



Study of ecosystem and pastoralism in Cholistan, Pakistan

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SUMMARY

The Cholistan desert is the oldest Hakra River civilization in the Indian Sub-continent. One of the largest desert in Pakistan comprising Bahawalpur, Bahawalnagar and Rahimyar khan Districts with a population of 10.6 million. Rohi pastoral people (0.22 million) engaged in livestock husbandry. Livestock rearing is much important for food security and is the only source of livelihood for these people. The pastoralists raise sheep, goat, cattle and camel breeds and have a herd size of up to 600 animals. Health facilities for livestock and human are very poor in the area. The livestock is under fed due to lack of vegetation and non-availability of other fodders. Cholistan pastoralists remain mobile throughout the year with their livestock in search of water and forage. Water is the major problem in the desert, although tobas of different dimensions are present but their de-silting is not carried out on regular basis. Pastoralists suggested the reseedling of grasses and fodder trees in the area. They also required marketing, veterinary facilities and value addition ecotourism and participation in the projects related to desert development.

Keywords: Cholistan, Pastoralists, Livestock, Hakra River

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INTRODUCTION

Cholistan desert, formerly a lucrative, vibrant, and thriving forest, is now almost abandoned. It is located in southern Punjab between latitudes 27° 42' and 29° 45' north and longitudes 69° 52' and 75° 24' east, and it spans an area of around 2.6 million hectares. This area is separated into two natural zones based on topography: Lesser Cholistan (area of northern 7770 km²) stretches north east from the Hakra River to the Satluj River's bank. Apart from the existence of intersecting permanent water of the Satluj and Beas Rivers and the Greater Cholistan (the southern 18130 Km² region), this section of the desert is barren. Large sand dunes with level interdunal plains define this wind-resorted sand desert. Greater Cholistan has an average dunes height of roughly 100 metres. On unstable sand dunes, vegetation cover is sparse. Because of the soil's water-retention capability, some interdunal regions (Dahar in local language) have good vegetation. It is a harsh hyper-arid sandy desert with mean annual precipitation ranging from less than 100mm in the west to

more than 200mm in the east, with monsoon season precipitation accounting for the majority of the rainfall (July-September). Rainfall is very variable in terms of amount and duration, and 10-year droughts are not uncommon (Malik *et al.*, 2015).

Annual precipitation determines the viability of life in the Cholistan desert. During the monsoon season, the primary supply of fresh water is surface water gathered in natural depressions or man-made ponds known as "Tobas," which does not last long owing to seepage and evaporation. The other source of water is subterranean, which is generally brackish, although according to Range management officials stationed here, a 3-4 km wide strip of delicious subsurface water runs parallel across Cholistan (Hussain and Abbas, 2019).

Cholistan now has two grazing systems: nomadic and transhumance. Due of the abundance of pasture grazing in the later system, pastoralists stay in the desert near water tobas throughout the monsoon season. During the post-monsoon (October-November), when water and fodder have entirely finished/depleted near the tobas, migration to semi-permanent having wells (khoo/wells) happens. Pastoralists go to the outskirts in the spring (Hameed *et al.*, 2011).

This desert has a total population of 0.22 million nomadic pastoralists. The bulk of people reside on the outside of the desert, and the interior is sparsely inhabited. The region's economy is mostly pastoral, and its people have lived nomadic lifestyles for millennia. Cattle, camels, sheep, and goats are owned by nomads in small to big herds. Camels are used as a form of transportation by the locals. Habitats are modest and widely dispersed. The pastoral system is defined by a year-round mass movement of animals and people in search of water and forage in the desert. The economy of these nomads relies entirely on restricted and precious natural resources, as well as irregular rainfall patterns. The majority of nomads live in poverty due to a lack of basic human requirements such as clean drinking water, enough food, health, and education for their children. Livestock is utilised in communal rites such as weeding, tribal festivals, childbirth, and funerals to trade presents, and animals are butchered for a feast for visitors. The quantity of a herd determines a nomad's status in the desert lifestyle.

