

## ARTICLE

# Portrayal of Camel Production in The Desert Ecosystem of Pakistan

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### ABSTRACT

Camel plays a pivotal role in the subsistence pastoral economy of diverse ecozones extending from Gobi Desert and India in central Asia to Somalia and Ethiopia in the horn of Africa. Camel has special attributes including its appearance and ability to survive in hot, harsh and versatile arid environments. Camel has fascinated mankind as it can tolerate many stresses like heat; scarcity of water; water with high salinity and shortage of feed. Camel can digest dry matter and coarse crude fiber better than any other ruminants. Among domestic animals, the dromedary is most important animal being survive in hot, arid and semi-arid regions and has potential to produce higher quality foods (meat and milk) under extreme environments at lower costs. Camel can tolerate solar radiations, higher temperatures and water scarcity. Camel consume those feed materials which remain un-utilized by other domestic animals, thus thrive well on sandy deserts with poor vegetation. Adaptation of Camelids in Pakistan is very well to their native environment as they are performing and well sustaining a life in hostile deserts. The dromedaries provide milk and meat to the pastorals and herders in those areas where the survival of other livestock species is very tough. So, camels equilibrate the food security chain in the deep deserts and provide nourishment to its keepers; proving it to be a good candidate of food security and sovereignty in the desert ecosystem.

## 1. Introduction

The potential of camel is well known as it provides meat, milk, hairs, wool and transportation to many people in the world. Millions of people are getting benefits from camels in different ecozones. It is the animal of arid, semi-arid, mountainous and especially desert areas where the survival and performance of other livestock species seems difficult<sup>[1]</sup>. Unique physiological characteristics aid the camel for this environment. It has food reservoir in the form of hump deposit on its back which

stores energy in terms of fat. The fatty hump provides energy during the drought conditions when there is shortage of food and water. Camel hump doesn't contain water as most of the people think; rather it has stored fat by which the camel can live off in the food scarcity period<sup>[2]</sup>.

Camel - an even toed ungulate has special defense system as it is fast runner and can go easily on sand, bite and spit on approaching when threatened by people<sup>[3]</sup>. Camel is versatile in its properties as it sustains life in adverse environment, eat and drink less, while no match regarding performance<sup>[4]</sup>. The popular notion of "ship of

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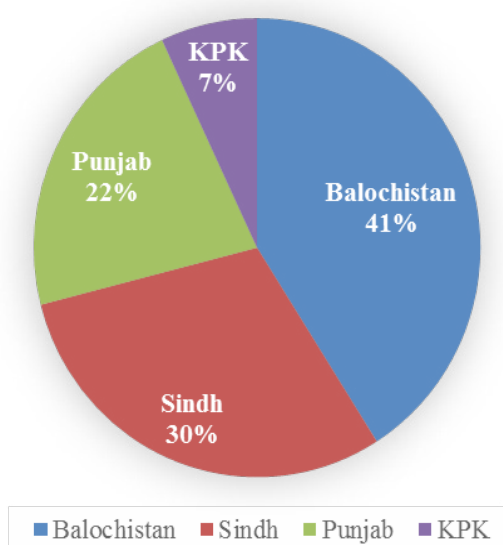
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the desert” about camel is now getting changed to a “food security animal”. Mainly two types of camels are found in the world; dromedary (*Camelus dromedarius*) with one hump, mostly found in Arabian deserts, Afghanistan, Iran, Central and South Asia [5]. The dromedary term is derived from “*dromos*” which is a Greek word used for road and applicable to racing and riding camel. The second is Bactrian (*Camelus bactrianus*); having two humps, from an area found in Central Asia, China and Russia while the name derived from a place “*Baktria*” on the river Oxus in northern Afghanistan from where it is considered to be originated [6].

## 2. Camel’s Population Distribution in Pakistan

Worldwide its population is 35 million and Pakistan ranks 8<sup>th</sup> among major camel raising countries [7] having 1.1 million camels [8]. Camels are found in the rangeland of Balochistan, coastal and deserted areas of Cholistan, Thal and Tharparker. In Pakistan, regarding province wise distribution of camels, the Balochistan has highest population of dromedaries as about 41%, Sindh has 30%, Punjab has 22% while Khyber Pakhtun Khwa (KPK) has 7% [9] (Figure 1). Pakistan has maximum population of dromedaries while few herds of Bactrian are also present in the northern areas. There are four ecological zones of camel production; viz: 1- sandy deserts including Thal & Cholistan in Punjab while Thar in Sindh; 2- Coastal mangroves including Badin, Thatta, and Karachi districts of Sindh; 3- Mountainous tracts of Balochistan, Dera Ghazi Khan of Punjab and Dera Ismail Khan of KPK; 4- Irrigated plains including all irrigated districts of Punjab and Sindh [10].



