



## A review on several important aspects of the camels

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### ABSTRACT

The present study was conducted to gather the information regarding habitat, population, management, production and economic analysis of the camels worldwide. The main findings of review showed camel population around 25.89 million worldwide in almost 47 countries. Majority of camel herders were reported un-educated. Researchers further indicated that camels generally are reared under sedentary (50%), transhumant (25%), nomadic (15%) and household (10%) management systems. Age of camel farmers ranges from 25 to 50 years. The female ratio markedly remains higher than males and young ones because the females are generally used for milk production. However the males are mostly used to carry the luggage, carrying load pulling cart etc. It was also stated by scientists that camels are mostly allowed for open grazing of natural vegetations. Breeding is practiced by natural method and the camel spend 20 to 30 minutes for matting. The female camels reach at the puberty age in 3-5 years, while male at 3.5 to 5.5 years. The duration of estrus cycle in camels vary from 16 to 22 days. Breeding period of camels remain between November and March. The average hair production of camels is 1.63 kg, average daily milk production 6.40 liter. Male have carrying capacity of 553 kg. In conclusion the husbandry practices of camel farming worldwide are based on old traditional methods, however the scientific farming rarely exists. There is no extension services available for the herders to motivate, educate and aware them modern management practices. Market infrastructure, as per study review, is not well established. Mostly the camel herder sale out their animals to middlemen due to long market distances.

### Introduction

Camel is multipurpose animal that tolerates its life in the harsh and hot atmosphere, even in that environment it implements very well therefore it is known as ship of desert. Furthermore, the camel provide meat, milk, hairs, hides and transport facilities. In the nomadic system milking is not regularly organized because they collect it according to the need of utilization (Asim *et al.*, 2013). The people of Somalia also practice this type of milking behaviors. In semi intensive system there are two times of milking per day adopted regularly. Commonly the export laborers are hired for the husbandry practices and regular milking of the camels (Babiker and ElZubeir, 2014). There are three major production system of camel in Pakistan i.e sedentary, transhumant and nomadic. Furthermore, the existing system is directly associated with the socio-economic importance of

camel herders. These production system are mostly examined by the environmental condition, land consistency, vegetation resources and availability of water. Extensive husbandry of the camels are generally characterized in the nomadic system (Yaqoob and Nawaz, 2007).

Camel herds are expanded in nomadic production system by goat, sheep, and donkey, while seasonal and disaster migration are noticeable for their basic objective of survival. During the rainy season in transhumant system fluctuating of ploughing operations into the rain fed areas (Abdlatif *et al.*, 2013). The herds migration is also primary strategy for survival through different types of movements will occurred i.e. seasonal, short distance and long distant disaster migration. The she camel of good health and having a proper nutrition may produce 15-20 liters milk per day (Nagy and Juhasz, 2010). More milk yield is obtained from she camels when the

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calving interval is increased, because unlike dairy cows, lactation and pregnancy can't overlap to this animal, while the milk production will be decline by decreasing calving interval. Camel can survive for longer periods without drinking and can replenish the loss in a very short time as compared to other kinds of livestock (Farah *et al.*, 2004). In most areas of the country the camel is reflected as prominent symbol. Few researches have been accomplished regarding with nutrition, physiology, reproduction and health of camel. In a single lactation period (250-500 days) the milk yield of she camels range from 900-4100 liters of milk. The camels' milk produced annually in Pakistan about 798.000 tons (Ali *et al.*, 2009). However production potential of the camel has been given much lesser attention. The current review was planned to evaluate interesting facts about camels worldwide.