The most prevalent and largest occupation in desert settlements is cattle grazing. The selling of animals and their products accounts for the majority of their revenue. As a result, the economic development of these settlements is primarily dependent on cattle output, which is in turn dependent on the amount of pasture available throughout the year. Overgrazing owing to overstocking, along with fast deforestation, has accelerated the rate of desertification, and as a result, production of food, fodder, fuel wood, and lumber has been dramatically decreased. This has had a negative impact on the ecology as well as the pastoralists' socioeconomic situation. As a result, it is critical that desert natural resources, such as land, vegetation, water, and animals, be maintained as well as developed in order to improve the socioeconomic situations of desert people. Water scarcity is a serious issue in Cholistan, as is overgrazing and malnutrition. The Cholistan environment, pastoralism, and herders' socioeconomic situation were all investigated in this research. It also looked at graziers' issues and how to address them (CDA. 2009).

MATERIAL AND METHOD

The survey of Cholistan was conducted during Dec-January 2014-15 and a total five sites were selected randomly namely Mojgarh, Kalla pahar, Jannu wali ,Mattan walla and Cheppan. From each selected sites 18 numbers of pastoralists were interviewed according to interview schedule which was prepared and pre-tested before the actual survey. In this way a total of 90 pastoralists were interviewed.

EDUCATION OF THE PASTORALISTS

Education is a right, like the right to have proper food or a roof over your head (UN). It is a fundamental human right and is key to sustainable development and stability within and among the countries and an indispensable means for participation in societies and in the economies of the 21st century.

The literacy rate in Cholistan seems very low because of the prevailing nomadic culture of the area and mainly due to poor economic conditions of the pastorals. The other reasons of less and low education are non-availability of schools, teachers and migratory habits of people along with their livestock in search of water and fodder. Table-1 shows that out of total 90 respondent's majority were illiterate which constitute 66.66%, only 4 respondents got education up to Matriculation while respondents up to Primary and Middle were 20 and 6 respectively (Table 1).

Table 1: Education of the pastoralists.

Education	Number of respondents	%age
Primary	20	22.22
Middle	6	6.66
Matric	4	4.44
Illiterate	60	66.66
Total	90	

FAMILY SIZE

Majority of the respondents have large families containing 9 members each and it constituted 60% of the total. Pastoralists having medium and small family size were 20 and 16 in numbers respectively. The main reason behind the large family is the lack of education, lack of recreational facilities among pastoralists and their believes which is more important that more hands earn more (Table 2).

Table 2: Family size.

Category	No. of Respondents	%age
Large (more than 8)	54	60%
Medium (5-8)	20	22.22%
Small (1-4)	16	17.77%

HERD SIZE

The livestock is the main wealth of Cholistan; pastoralists and is the major source of their livelihood. The average number of livestock kept by all the respondents of

Mojghar, Kala Pahar, Jannu Wali, Mattan Wali and Cheppan were 558, 580, 540, 578 and 432 respectively. The share of goat and sheep in the herd is 47.80% and 31.6% respectively. The camel contributes 2.71% of herd in every surveyed site, while in case of cattle it was 17.73% (Table 3).

Table 3: Average Livestock Holding.

Location	Sheep	Goat	Cattle	Camel	Total
Mojgarh (18)	276	182	85	15	558
Kalla pahar (18)	281	185	98	16	580
Jannu wali (18)	253	157	116	15	541
Mattan walla (18)	280	172	112	14	578
Cheppan (18)	198	155	66	13	432
Total	1288	851	477	73	2689

GRAZING PLACES AND GRAZING SYSTEM

Livestock play a vital role in social as well as economic conditions of the pastoralists. Transhumant and nomadism are two main production systems of the livestock in Cholistan. All the respondents grazed their livestock in Government rakhs/rangelands and followed continuous grazing system. The livestock remain underfed and there is only 55% satisfaction after grazing due to lack of vegetation. The major causes of low carrying capacity were severe climate, non availability of water, desertification, non-reseeding and lastly the commitment of the online departments (Table 4).

Table 4: Grazing places and Grazing system.

Sr.	Grazing Places	Respond	Satisfaction after Grazing (%)
1	Government Rakhs	90	55%
2	Private Land	0	0
3	Stall feeding	0	0

COPPING STRATEGY DURING DROUGHT

Livestock is the main source of the livelihood of the inhabitants of Cholistan and the major production system is transhumant in which livestock is shifted to flood plains and irrigated areas during fodder famine periods. Almost 42% of the pastoralists shifted their livestock to semi-settled areas, 10% in settled areas while 47.7% to periphery of the desert. A minute number of respondents use other fodder sources during drought period. Majority (83%) of the pastoralists do not sale their livestock during this period however more than 16% respondents sale out some portion of their herd in the lean season/period (Table 5).

