfed Districts of Balochistan (x 1000)

District	Sheep	Goats	Cattle	Camels
Kachhi	48	165	70	25
Kalat	1220	639	25	14
Khuzdar	2652	2049	195	12
Loralai	1136	297	142	16
Pishin	750	561	56	14
Quetta	90	47	6	8
Zhob	1243	335	82	45

Ethnically Loralai and Quetta are areas of mixed Baloch-Pushtun population. Pishin and Zhob are mainly Pushtun and Kachhi. Kalat and Khuzdar are mainly Baloch populated areas. Balochistan, in general, and its highland mountainous areas, in particular, have a resource base, which is conducive to small ruminant production. However, animals to survive under these environmental conditions, they must be able to travel long distances from watering holes to find feed over a large area. Goats are particularly adapted to the harsh grazing conditions due to their mobility and omnivorous grazing preferences.

2. Objectives of the Study

Although they make up a large proportion of Balochistan's population, the economic activities and production systems of herders are very poorly understood. One reason for this is the isolated nature of their livestock activities as range grazing is now available only in the more remote areas. The former rangelands in valleys have either been converted into agricultural land or they have become denuded and unproductive, since many of the valleys have also served as traditional nomadic migratory routes. Remoteness and inaccessibility, coupled with language problems (Talug, et al. 1989) generally made it difficult for research and development organizations to undertake research studies among animal herders. Like crop and animal raisers in other parts of the country, the Baloch are currently facing problems of low productivity and offtake from their animals and hence inadequate living standards for their families. As a first step towards any future development efforts, it is important that basic data regarding the physical and socio-economic conditions under

which animal raisers operate, is gathered and analyzed. How animal farmers utilize their resources of labor, rangeland, water resources and capital; whether the majority of animal raisers are subsistence or commercial producers; to what extent their economic enterprises are integrated in the national and international production and marketing systems; and what constraints and problems are faced by the ordinary animal raiser are all important issues to be studied. Among the animals, sheep and goats are particularly important in the highland rainfed areas of Balochistan and are therefore the focus of MART/AZR research activities. Baseline data covering the socio-economic life of the animal raiser in Balochistan, which has been gathered under the present program, will hopefully underpin future research activities on the diverse aspects of animal production.

3. Survey Methodology

(a) Secondary data

Secondary data, available with the provincial and federal agricultural and animal husbandry departments was compiled and reviewed.

(b) Informal survey

An informal survey was conducted in the rainfed highland areas of Balochistan to collect preliminary data about the existing goat and sheep farming systems, flock size, rangeland condition and ownership, lambing/kidding seasons, animal diseases etc. Informal interviews were held with individual animal raisers, herder groups and village/lineage leaders. At this stage no formal questionnaire was used, but key informants and previous contacts in the area were used to find out about groups of herders with similar flock characteristics and sizes.

(c) Formal survey

A formal survey by a multidisciplinary group of scientists from AZRI was carried out in June/July 1987. Two hundred households, 40 each from Ferozabad (Khuzdar), Kovak (Kalat), Zarchi (Kalat), Dasht (Kalat) and Tomagh (Loralai) were chosen at random and interviewed in detail. Beyond the generally known ecological conditions of the region in which the five locations existed, and the fact that the first mentioned four areas were inhabited by Brahui speaking and the last one by Pushto speaking tribes, no other quantified information was available at the time of the design of the survey. Also because of a lack of information about the homogeneity or otherwise of the social groups in the areas no stratified sampling procedure could be followed. It was therefore, decided that villages within the region should be selected randomly and due care be taken to include the maximum number of villages within the specific areas. From these randomly selected villages 40 Households were chosen again at random, for detailed interviews and survey. The

results of the survey were compiled and tabulated in the latter part of 1987.

SOCIO-ECONOMIC ENVIRONMENT

1. Social Organization

The social organization of the Baloch and Pushtun, which constitute the majority of Balochistan's population, is based on traditional tribal lines. There are many small and large tribes in Balochistan, whose customs and traditions vary slightly but are similar in their broader attributes. Each tribe (Qaum/Kaam) is divided into clans (Takar/Shakh) which are in turn divided into sections (Pasha/Shalwar) and sub-sections (Taal/Tabar/Khel). Starting from a family at the bottom of the system there is a hierarchical leadership pattern, at the top of which is the tribal chief or Sardar. The decision making process is decentralized and most of the petty disputes regarding personal matters, property rights and resource use between the section and clan members are settled at that level by their respective leaders. At all levels there are councils of elders called Jirga, to decide matters and enforce tribal customary laws. Outside influences, particularly government intervention in recent times, have resulted in the weakening of traditional systems, particularly among settled populations. As far as the animal raisers are concerned, they have always been the standard bearers of traditional codes of honor and courage. Balochi Mayar among Baloch and Pushtunwali among Pushtun have been the codes of conduct, that each community member was obliged to follow.