### Characteristics and Habitat of Camel

The most prominent physiological characteristics of this animal is having distinguishing hump on its back which is made up of fat deposition. Single humped camels are inherent mostly at dry deserted areas of the west Asia, while double humped camel are native to the Gobi desert, central and east Asia. It has ability to expand their toes of feet which provide support to make balance for stood up even upon top of the sand. The camel store their surplus energy into the hump and utilized it at the time when the availability of food and water is impossible, especially when moving into the desert areas for longer journey. During the sand storm in the desert areas it can close its nostrils and it also possess self-defense mechanism i.e. fast running when threatened, it will spits foul smelling liquid upon them (Qureshi, 1986). The Camels were domesticated animals by the nomads for the meat, milk and transport purposes. However the camel has great impact upon culture on the special occasions into the Muslim countries. Mostly the people of gulf countries purchased dromedaries camel from the North East Asia and Mediterranean sea. Progressively the dromedary camel referred as fattening animal even in extremely severe environment, sandy arid and Mountainous dessert (Ahmad *et al.*, 2010). In the desert areas of countries the camel meat is widely used as a special dish in large wedding ceremonies and also served to highly respected guests. Camel is also becoming increasingly popular sacrificial animal at the occasion of Eid-ul-Azha (Khan *et al.*, 2003).

### Camel Population

Globally the population figure of camels vary from source to source, its population may be around 25.89 million worldwide in almost 47 countries. The Indian NRCC Bakinar research center reported 19.31 million camels, further it was recorded that 15.13 million camels found in Africa while 4.17 million in Asia. According to the above mentioned camels' population the following countries were ranked as a first Somalia country which has camel population 6.2 million, second Sudan which has 3.2 million, third Mauritania 1.2 million, fourth is Ethiopia 1.07 million and fifth is India 1.03 million (NRCC, 2007).

In another research it was recorded that 18.58 millions of camel were found worldwide, from that population, 13.62 million found in Africa, while the 4.76 million in Asia and 0.2 million camels were found in Australia. Globally Pakistan has 8<sup>th</sup> rank among the major camel rearing countries which has 1.2 million camel population (Afzal, 2006). More than one million of camel population was recorded in Pakistan which producing almost 0.6 million ton of camel milk annually. Baluchistan has the highest population of one humped camel 41% followed by 30% in Sindh, 22% in Punjab and 7% in KPK Province. There is highest number of one humped camel in this country, while some few herds of double humped camel are also found in the northern areas. Ecologically the camel population is randomly spread into four different zone of Pakistan i.e. sandy desert, costal mangroves, mountainous tracts and irrigated plains (Kakar *et al.*, 2008).

### Camel Management

Camel under traditional management practices produce more milk as compare to other types of domestic animals reared in the same environment. The camel contribution for the welfare of people in the developed countries covered by numerous factors that undervalue the real worth of their products. Firstly the estimated population of camel were usually incorrect due to the lack of camel population census regularly and secondly rare number of its products finally reach at the market for sale out, so its share into the national economy is declined (Njiru, 1993). It has not given proper attention by the government and herders in term of their management improvement from many years. In the nomadic system milking is not regularly organized because herders collect the milk according to the need of utilization. The people of Somalia also practice this type of milking behaviors (Mehari, 2007). The people of nomads made special meal

from camel milk and also prepare some greeses, and served to their special guests in a fresh state and also it was effective against sick and weak calves (Suliman *et al.*, 2014). Moreover they also supply their surplus milk to their neighbors which does not have sufficient milk for their family needs and also offered free to those people though had need for the medicinal purpose. Generally the milk of this animal is mostly consumed to fulfill the household necessities in the nomadic societies. In semi intensive system there are two times of milking per day adopted regularly. Commonly the export laborers are hired for the husbandry practices and regular milking of the camels (Zubeir and Nour, 2006).

In another study it was stated that more than half of the camel herders were milking their camels two times in a day (7 am and 4 pm), while some herders milked their animals three times and four times in a day depending upon the quantity of milk and feed availability (Dioli *et al.*, 1992). This is only single animal which has been neglected from long time in the field of scientific research, even it is also food producing animal of livestock family. The major cause of its negligence is because they were mainly present at the semi-arid, arid and tropical region of Asia and Africa, malnutrition and management problems are basic issues (Sohail, 1983). Few others reported that the daily weight gain of camel calves at Barani livestock production research institute (BLRPI) Kherimorat is 0.75kg and 0.82kg weight gain of calves at the private farm. It may be due to the extra supplement concentrate and attention given to the animals as well as calves by the private farmers (Iqbal *et al.*, 2001).