Table 5: Copping Strategy for Livestock during Drought.

Sr. No.	Location	Shifting Places			Use other Resources	Sale out Livestock	Keep Livestock
		Semi settled Area	Permanent Settled Ares	Periphery of Desert			
1	Mojgarh (18)	10	4	4	0	4	18
2	Kalla pahar (18)	15	0	3	0	3	18
3	Jannu wali (18)	3	0	15	3	4	18
4	Mattan walla (18)	10	2	6	4	2	18
5	Cheppan (18)	0	0	15	3	2	18

GRASS/PLANT SPP. SUGGESTED BY RESPONDENTS TO BE PLANTED

Respondents of all the five sites suggested that reseedling of grass species like Gorkha and Dhamman is necessary for rearing livestock in Cholistan and it must be done on regular basis. They were also in viewed that dry afforestation of Kikar, jand and Mallah/Ber is essential for the development of Cholistan because vegetation is the most important for the livestock of this area as it constitutes the main source of fodder for animals and control desertification and conserve biodiversity (Table 6).

Table 6: Plant Species Suggested by Respondents.

Sr. No	Species Suggested	Number of Respondents	%age
1	Kikar	90	100
2	Jand	90	100
3	Mallah/Ber	90	100
4	Dhaman	90	100
5	Gorkha	90	100

PROBLEMS FACED DURING GRAZING

The current situation of the Cholistan desert is very serious as there is a great pressure on pastoral lands due to commercialization of this land, Government policies, non availability of markets and poor health care. According to the pastoralists land grabbing is an important issue, as grazing lands are decreasing.

Lack of vegetation and low carrying capacities are the main features of the Cholistan. Almost all the pastoralists were in viewed that carrying capacity of the desert rangeland is very poor and it cannot meet the fodder requirements of their livestock. Scarcity of water is also big problem in the Cholistan and 100% respondents claimed that reduction in abundance of palatable species especially grasses is another big problem of the area. Severe loss of vegetation cover including shady trees is a threat to pastoralist. There is almost no salting points in the desert for

livestock and finally the quantity of Tobas are also less and they are located in far-flung areas (Table 7).

Table 7: Problems Faced During Grazing.

Location	Lack of water	Low Carrying Capacity	Un-Palatable Vegetation	Lack of Shady Trees	Lack of Salting Points	Less Number of Tobas
Mojgarh (18)	18 (100%)	18 (100%)	16 (89%)	14 (78%)	18 (100%)	6 (33%)
Kalla pahar (18)	18 (100%)	18 (100%)	14 (78%)	16 (89%)	18 (100%)	4 (22%)
Jannu wali (18)	18 (100%)	18 (100%)	14 (78%)	18 (100%)	16 (89%)	2 (11%)
Mattan walla (18)	18 (100%)	18 (100%)	14 (78%)	18 (100%)	16 (89%)	2 (11%)
Cheppan (18)	18 (100%)	18 (100%)	18 (100%)	18 (100%)	18 (100%)	4 (22%)

SIZE OF USER FRIENDLY TOBAS AND THEIR DESILTING

A number of organizations are working in Cholistan for uplifting socio-economic conditions of pastoralists and for development of the area. Almost all are constructing water Tobas for pastorals and their livestock. The role of Cholistan development authority and Punjab Forest department is commendable regarding digging of tobas, each of both have digged tobas of different sizes. Dimensions of tobas as told by respondents and measured by the researchers were 8'x100'x100' and 20'x110'x160' for Forest Department and Cholistan Development Authority respectively. According to the 89% respondents the tobas having a dimension of 8'x100'x100' were most user friendly as compared to other dimension of 20'x110'x160'. Majority of the respondents were in viewed that a depth of 20' of a toba is much more and if any time an animal entered in toba cannot come out. A large number of the respondents were in viewed that desilting of tobas must be done after every 03 years while 40% respondents required desilting after every 04 years (Table 8).

Table 8: Common Size of Toba and Size of User Friendly.