**Figure 1.** Quantitative distribution (%) of Pakistan whole camel population

## 3. Camels in Pakistan

Camels in Pakistan are performing very well in their native environment, in hot and harsh deserts. In the areas which have Extreme environmental conditions affecting the performance of other animals, the dromedaries proving its worth quite a nice way [11]. The unique attributes camel has gifted from God; enable him to thrive best in rough topography, poor vegetation, water scarcity and solar radiations [12].

Two types of camels are being found in Pakistan; 1- Mountainous camels which are also known as “Pahari” mostly found in north parts of Punjab and Balochistan. 2- Riverine camels native to the irrigated plains of Punjab and Sindh and commonly found in deserts. Up till now there are twenty breeds of camel documented in Pakistan [10] (Table-1).

**Table 1.** Camel Breeds in four provinces of Pakistan

Province	Camel Breeds
Punjab	Marecha (Mahra), Barela (Thalochi), Bagri (Booja), Mountainous (Cambelpuri) and Kalachitta
Balochistan	Brahvi, Kharani, Kachhi, Makrani, Lassi, Pishin and Rodbari
Sindh	Dhatti, Larri (Sindhi), Kharai, and Sakrai
KPK	Ghulmani, Gaddi, Khader and Maya

## 4. Camel Production Systems

There are three major camel production systems found in Pakistan; (1) Nomadic production system, (2) Transhumant production system, (3) Sedentary production system. These all production systems are associated with climatic conditions, plant phenology, topography and water availability; thus, clearly depicts the socio-economic importance of the camels in Pakistan. In Nomadic production system the camel rearing is mainly linked with the social life of the pastorals and camel herders. The nomads are constantly moving from place to place due to the reason of lack of forage for grazing/browsing of camels and the water shortage problems. They locate and found the place where the feed is available for some time and by vanishing the resource they move to next place. Almost 26% of the pastorals/camel herders follow this system in Pakistan. This production system is characterized by three basic features; 1- Seasonal and disaster migrations are obvious with main objective of survival, 2- Camel herds are diversified with sheep, goat and donkeys, 3- Sharing and loaning of camel herds are the routine activities practiced by these herders/nomads [10].

In transhumant production system there is shifting of the tillage operations in rain fed area during the rainy

seasons. Here in this system, the fundamental objective of availability of feed and water cause the migration of the herders. There are 23% camel herders which are involved in this system. Rest of the 50% camel herders are involved in sedentary production system which constitutes the major proportion of the household income. Women play major role in this system; they are not only involved in camel rearing but also play their important role in the value addition of byproducts, convert them into useful products, market them and put major share in home economy<sup>[10-11]</sup>.

## 5. Milk Production

Production in the traditional system is mainly geared to milk production. Male calves face a stiffer competition with the herders for their dam's milk than female calves. They are often allowed to one teat only or given access to dam's udder after milking. As a consequence pre-weaning survival is less and lower weaning weights are achieved. The basic factors in the growth of camel calves are availability of milk from dam and skilled management of calves. There is a severe competition between camel calves and farmer's family regarding the availability of milk. Male calves deprived of their due share of milk, that exhibit detrimental effects on their growth, leading to a downward trend in their meat production potential<sup>[12]</sup>. On the other hand, milk off take from dam with male calf is 80% and from dam with female calf is 30%, respectively. Approximately, 55% of the total milk production of camels is taken by the calf<sup>[5]</sup>. By minimizing this percentage camel milk yield can be increased. Weaning of calf could be the possible solution for these problems<sup>[12]</sup>.

Dairy potential of Pakistani dromedary camel is well known and these are exported to Gulf States for dairy purposes. Reported average lactation yield of Marecha she-camel is 4179 liters per year which is probably the best milk yielder in the world having longer lactation period as 270 to 540 days while its total milk yield ranges from 1300-4200 liters (Figure 2). Barela is also a best milk producing breed having prominent milk vein. In desert conditions and in the area of poor fodder production, its reported average yield is 8-12 liters per day. Some heavy breed camels produce up to 35 liters milk per day<sup>[13]</sup>. Author of present study has visually observed some specimen of Marecha camel in Thal Desert producing up to 25-35 liters milk per day. Camel can maintain its average milk yield for a long time (12-18 months, at least for one year) by the provision of adequate feed and water which is not possible in other domestic species. Frequency of milking is more in camels (up to 5-6 times a day). It is said that whenever a man needs milk from camel; he has to tie the camel legs and she will be ready for milking. Camel milk is rich source of vitamin C,

while concentration of protein, fat, minerals and vitamins is almost same like cow milk<sup>[14-16]</sup>. Camel milk is superior to the milk of other domestic species as it is rich in phosphorus concentrations. Camel milk has higher protective protein contents which perform an inhibitory action against certain bacteria thus has increased shelf life. It is easy to market camel milk with basic hygienic conditions even in the higher temperature<sup>[13]</sup>.