**Figure 1.** Adult camel and calves feeding the natural vegetations

The feeding behavior of camel in Raya-Azebo district was mostly browsing at distant fields. In that environment, the camels were mostly reared on range land areas (92.5%). Only few herders (22.5%) use to purchase feed for their animals, although they also

give them mineral salts as supplementary feed (69.1%) at home or resting sites in the field, particularly in the dry season when camels were fed only on succulent feed during wet season of the year (Figure 1). Un-herded and migratory form of the herders was reported to be common during the dry season. In these findings, it was observed that camels were move freely to the range land moving from one place to the other without restrictions during the dry season in areas of northern Kenya. The rock salt and atron (source of calcium) is also supplied to their camels by the nomadic herders of Sudan. The salt and atron are also mixed with pure water after completely dissolving, it is offered to the camels. An atron has ability to build massive and compact muscle to enhance its strength for movements to longer distance (Musa *et al.*, 2006).

In another research, scientists observed the socio-economic situation of camel's herders. They were found that almost more than half camel farmers were 27-50 years old and most of the respondents were illiterate (33%). Whenever 57.5% camel herders were only reared, whereas 85.24% possessed their camel stock through inheritance. It was reported that in the study area camel diseases were (61.7%) infectious (Bacterial, viral, protozoal and fungal diseases) followed by plant intoxication (27.5%) and parasitic disease (10.8%), where mostly diseases were reported to occur in the dry season of the year (75.0%) (Mansour and Faye, 2016). Although there was no problem of veterinarians in the study area, most of the camel owners used to treatment their animals by using traditional medicine. Moreover, prophylactic treatment (39.4%) was the dominant means of controlling infectious diseases of camels, while deworming (85.8%) was the dominant means of controlling parasitic diseases (Tura *et al.*, 2010). In another study it was revealed that three major production systems of camel are there in Pakistan i.e. sedentary, transhumant and nomadic (Figure 2). Furthermore, the existing system is directly associated with the socio-economic importance of camel herders (Asim *et al.*, 2013).



**Figure 2.** Camels reared under nomadic production system

These production systems are mostly examined by the environmental condition, land consistency, vegetation resources and availability of water. Extensive husbandry of the camels are generally characterized in the nomadic system. The basic reason for the moving from one region to another region is the shortage of forages for grazing and deficient water availability and in Pakistan 26% of camel farmers follow this type of production pattern (Ahmad et al., 2010). Camel herds are expanded in nomadic production system by goat, sheep, donkey and seasonal and disaster migration are noticeable for their basic objective of survival. Respectively sharing and allowing of camel herds are usual activities performed by these nomads. The herds' migration is also primary strategy for survival through which different types of movements occur i.e. seasonal, short distance and long distant disaster migration (Iqbal, 2010).

### Camel Production

In Pakistan 23% of camel farmers are involved in transhumant system. Relating to sedentary system there is about 50% of people are involved in this production system which creates maximum share of income for their household needs. Women plays major role in sedentary system because they are not only engaged in rearing of camels but also convert byproducts into valuable commodity and finally market them for the additional income. Generally the number of animals reared by the herders is significantly important for the worthy status of man in the nomadic society. It has substantial contribution as a primary source of food in that community (Younas and Iqbal, 2001). Globally increased production of meat, fiber and hide from 353, 21 and 353, 28 thousand tons was noticed, while milk production globally increased from 4.8 to 5.1 million tons. More milk yield is obtained from she camels when the calving interval is increased, because unlike

dairy cows, lactation and pregnancy can't overlap to this animal, while the milk production was declined by decreasing calving interval due to early conception (FAO, 2003). The basic principle products of this animal are milk and meat (Figure 3).



**Figure 3.** Milking of camels

The meat demand of this animal among the people is going to be increasing, which mainly comes from the older female and male though are served usefully in early life for different purposes. Only small number of castrated males are raised for sale out on special religious festival i.e Eid-ul-Azha. In Pakistan camel meat is produced annually about 50000 tones that has valued Rs. 250 million. The meat marketing channels of this animal is not well developed except in Sudan, but profitable opportunities of export are available in the Egypt, Saudi Arabia, Libya and Gulf States. The camel meat is graded better from the beef because of delicious taste into the Gulf States. Outside from Gulf States the meat of young one camel has been scored as a prime beef according to the taste (Farah et al., 2007).