2. Cooperation Among Animal Raisers

The formation of tribes, tribal cohesion, customs and traditions were, in fact, necessitated by the needs and the environment of the animal raisers. Conflicts and fear of invasions existed, therefore a socio-economic and politico-military organization was needed to protect its members' property and life. Pushtunwali and Balochi are terms used for the situation where cooperation of tribal members is essential and is required and enforced by custom and tradition. The council of elders or Jirga were not only to settle interpersonal disputes, but also to encourage people to cooperate in matters of mutual interest and well-being. In the case of common rangeland resources the cooperation of all members is needed, if the resources are to be used on a more or less sustainable basis and overuse is to be avoided. Where the tribe or section closes their rangelands for part of the year, it is necessary that all leave the rangelands. These types of cooperative activities for the good of the entire group must be enforced, even if that requires the use of force or invoking sanctions. There are other cooperative activities which are voluntary but are followed

by all because they consider that it is in their own personal interest to do so. Among such activities are contributions when a member is faced with expenses that he cannot himself afford. In the economic sphere there are activities that require cooperation between members of the village. Animal shearing needs to be performed in a short time and an individual is not generally able to do it conveniently by himself. If an individual loses his sheep or goats due to an epidemic, theft or a natural hazard, it is imperative that relatives, lineage and tribesmen help him by lending animals so that he can continue to make a living and be given time to recover economically from the disaster.

3. Resource Ownership and Economic Differentiation

Most of the rangelands now existing in Balochistan are those lands where crop raising is not possible. These are generally located in remote and mountainous areas. Traditionally, the tribes owning the rangelands in common, had institutional arrangements to manage their resources effectively and to use them in ways that were not detrimental to future productivity. Since these societies have been exposed to outside economic and social influences, tribal institutions have come under increasing pressure and in some cases they have been replaced by a greater degree of anarchy. As a result range resource depletion has been experienced rapidly.

At the present time there are two basic types of rangelands in Balochistan; common rangelands and open rangelands. The open rangelands came into being as a result of tribal needs for some lands where they could go when they closed their own common rangelands. These open rangelands have reached a stage of severe depletion and unproductiveness, due to overgrazing, so that no single tribe claims them as their exclusive common land for grazing purposes. Such open lands have, in some cases, been increasing in area as the more exclusive common rangelands have been rendered unproductive and are unable to sustain animal feed demand, and are therefore abandoned by the owners. The 'true nomads' who move from place to place throughout the year and have no rangelands of their own, use these open rangelands for short durations before they move on to the next area. The semi-nomadic groups owning common rangelands move within these territories and may practice some type of rotational grazing.

Where traditional institutional arrangements to use rangelands exist, there is social and economic stability, and usually cooperation and solidarity between the members of the owner tribes. The more a tribe is exposed to outside influences, the more it is likely that it has lost some of its traditional characteristics. But in the areas where tradition is still followed, the economic and social

systems of the society are mostly egalitarian in type. Everyone in the tribe, including the chief, has co-equal rights of resource ownership and use. The chief would normally get annual contributions of not more than a sheep or goat per flock from the members of the tribe. These are necessary because people from their own tribe and from other tribes frequently visit the chief's Otak/Mehmankhana (guest house) and he needs additional resources to entertain them. Thus, in fact, these contributions are part of tribal obligations for the common good. A second reason for an egalitarian system is based on the fact that unlike the owners of landed property, animal raisers are generally unable to accumulate much surplus wealth. A drought, an epidemic, a bridal fee or a blood feud compensation payment could eliminate years of accumulated wealth in animals. So among the animal raising tribesmen generally there is very little economic differentiation. Yet another reason is that the segmentary lineage system within each tribe makes lineages and sections of the tribe compete with each other. Since the chief himself belongs to, and is the head of one of the lineages, he is not different from other tribesmen and heads of other lineages. Politically if a different lineage Malik/Takkari is in conflict with the chief, the lineage members owe first allegiance to their own Malik/Takkari not to the chief. Because of this situation the system of Jirga or council of elders, not the chief alone, decides important matters. By the very nature of the system the chief cannot become an autocratic ruler.

ANIMAL FARMING SYSTEMS IN THE HIGHLAND RAINFED AREAS OF BALOCHISTAN

1. Animal Raising

The ability of animals to adapt to Balochistan's topographic, climatic and botanical environment and people's needs have determined the types of animals raised in the province. The animals raised include sheep, goats, cattle, camels, horses, donkeys and poultry. All these animals are important and play a useful, even crucial role in the fulfillment of basic subsistence needs. Oxen have been used for crop production operations as well as for subsistence food needs. There were 0.8 million cattle in 1986 which constituted 5.4 percent of the total animal population in the province. For centuries, the camel, called the intimate friend and companion of the Baloch, has been used as a multipurpose transport, draft and subsistence food animal. In 1986 there were an estimated 0.2 million camels in Balochistan. However, the animals which enable the majority of the inhabitants of Balochistan to subsist are sheep and goats. In 1986 there were an estimated 11.1 million sheep and 7.3 million goats constituting respectively, 48.3 and 42.3 percent of the total animal population of the province. The sheep and goats provide

meat, milk and butter for nutrition, wool and mohair for a variety of uses including rugs, tents, bags, ropes and their hides are used for making domestic containers and shoes. For the fulfillment of the remainder of their needs the animal raisers sell or barter sheep or goats.

The three main sheep and goat production systems common in Balochistan are those of the transhumant, nomadic and household types. the Food and Agriculture Organization has reported (FAO, 1983) that 65 percent of all sheep raisers and 52 percent of the goat raisers in Balochistan are transhumants. Those leading a nomadic life were estimated to be 30 percent and household production amounted to 5 percent of the sheep raisers and 18 percent of the goat raisers. Most of the transhumants are also dryland farmers in upland Balochistan, who in the summer months engage in various crop raising activities while grazing their animals on the periphery of cropped areas and on common rangelands. During the winter the transhumants, in the face of severe weather, lack of feed for their animals and lack of alternative employment opportunities for their family members, migrate to the warmer areas of southern Balochistan and Sind. These seasonal movements have been particularly important for the Brahui of central Balochistan, and in the past they fought many battles over the right to migrate to the warmer areas of Sind and the Kachhi plain (S. Balochistan) in winter, where they traditionally grazed their animals and sought employment.