Sr.	Dimension of Toba	Authority of Toba	User Friendly Number of Respondents
1	8'x100'x100'	Forest Department	80
2	20'x110'x160'	CDA	10

LIVE STOCK PRODUCTION AND HEALTH MANAGEMENT

Three inter-related aspects of animal health i.e. feed, water and disease have been encountered in Cholistan desert. Shortage in availability of forage, drinking water and diseases severely affect their productivity. Veterinary health centers or hospitals are not available in the desert and very few poorly-equipped small units are available in

peripheral cities with minor quantities of drugs. Only 22% respondents have access to these drugs. There is also a lack of understanding and confidence between veterinaries and local pastoral people. The pastoral people do not trust the veterinaries and think that their way of treatment to livestock is incorrect. So they mostly rely on indigenous treatment and ethno veterinary medicines. In general the health of livestock is not good resultantly low production (Table 9).

Table 9: Veterinary Facility for Live Stock.

Location	Hospital/Dispensary Present		Availability Of Medicine		Distance Of Nearest Hospital/Dispensary	Availability of Private veterinary Doctor
	Yes	No	Yes	No		
Cheepan	18	0	4	14	20 Km	0
Mattanwala	18	0	8	10	20 Km	0
Jannu wali	18	0	6	12	In The Village	4
Kalla pahar	0	0	2	16	30 Km	18
Mojgarh	18	0	4	14	18 Km	18

LIVESTOCK MARKETING

The pastoral nomads of Cholistan are living below poverty due to lack of education and their total dependence on meager natural resources. The quantity and quality of livestock is not enough to support a family. Marketing of livestock is generally through middle man due to non availability of proper markets. Average distance of nearest market from village is 54 Km while maximum is 80 Km. The roads leading to these markets are mettle as well as mud made (Table 10).

Table 10: Distance of Nearest Livestock Market.

Location	Distance From Market	Type Of Road	
		Kachha (%)	Pakka (%)
Cheepan	70 Km	70	30
Mattanwala	50 Km	80	20
Jannu wali	40 Km	65	35
Kalla pahar	30 Km	65	35
Mojgarh	80 km	75	25

CONTRIBUTION OF FOREST DEPARTMENT IN DEVELOPMENT OF CHOLISTAN

Grass, shrubs, fodder trees and other vegetation are the most important for the livestock of Cholistan as they constitute the major portion of their feed. The Cholistani pastoralists rely solely upon deserts vegetation for their livestock fodder. The role of Punjab Forest Department cannot be overlooked and all the respondents acknowledged as the Department reseed grass species on the vast area every year. The Forest Department is playing a vital role in development of pastoralists by digging and desilting of tobas, by dry afforestation and providing advisory services to the pastoralists, regarding grazing systems and livestock health (Table 11).

Table 11: Contribution of Forest Department in Development of Cholistan.

Works Done By Forest Department	Number of Respondents
Reseeding of Grasses	90
Disilting of Toba	70
Dry Afforestation	34
Digging of Toba	58
Advisory Services	90

TYPE OF ASSISTANCE REQUIRED BY RESPONDENTS

Although the financial status of the respondents is very weak but majority of the respondents hesitate in getting capital as loan. All the respondents were in demand of water, veterinary care, proper markets for selling their livestock, animal production advices for getting maximum production and good/pure breeds of livestock for uplifting their socio-economic conditions (Table 12).

Table 12: Type of assistance required by respondents.

Sr. No	Type Of Assistance	Number of Respondents
i)	Capital	10
ii)	Water Resource	90
iii)	Seed for Domestic Fodder	0
iv)	Veterinary Care	90
v)	Market to Sell Livestock	90
vi)	Animal Production Advice	90
vii)	Good Breeds	90
viii)	Others (salt points)	4

SUGGESTION FOR IMPROVEMENT OF TOBAS

The respondents were asked about the improvement of tobas and suggestions were taken from them. Out of total 90 respondents 74 suggested that reseeded of palatable grasses in catchment's area of tobas is necessary. Desilting of tobas is an important tool for storage of rain water in huge quantity and all respondents were viewed that it must be carried out on regular basis. Almost half of the respondents proposed the maintenance of slopes of tobas and afforestation around tobas and on strips. Pastoralists do not follow carrying capacity and only 12 respondents were in view that it must be followed (Table 13).

Table 13: Suggestion for Improvement of Tobas.

Sr.	Suggestion	
i)	Reseeding of grasses in Catchment area of tobas	74
ii)	Timely Disilting of Toba	90
iii)	Afforestation in Catchment area/patteries	42
iv)	Maintenance of slope of Toba	30
v)	Proper number of livestock	12

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