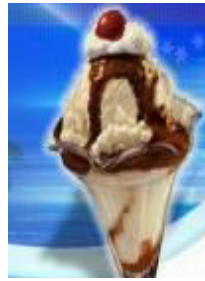


**Figure 2.** Marecha (Mahra) camels of Punjab, Pakistan



**Figure 3.** Barela (Thalochi) camel of Punjab, Pakistan

Camel farming could be practiced as commercial dairy farming in the areas of Thal and Thar Deserts and Cholistan rangelands. Camel milk is consumed as such and also with some value additions in Pakistan. Tea, yogurt, lassi (whey proteins) are also made from camel milk. Camel milk has different sensory characteristics. Pakistani camels qualify to be a good dairy animal as it has all prominent dairy features. By the adoption of modern husbandry practices; camel could be the valuable source for future food production especially in arid, semi-arid, mountainous and deserted areas. Average milk production per lactation of Pakistani camel is reported as 2920 kg with per day yield of 8 kg in extensive conditions<sup>[10]</sup> (Table 2).



Ice cream



Chocolate



Cheese



Yogurt



Flavoured milk

Figure 4. Camel milk by-products

Table 2. Camel milk production

Country	Milk yield (kg)	Lactation length (months)	Average milk yield (kg)
Pakistan	2920	16-18	8
India	2482	18	6.8
Somalia	1825	9-18	5
Tunisia	1460	9-16	4
Algeria	1460	9-16	4
Ethiopia	1825	12-18	5

## 6. Growth Rate

The growth (daily weight gain) of camel calves is excellent as other livestock species<sup>[17-19]</sup>. In provision of camel meat, mostly the old and spent camels are slaughtered in Pakistan. A very few numbers of castrated camels are used for fattening purpose. Camel is also slaughtered blissfully at Eid-ul-Azha by Muslims and that camels fetch a good price. Export opportunities are there, camel meat could be exported to Saudi Arabia, Gulf States, Egypt and Libya. In Pakistan 100-200 camels are slaughtered daily in different slaughter houses at meat day. Meat of camel is consumed as fresh, in minced form and also in barbeques and sausages. The taste of camel meat is very similar to beef. The amount of minerals, protein and ash is the same as that of beef, but camel meat contains less lipids (1.2-1.8% versus 4.0-8%) and high water contents (5-8% more) than that of beef. Dressing percentage of camel ranges from 45-55% (exceptionally 60% in some animals). Average slaughter weight is 400-660 kg and growth rate are 0.3-1.0 kg from birth to 1 year of age<sup>[2]</sup>.

## 7. Camel by-products

Hair production is another valuable aspect of camel production; an adult and mature camel can produce 1 to 3 kg hairs per annum which are used for different purposes like making of ropes, mats, bags, blankets and carpets. Its first shorn especially in new born calves produces some fine wool which is used in blankets industry<sup>[2]</sup>. Saddles and shoes are made from its hides. The usual price of its hide is PKR 2000 to 5000. Camel plays an indispensable role in the socio-economics of people in arid, semi-arid and marginal regions of the world. Camel has a significant contribution to the livelihood of pastoral community which doesn't have any alternate mode of production system. Despite of the fact; the camel has been remaining a neglected specie by the scientists/development workers and very few attempts have been made so far to characterize its production potential and related parameters under natural habitat. While in extensive/traditional management system the camel production traits are very

low so the traditional camel husbandry has no future<sup>[17-18]</sup>. Camel husbandry system is in a state of constant flux as the pastoralists are deviating/shifting from their traditional management system to semi-intensive and intensive management system. This rapidly changing scenario needs overall evaluation and there is an urgent need to undertake multi-disciplinary studies<sup>[19-21]</sup>. Recently the intensive studies have been taken in Pakistan regarding the growth performance of camel calves in different management systems and the reported range of average daily gain in Marecha camel calves is 0.4 to 1 kg, so it proves camel a good candidate for feedlot as well<sup>[22-23]</sup>.



Lamps



Bags



Shoes



Hides, Leather

**Figure 5.** Camel by-products

## 8. Conclusions

Growing needs and emerging awareness has changed the notion of “Ship of the desert” to “food security animal” - Pakistan is not exception to this. Camel is of prime position in this regard as it meets the milk and meat demands of pastorals and people of arid, semi-arid and deserted areas. Camels in Pakistan are very productive and the potential in terms of milk and meat is well recognized now. But unfortunately, a little importance has been given to camel by the policy makers, scientists, development workers and coworkers. Is it a useless and unproductive animal, if it is so, its population would be diminished gradually but it's the other way round. Pakistan has a sizeable population and the dairy camels are exported to the Gulf countries for milk production then why these can't be harvested in Pakistan. Resurgence of special interest has to be given in this regard. We have to evaluate the production potential of the Pakistani camels and to build a country's data base for future studies in terms of production. Author of current study with his co-workers have evaluated and validated the results about the meat and milk production of camels in Pakistan under various management systems, which will show up the facts about the production potential of Camelids in Pakistan. This will pave a way for further investigations in camel science and aid to the overall scenario.

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