Among the nomadic groups there are two types the true nomadic and the semi-nomadic. Salzman (1967) defined true pastoral nomadism as "a way of life at least partially based upon movement of people in response to the needs of their herds and flocks". Most of the true nomads come from Afghanistan although some, particularly due to the recent troubled political environment in Afghanistan, do not cross the border to Afghanistan and stay within Balochistan. An FAO estimate (FAO, 1983) shows that there were a total of 415,000 sheep and 493,000 goats owned by Afghan Powindahs or Kuchis, which passed through Balochistan during 1982. Those Afghan refugees not crossing the border back to Afghanistan own, according to the same FAO estimates, 267,000 sheep and 254,000 goats. These nomads are called true nomads because they keep moving throughout the year and most of them do not have any permanent rights of rangeland ownership, and they live off their flocks without settling down to plant crops. They generally follow specified routes, graze their animals on open rangelands and engage in labor and trade. Their movements follow those of the transhumants; that is, in winter they go to the warmer areas of Sind and Punjab and in summer return to the highlands of Balochistan and Afghanistan.

Almost all dryland farming households keep some animals. These provide milk, butter, wool and hides for the family consumption while also providing a supplementary income, particularly crucial for family survival during years of crop failure.

2. Rangelands, Tenure Systems and Productivity

An area equal to 32.3 million ha of Balochistan's total land mass of 34.7 million ha, (93 percent of the total) is classified as arid and semi-arid rangeland. But only 21 million ha (60 percent of the total) is actually being utilized as rangeland. Fifty-six percent of the total rangeland area is classified as poor, providing only 30-50 kg/ha/yr of dry matter, while only 14 percent is classified as good quality range providing 250-280 kg/DM/ha/yr (FAO, 1983). The remainder of the Balochistan rangelands (40 percent of the total) consist of medium quality rangelands whose productivity varies from year to year depending upon the amount of precipitation.

The rangeland productivity and tenure systems together determine the type of animal raising that is followed. The so called true nomads generally do not have ownership rights over any productive rangelands, while transhumants and household animal raisers have generally well defined and secure ownership rights over rangelands. When the nomadic Baloch and Pushtun tribes first arrived in highland Balochistan, they found some very rich and productive rangelands, which they occupied and used according to their seasonal needs. Other tribes were excluded from the use of these rangelands only after scarcities of rangeland developed; this was the beginning of exclusive tribal common rangelands. Over the years certain portions of the rangelands became depleted and were unable to support animals for any prolonged period. These areas became open rangelands available for use by the local as well as nomadic animal raisers during certain periods of the year. The remaining better parts of the rangelands were retained as exclusive and common tribal property. The vast majority of rangelands in Balochistan fall into this latter category, and from an economic development standpoint it is important to understand their present tenure, utilization and management systems.

As long as the tribal populations were relatively small and the rangelands more productive, the entire tribe had usufruct rights over range resources. However, at some stage, each section or clan of the tribe tended to separate its share of the rangeland establishing exclusive sectional/clan rights over it. The degree of division of the original common tribal lands depended mainly on the

increase in population, but sometimes was the result of conflicts between various sections of the tribe. Whether commonly owned by the entire tribe or a clan or a section, the same rules regarding the use of common resources apply. Each member of the tribe/group including the chief/head has co-equal use rights, but these rights are non-transferable. No group member has the right to sell or even to separate his share of the rangeland. He has use rights over the entire rangeland but cannot claim ownership to any particular parcel of land within the rangeland. This mechanism ensures that the common rangeland remains intact providing subsistence to the entire group.

Various studies have shown (Dahlman, 1980) that a given rangeland, while supporting the same amount of animals in both cases, will have a higher productivity if it is used in common than if divided into small parcels and used individually. Economies of scale are obtained as animals have wider areas over which to search for grazing. Different sections of the range are grazed at different times allowing vegetation to regenerate and, through vertical movements, efficient use is made of both winter and summer vegetative growth. There are no formal limits on the number of animals a co-owner can raise, but informally this number is limited by economic as well as social considerations. Economically, beyond a certain number of animals in the flock, its mobility, crucial for survival in semi-arid range conditions, is seriously curtailed and flock productivity declines. Socially, those with larger flocks are required by tribal customs to contribute a larger share of the tribe's collective obligations, such as caring for the needy, showing hospitality, paying ransoms, fines and compensation to other tribes, etc. As far as the use of the other resources of the rangelands, for example, trees, there are specific and formal limitations to use. There are also, generally, periods in the year when the entire rangeland is closed and the members go to the open rangelands. This is generally the rainy season and closure allows the vegetation to regenerate, so that when the rangelands are reopened the vegetation has grown sufficiently to escape uprooting when grazed. In each rangeland, regardless of whether it is owned by the tribe or clan, there exists a political leadership and decision making mechanism (jirga system). Local leaders in consultation with smaller sectional heads, decide what use should be made of rangeland resources. Matters regarding the amount of lumber trees to be cut during the year, contributions for tribal causes, the duration of closure periods etc., are decided periodically. The enforcement of decisions is sometimes through sanctions and ostracization but sometimes force is used. Systems of range management differ from region to region and sometimes from tribe to tribe, but similar arrangements exist in all areas where animal raising is the mainstay of the economy.