Camel milk is nutritious source of food for the people of urban as well as remote areas of the country. Peoples in many countries of the world are widely consuming camel milk especially in the arid and semi-arid zones for its nutritional value and medicinal properties (Mal and Pathak, 2010). It is beneficial for a good health because it contains certain type of proteins and enzymes viz lactoferrin, lactoperoxidase, lysozyme and other antibacterial and antiviral proteins that provide ameliorative effect, which make it more superior over cow milk. However economically the camel milk has somehow low importance for the income of nomads, because almost completely it is utilized by the nomads. However, due to the awareness of medicinal and nutritional importance of camel milk especially the urban people of Sudan country, market demand of the camel milk products is increasing (Afifi, 2010). The milk of she camel possess anti-carcinogenic property, act as protective effect against cisplatin-induced nephrotoxicity, reduce allergic reactions and also effective against the diabetic patients. There is

increased number of unsaturated fatty acids into the camel milk which make it more superior as compared to other animals' milk (Shabo *et al.*, 2005; Konuspayeva *et al.*, 2008). The minimum quantity of  $\beta$ -lacto globulin and  $\beta$ -casein are directly linked to reduce the allergic response due to the utilization of milk of camel. As compare to other ruminants' milk, camel milk is somewhat different because it possess less quantity of cholesterol, less sugar more minerals (Na, K, Fe, Cu, Zi and Mg), greater number of vitamins, less protein and more insulin concentration. Furthermore, this milk has many advantages because it can be utilized by those persons who have deficiency of lactase enzyme and having weak immune system (Konuspayeva *et al.*, 2007).

### Camel Reproduction

The female of dromedary camels are known as induced ovulators where coitus, so far is believed to be the main cause for ovulation to occur. The reproduction system of camel is different from other domestic animals because during the specific season of breeding both male and female come to close for mating that's why it is called as a seasonal breeder animal (El-Hassanein *et al.*, 2010). Usually this period is started from the month of November and up to the march. Especially in that season the male which is used for breeding is known as a Thoot, Rutt or Musth (Figure 4). The female camel become mature at an average age of 3-4 years and the male camel become mature at an average age of 4-5 year (Khanvilkar *et al.*, 2009). In breeding season dromedary bulls increase walking and anxiety, becoming very aggressive towards other males and people. Due to this aggressiveness, rutting camels are usually tied with tight ropes and kept singly in the pens or boxes and their handling is considered to be very difficult in that period (Abu-Zidan *et al.*, 2012). It is only single domestic animal which copulates in sitting position. Usually the breeding were completed within one hour, whereas about 10-20 minutes are required for the copulation of camel with 3-4 times of ejaculation (Al-Hazmi *et al.*, 2012).

Commonly a single male camel can serve the number of 20-50 female during one breeding season. In single breeding season the male camel does not allow to service more than 50 she camels. The duration of estrus cycle varies from 16-22 days, while the heat duration is 3-4 days. Mostly in summer season the camel does not come into heat. When the mating of male and female is completed the grunting sound will be producing from both sex after mating.

After 15-25 days, if she camel is pregnant then erect her tail when the male camel wants to approach it for copulation and also same type of response given to their owner or attendant. If she is not pregnant then erection of her tail is not observed (Rathore, 1986). Majority of the breeding males (45.8%) of the study district were from unknown sources, particularly during the dry seasons because in the dry season un herded and migratory types of grazing are the most commonly practiced activities in the study area giving a high chance for accidental mating with unknown breeding males.



**Figure 4.** Musth camel ready for the breeding

While significant proportions of herd owners use a well-known breeder male of their own (41.7%) and from their neighboring households (12.5%). This in fact has led to a controlled type of mating to be practiced by most of the household owners (62.5%) in the study area. Breeder males were mainly selected upon the based on their body sizes (55.8%) and skin colors (42.5%). Few others have reported that a considerable control of breeding males is commonly practiced by all of the Somali herd owners and the best breeding males have been selected upon following parameters i.e physical strength, appearance behavior, skin color, height and ancestors characteristics such as milk production, color and resistance (Simenew *et al.*, 2013).