There is a very small number of rangelands which are claimed to be privately owned. In recent times parts of the common rangelands considered good enough for crop raising, have been separated and distributed among the members of the tribe. Those who are not able to raise crops, use their lands for private grazing purposes. In some cases more affluent individuals bought rangelands and established what would elsewhere be called private ranches. However, due to the Islamic inheritance system, even such private rangelands tend to turn into common ranges in a few generations time.

3. Grazing Patterns and Systems

Grazing patterns and systems vary according to the type of animal raisers and rangeland ownership.

(a) True Nomads

True nomadism has been followed for centuries and those involved in it follow traditional practices and systems of movement. Within the framework of seasonal movements between colder highlands and warmer lowlands a large number of day to day decisions need to be made by each group. They generally pass through the less productive open rangelands, where they can stay for days, sometimes weeks if vegetation to support their animals exists. By tradition, they can pass through common tribal rangelands but cannot prolong their stay. Once in the lowlands, they generally have contacts with local farmers from whom they buy stubble grazing rights, straw and other feed for their animals and sell their own labour and animals and their by-products in exchange. The decision about the timing and route of passage is crucial for their survival. En route, they must have detailed information about rainfall and vegetation growth conditions, to ensure flock feed supplies in what is a competitive environment. Their arrival in warmer crop growing areas must coincide with the crop harvest time, when they can get work and cheap feed is available to their animals. Their return to cooler upland areas must, likewise, be coordinated with the growth of grasses and other vegetation and the requirement for labor in the highland areas.

(b) Transhumants

There are two types of transhumants in Balochistan, those moving between the highlands and the plains who practice dryland farming and those moving within the common rangelands and spending their summers and winters according to grazing availability. This type of transhumants are also called semi-nomadic. In the case of the true nomads the movements are in a potential area as wide between India and Soviet Central Asia; while in the case of the most

restricted transhumants the movements are solely within tribal rangelands, sometimes as small as 100 square miles in area, but having separate summer and winter pastures.

(i) Semi-sedentary transhumants

These transhumants raise rainfed crops, mainly wheat in winter, and sorghum, fodder and pulses in summer. Neither their labour nor time is fully employed nor their subsistence needs fully met by this crop raising activity. So each winter these groups, mostly from the central highlands of Balochistan, move to the warmer areas of the Indus valley. In the northeastern districts of Loralai and Zhob these movements are not so pronounced because of climatic and locational differences. These transhumants, once in the warmer areas, follow the systems of truly nomadic population. They sell their labour, animals and by-products to crop farmers and purchase from them grains and feed for their animals. In the case of the cooler Quetta/Kalat areas, transhumants sow their winter crops before leaving and return at a time when they are almost ready for harvest. These transhumants generally go each year to one particular area in the Kachhi plain (Baluchistan) or Sind and stay in that general area for the entire duration of the winter. The travel time between home and the area in the lowlands is normally not much more than a week to 10 days.

(ii) Semi-nomadic transhumants

These populations are, in general, completely dependent upon animal raising for their living. They are co-owners in the common tribal rangelands, and in most cases their movements are confined within the limits of their tribal lands. In summer they may close their common rangelands and for a period take their animals to open lands at the periphery of their rangelands. Otherwise they may go to summer pastures at higher elevations in the mountains for a few weeks or months. But in all cases they return to their permanent dwellings in the rangelands during the winter months. In years of drought, they take their animals, if need be, far beyond their own rangelands and are allowed by other tribes to graze in the resident tribe's rangelands, as a reciprocal survival mechanism. Some of these semi-nomadic transhumant groups take their families and animals to the nearby agricultural valleys, where the family engages in agricultural labour and the animals are grazed on the stubble or grasses in and around the fields. This generally happens in the summer at wheat harvest time, when the sedentary farmers need the animal raiser's labour for harvesting, hauling and threshing of wheat. This is also a time when there are no standing crops in the fields and the farmers permit the animal raisers' flocks to graze in their fields for a small fee. The animal raisers gain in many ways through this arrangement. They are able to close their own common rangelands, thus saving the

vegetation and hay for the winter. In addition, they sell their labour and receive rent for their camels and donkeys which are used for crop transportation. They are normally able to earn enough money by these means to buy wheat grain and other supplies for the coming winter.

(c) Household Animal Raising

Because of their tribal nomadic background and the fact that animals provide important services and food, most people living in agricultural villages in Balochistan raise a few animals. This supplementary animal raising, sometimes, accounts for a major portion of the household income and helps increase farm productivity. Women play a major role, not only in the raising of these animals, but also in converting their by-products into useful food and appliances. For grazing, normally a shepherd is employed to tend all the animals from a village as a single flock. As the agricultural villages are normally inhabited by the members of the same lineage or clan group, they have use rights over the rangelands adjacent to the village.

4. Supplementary Feeding and Feeds

In all categories of animal raising there is some degree of supplementary feeding, but it is generally highest in the case of household animal raising and lowest in the case of true nomadic animal raising. The sample selected during the Household Production Systems Survey was biased in favor of household animal raising; therefore, the results shown in the following tables may not be completely representative. Different types of feed supplements were used; the following table shows the proportion used of each type.