### Economic Importance of Camel

Generally the production of camel milk is mostly in far-off places i.e. deserted and mountainous areas, where it could not be possible to supply the urban markets for commercial purposes. But in rare cases when the demand of milk in market is increased from usually supply in that condition the milk of camel is also mixed with cow and buffalo milk and sold to the urban markets to fulfill the need of human

consumption (Mayouf *et al.*, 2014). The pasteurized milk of camel could be sold in some foreign countries i.e. UAE, Kazakhstan, Saudi Arabia and Mauritania. Camel milk possess optimum amount of fat, minerals, protein and vitamins, mostly ascorbic acid (Vitamin C). The quantity of phosphorus in this milk is greater that's why it is more superior milk from other species of domestic animals (Raziq, 2009). This animal play major role in the socio-economic life and support millions of peoples for their survival and income in dry arid zone of Africa and Asia. It is best source of nourishment for the peoples of pastorals areas throughout the years. This animal proved that it is fit domestic animal even in drought and harsh period. This animal not only survive in severe condition but also keep the process of production and reproduction continued (Wardah, 1989).

In Muslim countries like Pakistan there are about 70-75 camels slaughtered daily, except on meatless days at different slaughter houses. The camel meat is used in barbeques and sausages in a fresh state or minced form and it has similar taste to the beef meat. The dressing percentage of camel meat ranges from 45-55% and in some cases it may be up to the 60% and the average weight of camel at the time of slaughter is 395-660kg and growth rate from birth to one year of age is about 0.3-1.0kg (Khan *et al.*, 2012). The livestock sector is most important sub sector of agriculture in Pakistan which contributes about 58% and its share is 11.6% in the GDP of Pakistan. The earning from foreign exchange of this sector commodities is going to be increased from 53 billion rupees in 2007-8. Due to important of this sector in Pakistan almost 30-35 million people of rural population is engaged with this sector and originates about 30-40% of their household income either directly or indirectly (Raziq *et al.*, 2010).

In another research it was found that camels have great importance in agriculture as well as industrialized world because it is cheap source of power for ploughing, drawing water from wells, leveling of land, working for oil extraction in mini mills (from oil seeds), grinding wheat, corn and other different grains, sugarcane crushing and pulling carts of transportation of goods as well as people (Simenew *et al.*, 2013). An average about 1-3kg hair can be produced by a single mature camel per year that is used for buildup bags, mats, ropes, carpets and blankets. A well trained and racing camel may fetched up to 150000 to 200000 rupees, while she camel with good milking may fetch on averaged 120000 rupees. The fattening camel may be sold on averaged 100000 to 150000 rupees and those animals which are sold at

the time of religious festival occasion of Eid-ul-Azha ranges from 100000 to 3000000. Most commonly this animal is slaughtered weekly particularly on Friday at different marketing places of urban communities, where people come to purchase meat of camel from distant places. There are so many important objectives of this useful animal such as transport of fuel, woods, salt, agriculture commodities and household goods, where the other mechanical vehicles are not possible to move due to uneven infrastructure of roads, desert and mountainous areas. Furthermore it carries easily 300kg load up to 30 km at the distant places. It can do massive help to those people which are directly engaged in its rearing for the improvement of their livelihoods. On comparison of this animal to other ruminants, there is lower death rate observed into adult camels even in severe adverse condition (Magjeed, 2005).

### Conclusion and Recommendations

On the basis of findings obtained from the detailed review it could be concluded that the husbandry practices of camel farming throughout the world are based on old traditional methods. The scientific farming does not exist and there is no any extension services are available for the camel herders motivating and educate and aware them about the new modern technologies. Market infrastructure in the study area is not well established. Mostly the camel herders sale out their animals to middlemen due to long market distance and that middlemen get more benefit from camel herders due to lack of nearest market facility. The price of camel vary according to its category i.e trained racing camel, she camel with good milking, young one of 1-2 years and extraordinary camels.

According to existing data it is suggested that farmers should be advised to rear the scientifically proven camel breeds in order to obtain better milk production. The milk production of poor breeds should be improved using better breeding plan feeding, and management practices. Further, camel herders should be educated for improving management practices and marketing of camel in their respective region. Marketing facility should be established in the areas where the population of camel is in majority. Trainings and awareness programs should be arranged to train and aware the camel herders regarding the proper management, housing, feeding and breeding program for better camel production.

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