Table 2. Livestock Feed Supplements Used in the Highlands of Balochistan

Supplementary feed	Percent
Wheat straw	13
Barley grain	27
Barley straw	5
Sorghum grain	10
Sorghum stalk	8
Millet grain	1
Hay	25
Green fodder	11

As is shown, barley grain is the supplement most used in the areas of the study, while millet grain is the least used. Barley is much less widely grown than wheat, but wherever it is grown, a relatively higher proportion is utilized as a feed supplement. In the areas of Khuzdar and

Kachhi, where sorghum is the main summer crop, its grain and straw constitute the major feed supplement. Hay, the second most important supplement in the survey area is used throughout the highlands of Balochistan, particularly in the winter. The main animals receiving supplemental feed were sheep, goats and cattle. The following table shows the relative consumption of supplements by each of these categories of animals.

Table 3. Categories of Animals Receiving Supplementary Feed

Animal Category	Percent
Sheep	44
Goats	42
Cattle	14

The survey also covered aspects of variation in supplementary feeding in different seasons of the year. The following table summarizes the results of the survey.

Table 4. Seasonal Variation in Supplementary Feeding

Supplement	Percent of Supplementary Feed During			
	Winter	Summer	Spring	Fall
Wheat straw	54	4	0	42
Barley grain	86	5	2	7
Barley straw	60	13	13	14
Sorghum grain	77	9	9	5
Sorghum stalk	92	0	9	5
Millet grain	100	0	0	0
Hay	86	5	2	7
Green fodder	50	5	0	45

As would be expected most of the feed is utilized in the winter time when there is inadequate grazing.

5. Livestock Ownership, Flock Size and Productivity

Animal raising is a higher risk enterprise than crop raising. In a worst case scenario the crop farmer loses the seed and the other input investments he had made, but he still has the land; whereas the animal raiser can lose everything, the mother stock as well as the expected crop. Losses can come from drought, snow, hailstorms, epidemics, predators and theft. Land owners are able to accumulate and store surpluses, whereas the animal raisers tend to be less able to do this. Besides, among the communities in Balochistan, as social obligations increase progressively with an increase in flock size, there is a disincentive to accumulate larger flocks. Most importantly there are sound economic reasons for keeping flocks sizes relatively small.

It is estimated that an average flock in upland Balochistan travels between 16 to 24 kilometers a day in search of food and water (Buzdar, 1982). Mobility is crucial to animal survival and the larger the flock size, the lower the mobility tends to be. Another possible reason for a preferred smaller flock size is that they receive better management, protection and care, so that the marginal productivity of animals may decline beyond a certain size of flock. An optimum flock size will depend on the range conditions, availability of family and hired labour and distance of rangelands from home or camp, among other factors.

Buzdar (1982) in his studies covering 210 randomly selected animal raisers in the eastern parts of Loralai and Zhob districts determined that the average and optimum flock size was 120 sheep/goats. Flock sizes actually varied between 50 and 200 animals. A flock of less than 60 animals did not provide the minimum subsistence requirements and it would be more economical for the owner to work as a shepherd for other animal raisers rather than to continue raising his own. Similarly if numbers exceed 200 then it would be more economic to split the flock or loan a portion to others.

Due to logistic problems of interviewing true nomads, only the household type of animal raiser was included in the Household Production Systems Survey. The average numbers of different types and age groups of animals raised by a farmer in this category and, restricted to this category, are shown in the following table.

Table 5. Average Number of Animals Raised by Households

Animal	Location				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Sheep(F)	8	12	29	16	22
Sheep(M)	4	3	4	6	5
Lambs(F)	7	5	11	8	16
Lambs(M)	3	3	6	4	7
Goats(F)	6	5	26	10	8
Goats(M)	4	1	5	4	3
Kids(F)	4	3	15	4	12
Kids(M)	3	2	6	3	7
Cows	4	1	1	1	1
Bullock	2	1	1	2	2
Heifers	2	0	0	0	1
Calves(M)	0	1	4	0	1
Camels(F)	1	3	2	1	1
Camels(M)	1	1	1	1	1
Yg. Cam(F)	1	0	1	1	2
Yg. Cam(M)	1	0	1	3	1

The numbers of family held animals are not the same as those of the pure animal raisers. But they are important in

showing the supplementary nature of animal enterprises for small farmers subsisting under rainfed conditions.

6. Flock Composition

Different types of animals and their by-products are required to fulfill the animal raisers need for food, appliances, transportation, etc. Moreover, different animals have different levels of susceptibility to diseases and drought conditions. For an animal raiser these are important considerations in deciding on the composition of his flock. However, the most important consideration in this choice is the precarious availability of grasses, shrubs, trees and other vegetation in the rangelands. There are four important reasons for animal raisers to raise mixed sheep/goat flocks rather than a pure flock. Firstly, goats have the mobility and night vision necessary to graze over large areas of the range, while sheep have the necessary instinct to follow. Secondly, while sheep prefer to graze on grass and other vegetation close to the ground, goats prefer to browse on tree leaves and shrubs. Thus, a more balanced grazing is obtained and extreme pressure on any one type of botanical resource is avoided. Thirdly, the goats tend to be more hardy and resistant to drought conditions than sheep. In bad years, sheep may be completely or partially lost, while goats still provide minimum subsistence needs. Fourthly, the sheep and goat meat, wool/hair, skin/hides and other by-products have different and sometimes competing uses. The market prices of the animals and their by-products vary and fluctuate from year to year. Therefore it makes good economic sense to raise a mixed sheep/goat flock, changing the composition as economic and household utility conditions dictate. The results of the Household Production Systems Survey in this regard are summarized below:

Table 6. Sheep/Goat Ratio in the Flocks of the Highland Rainfed Areas of Balochistan

All Areas	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
1.71	1.66	1.75	0.98	1.38	2.8

As is shown, the highest ratio is at Tomagh while the lowest is at Kovak. This is, most probably, an indication of the condition of the rangeland vegetation. Tomagh in Loralai has more grasses and ground vegetation while Kovak has the least grass, but relatively more shrubs. In the survey, animal raisers were also interviewed about their cattle and camel ownership. These ratios are shown in the following table.

Table 7. Oxen/Camel Ratio in the Highland Rainfed Areas of Balochistan

All Areas	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
1.61	3.38	1.32	0.17	0.36	2.83

As is shown, in all the areas combined there are more camels than oxen, but at least in the two more sub-tropical areas of Khuzdar and Tomagh, cattle numbers far exceed those of camels. Since our survey was biased in favor of dryland farmers cum animal raisers as opposed to pure animal raisers, it is more indicative of the oxen and camel uses as draught animals. The ratios would in this regard, most probably, be not very different if more pure animal raisers had been included in the survey. Considerations similar to those mentioned in the case of sheep and goat also apply here. Camels like goats are hardier, more mobile and are browsing types of animals, while oxen prefer grass and other ground vegetation and require more feeding and care.

7. Animal Labour/Shepherding

According to the Household Production Systems Survey, 22 percent of the animal raisers in Khuzdar, 55 percent in Zarchi, 28 percent in Kovak, 24 percent in Dasht and 19 percent in Tomagh employed shepherds to tend their animals. Two main types of shepherding arrangements, corresponding to the two main type of animal raising, are in vogue. Small household or supplementary animal raisers of a village or portion of a village combine their animals and together employ a shepherd. Under this arrangement the shepherd is paid a monthly salary in cash, and in the case of longer contracts, he also receives fixed amounts of food, clothing, shoes etc. Because there are so many different systems no averages except those of wages could be ascertained. The average monthly payment per head of sheep or goats was Rs. 3 while it was Rs. 10 per head of cattle. The camels generally do not need any special tending or shepherding, but owners of big camel herds (Bug) often employ professional camel keepers or tenders called Jat. The Jat are paid higher wages because their job requires them to live in remote mountainous or desert areas under difficult conditions away from population centers.

The mainstream sheep/goat shepherding arrangements work as follows. A normal shepherding contract is for a period of one year. In the survey, 100 percent of the contracts in all locations except Tomagh were for a period of one year. In the case of Tomagh, 52 percent of the contracts were for a period of one year and 48 percent for periods of more than one year. The shepherd's annual remuneration is a combination of cash and a profit-loss sharing arrangement. The most common arrangement existing among the animal

raisers in highland Balochistan is a cash payment of Rs.1000 (1\$ = approx 18 Rs. at the time of survey), two sets of clothing and of shoes, two meals a day and a share equal to 1/8th of the male and 1/12th of the female offspring. Before the offspring are divided between the owner and the shepherd, any losses that have occurred among the principal stock during the course of the year are deducted from the common lot. In some other cases there are no animal shares involved and the shepherd receives annual wages in cash in addition to food and clothing. Such cash wages varied between Rs. 6000 to Rs. 8000 per annum.

8. Animal Birth Rates

Because of general conditions of inadequate nutrition, high incidence of disease and poor flock management, birth rates tend to be low in most years. The following birth rates were recorded during the Production Systems Survey.

Table 8. Animal Birth Rates (percent) in Highland Balochistan

Animal Birth Rate During the Years 1986-87.

	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Sheep	66	58	54	56	54
Goats	72	63	69	58	87
Cows	25	50	-	-	83
Camels	75	-	81	25	-

The general trends in data seen elsewhere are also evident from the above table. Tomagh, is a relatively high summer rainfall area and has a more developed infrastructure and communications system. The animal raisers may also have better access to veterinary services for their animals. These are possibly the main reason behind the relatively higher birth rates in the Tomagh area. The same general rules may apply to the second highest birth rate location of Khuzdar.

9. Animal Mortality and Diseases

No thorough investigation into the occurrence of diseases has been made in Baluchistan; therefore, the presence and extent of epidemic and non-epidemic diseases is not fully known. Some of the diseases known to be common in Balochistan are enterotoxaemia, anthrax, liverfluke, pleuropneumonia and other bacterial, parasitic and viral diseases. The AZRI range/livestock group conducted a survey in Kovak valley of Kalat District and found the following rates of parasitism (Khan et al. 1988). Among the endoparasites, the incidence was Nematodirus spp. 86%, Haemonchus contortus 63%, Strongyloides papillosus 49 %, Trichostrongylus spp. 42%, Marshallagia marshalli 41% and

Fasciola hepatica 33%. The incidence of ectoparasitism was tick infestation (Ixodes ricinus) 35% and sheep scab Psoroptes ovis 23%. In this particular area 100 percent of the animals were suffering from one or other type of parasitic infestation.

The mortality rates recorded during the 1987 survey were extremely high. The following table shows these rates in the different areas of the study.

Table 9. Animal Mortality Rates (percent) in Highland Areas of Balochistan

Animal	Mortality Rate per Location (percent)				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Sheep	31	20	11	14	7
Goats	26	18	7	27	6
Cattle	27	14	0	5	18
Camels	38	23	3	0	8

As the above table shows the mortality rates were extremely high. Obviously, with such high rates every year, those involved in animal raising could not continue to maintain a livelihood for long. But fortunately it was not a normal year. The year of survey was conducted in a year of severe drought. This drought, which also extended into the next year, claimed the lives of hundreds of thousands of animals throughout Balochistan. The rates are particularly high in the Khuzdar area because that area was the worst hit by the drought.

10. Animal By-products

Traditionally being an animal raising people, the inhabitants of Balochistan have depended on animals for almost all their necessities of life. Animal meat and milk, used directly or in the processed forms of Roghan/Ghoraee (purified butter), yogurt, cheese, Landee/Parsanda (dried meat), etc. have been the main sources of nutrition. The hides and skins are used as Mashk, Heezak and Zink containers, respectively, for water, milk and purified butter. The wool and mohair are the most valuable by-products as they are used for making rugs, carpets, tents and all types of containers for grain and household goods. In recent times when animal raisers are able to purchase these necessities of life cheaply from the market, they sell their own animal by-products in the market.

The Household Production Systems Survey covered only wool, as far as the distribution of the by-products between home consumption and marketing is concerned. The following table shows the results.

Table 10. Wool Consumption and Marketing in Highland Balochistan

Use/Disposal	Percentage of total per location				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
HH Consumption	31	53	28	22	36
Marketing	69	47	73	78	64

The table shows that, except in the case of Zarchi, more wool is marketed than is consumed at home. The wool consumption at home is a function of a variety of factors, some of which are the market price of wool, family skills in making handicrafts, rugs, tents and containers using wool as the input, and the prices of substitute goods in the market. Lately the farmers have discovered that goods like a jute guney bag were far cheaper than a similar container that they used to make from wool and that they could buy more than a dozen earthenware water containers by selling one goat skin which they traditionally used for water storage. The figures in the above table are evidence of the animal farmers' ability to benefit from trade and exchange and a gradual breakaway from a traditional self contained economy to an economy integrated into the regional and national marketing systems. Limited data were also collected on the existing prices of wool and hides. These are summarized in the following table.

Table 11. Wool and Skin Sale Prices in Summer 1987 in Highland Balochistan

Item	Price in Summer, 1987 per Location (Rupees)				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Wool/kg	23.7	26.1	34.7	20.7	34.5
Skin/unit	33.3	52.7	35.5	38.3	25.2

The variation in some cases was very large. This may be due mainly to the fact that wool and skins are sold in different local, regional and national markets. The main market for Tomagh producers is the Punjab, while Quetta, Mastung, Kalat and Karachi are generally the main markets respectively for Dasht, Kovak, Zarchi and Khuzdar area producers.

11. Loaning of Animals

Animal loaning is very common and takes place among all the communities in Balochistan. Animals are loaned to those kin and tribal members who have lost their animals due to a natural calamity, personal tragedy and or in payment of

compensation and fines. Such loaned animals provide the minimum subsistence to the family until it is able to make its own living. Animals are also loaned to establish and strengthen family and clan relationships and to secure their support. However, there are two loaning systems which are widely used and are of economic importance. The first, popularly known as 'Nimsudi', involves loaning a certain amount of mother stock (principal) on the conditions that after a year the debtor and creditor will equally share the offspring (profit) and the principal will be returned. The losses among the mother stock during the year are deducted from the common offspring crop. The second system known as 'Zarsari' involves deciding the value of animals before they are loaned out. The added value during the year is considered as profit and again equally shared between the owner and the shepherd.

The results of the survey with respect to the major animal types borrowed are shown in the following table.

Table 12. Animal Loaning and Borrowing among Herders in the Highlands of Balochistan

Animal	Percent of Flock Borrowed				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Sheep	25	55	88	40	100
Goats	17	31	4	40	0
Cattle	58	11	0	10	0
Camels	0	4	8	10	0

As the data show, 100 percent of the sheep at Tomagh were borrowed. The use of winter dried meat is relatively higher in Tomagh and almost 100 percent of the animals used for winter dried meat are sheep. In general, therefore, the demand for sheep should be higher in Loralai, than, for instance, in Khuzdar. The data also show that with respect to cattle and camels, more borrowing is done in Khuzdar in the first case and in Kovak and Dasht in the second case. This is because of their uses in each area as the main draft animal. The higher rates of borrowing in sheep and goats may be indicative of the variation in the socio-economic conditions prevailing in each of the areas studied. Some of these socio-economic factors have been mentioned above.

12. Risk Aversion Strategies

Living in harsh environmental conditions, animal raisers are continuously faced with risk and uncertainty. There is a certain level of security against risks that is provided by the family, the tribe and its sub-groups and the fact that obligations and privileges are socialized. But

individual households also adopt other risk aversion strategies:

(a) The Dispersion of Animals and Flocks.

The many risks to animals from droughts, epidemics, storms, thefts etc. when experienced will be more acutely experienced if all one's animals are kept in the same place. Therefore the animals are dispersed as widely as is possible. Animals are loaned to individuals living in different rangelands and localities and if a herder has more than one flock, they will be kept in different localities and different parts of the rangeland.

(b) Composition of Flocks.

Goats are hardier, more mobile and resistant to drought conditions, but generally sheep are more valuable monetarily. Sheep and goats are susceptible to different diseases, predator attacks and have different lambing and kidding times. To reduce risk both types of animals need to be included in the flock. To further guard against risk, in some cases the animal raisers also add cattle and camels to their stock. A great benefit of combining different types of animals is that these animals have different grazing habits and preferences.

12. Animal Marketing and Prices

Generally the farmers in Balochistan use a portion of their animal by-products for their household subsistence and social needs, and sell or barter the rest so as to be able to buy those necessities of life which they do not themselves produce. The following table shows the results of the survey with regard to the proportion of animals sold in the market and the proportion used for other household and social purposes.

Table 13. Animals Used for Household Consumption, Social Uses and Marketing

Animal and Uses	Percentage of Total Animals				
	Khuzdar	Zarchi	Kovak	Dasht	Tomagh
Sheep used for					
HHC/Soc/invst	77	92	91	94	95
Sheep marktd.	24	8	9	6	5
Goats used for					
HHC/Soc/invst	90	99	94	95	91
Goats marktd.	10	1	6	5	9

Where: HHC = Household consumption

As the results of the above table indicate, a very high proportion of the animals raised are used by the household for their own consumption and social and investment purposes. Most of the marketing is done only when the family needs to purchase the necessities of life from the market. Clothing, tea, sugar and sometimes grain are the main items of purchase. Since in a majority of the cases the animals graze on common rangelands and at the periphery of fields, no payments are made for this feed. Thus the direct marginal costs of raising an additional animal are very low, and therefore generally the best investment of capital is animals themselves. Besides, there is a shortage of other worthwhile investment opportunities available to animal raisers.

The farmers were asked about the proportion of animals and their by-products that they used for different household and social purposes. The following table summarizes their responses.

Table 14. Animal Uses for Different Household Consumption and Social Purposes in the Highlands of Balochistan

Animal	Percent Used for the Purpose			
	Consumption	Gifts/Kin	Bridal price	Sacrifices
Sheep	15	1	1	13
Goats	10	1	1	8
Cattle	7	7	0	29

As the results in the table show, the highest percentage among all the consumption and social categories was for the purpose of sacrifices. Besides the religious significance of animal sacrifices, often important social and political benefits are associated with them. Most families cannot afford to consume meat and for them the sacrifices provide the only opportunity for red meat consumption. On occasions of births and deaths, circumcision and the naming of sons, on the Prophet's birth and death anniversaries, parents and other relatives death anniversaries, Eid-ul-Bakr etc., are some of the occasions when animals are sacrificed. Richer people are required by tradition to sacrifice more animals and this enhances their political and social prestige.

13. Economic Policy Related Problems

For the last few years, while there have been weekly meatless days and a government ceiling on meat price was enforced, the policy with respect to agricultural crops, particularly wheat production, has been the reverse. Subsidizing wheat producers, through government supported prices is a good national policy as far as its effects on the country's self sufficiency in providing the main staple

food. However, for animal raisers these policies are not only discriminatory but also disproportionately burdensome because, animal raisers being poor spend a very high proportion of their income on food grains. The fact that special permission is needed to take animals from other areas of Balochistan to certain border regions like Makran, reveals that animal prices in neighboring countries are higher and there is an export demand for animals. While the government encourages export of agricultural produce such as cotton, rice and fruits, the inverse has existed for animal exports. There may be currently a genuine concern about overstocking and depletion of rangelands, but if market forces are allowed to work unhindered, resource allocation by farmers and animal raisers, in general could be more optimal. If Balochistan has a comparative advantage in animal raising over the other regions of Pakistan and if it pays to expend resources on animal raising rather than crop raising, farmers should be encouraged to raise animals. In fact, the current policy encourages more depletion of land and misallocation of resources, as land effectively fit only for animal raising is being converted to crop land. A reverse process could, and possibly should, take place, if the government economic policies were more appropriately formulated.

14. Social/Institutional Problems Relating to Range Management

Most of the rangelands in Balochistan are commonly owned and managed. Traditionally the tribes and sections owning the rangelands had institutional arrangements to utilize and regulate the use of ranges and other resources in the rangelands. The informal institutional arrangements enabled the maintenance of rangelands at certain sustainable levels of productivity. There were some forms of limits on the animal numbers raised and in most cases there were periods of closure during the year and some form of rotational grazing was practiced.

Two factors during the last few decades have resulted in rapid rangeland depletion and deterioration. Firstly the traditional tribal organization in most areas of Balochistan has either weakened significantly or has completely broken down. As far as the use and productivity of rangelands in Balochistan is concerned, the effects of the weakening of the tribal organization have been bad. One of the main functions of the council of elders under the local Mokaddam/Takari/Malik was to make day to day and season to season decisions regarding the resource use, camp locations and movements within the common rangelands. Government officials have taken over the political functions of the elders and chiefs, but no arrangements have been made to either perform or assign the resource use regulating functions of the traditional leadership. A second factor which also has had adverse effects on rangeland productivity

was the partial transformation of animal raising from a subsistence to a commercial activity. For this purpose no traditional limits are observed, no social obligations normally associated with large flocks are met and no rules of rotational camping etc. are followed.

CONCLUSIONS

The animal raising systems of the highland rainfed areas of Balochistan have been described from a socio-economic and anthropological perspective. It is evident that these systems of animal production are undergoing severe pressure to change from traditional modes owing to the combined and associated stimuli of national development, animal overpopulation and degradation of range feed resources.

Technical and socio-economic research is now urgently required to ensure that this change can occur with a minimum of human social disruption. Additionally, it is needed to permit the evolution of new biological and economic production systems which have the capacity to be sustainable in the longterm.

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