

Unit

1



Introduction to Dairy Farming

INTRODUCTION

Dairy farming has been an important part of the agricultural scenario for thousands of years. India being a predominantly agrarian economy has about 70 per cent of its population living in villages, where livestock play a crucial role in the socio-economic life. Livestock provide high-quality foods such as milk, cheese, butter, ghee, etc. India is not only one of the top producers of milk in the world, but also the largest consumer of milk and milk products in the world. Due to the shortfall in supply, we have to import significant amounts of milk products to meet internal demand.

Agriculture and animal husbandry have a symbiotic relationship, in which the agricultural sector provides feed and fodder for the livestock and animals provide milk, manure and draught power for various agricultural operations. Dairy sector is instrumental in bringing socio-economic transformation in India. It has created a lot of employment opportunities and also provides improved nutritional benefits.

Animal husbandry is a major sub-sector of agriculture sector and contributes about 28.6 per cent to the agricultural value output (*Annual Report 2017–18, Department of Animal Husbandry, Dairying and Fisheries, Government of India*). The growth rate of 6.27

per cent and 6.37 per cent during 2015–16 and 2016–17, respectively in the livestock sub-sector is much faster than the overall 0.7 per cent and 4.9 per cent growth rate of agriculture and allied sector during the same period (*Economic Survey*, 2016–17). The statistics indicate that there is a lot of employment potential for entrepreneurial activities in the dairy sector. This Unit discusses the scope of dairy sector in the Indian context.

SESSION 1: DAIRY FARMING IN INDIA

Importance of dairy farming

Milk is a wholesome food among all the animal products. It contains in proper proportions the various essential food ingredients required by human body in an easily digestible form. Inclusion of milk in the human diet increases the digestibility of other types of food as well.

The productivity of milk varies in different countries, as some countries are surplus in production, some are deficit in production, and in some of the countries, availability matches their requirement.

The annual milk production in India in 2015–16 was 155.5 million tonnes and the per capita availability of milk was 337 grams per day.

In India, milk is produced by a vast number of small, medium and large-sized farms. There is exponential growth in the number of the commercial dairy farms in the urban and semi-urban areas of the metros and big cities.

It is clear from Fig.1.1 that 49 per cent of milk production comes from buffaloes, followed by 27 per cent, 21 per cent and 3 per cent from crossbred and exotic cows, indigenous cows and goats, respectively. Small quantity of milk is also procured from camel, sheep and yak. Uttar Pradesh is the largest milk producer in India, followed by Rajasthan. The per capita availability of milk is highest in Punjab, followed by Haryana (Basic Animal Husbandry Statistics, Government of India, 2017). It is interesting to note that in 2016–17, the per

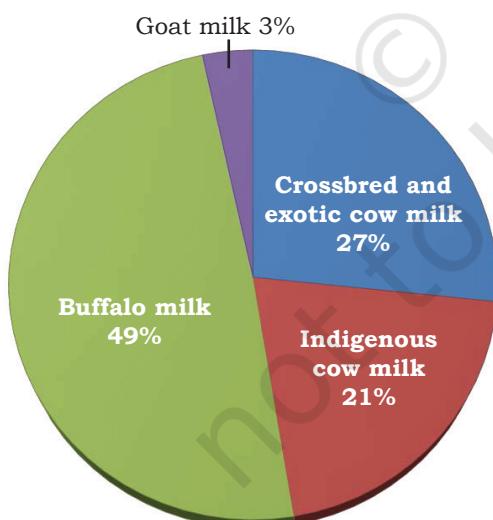


Fig. 1.1: Milk production from dairy animals in India



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capita availability of milk was highest in Punjab at 1075 grams, followed by Haryana at 930 grams, whereas Delhi recorded a dismal 35 grams.

The demand for milk is constantly increasing in cities as well as small towns and rural areas. The factors influencing this increased demand are — rapid increase in population, spread of education, growing nutritional awareness and improved purchasing power of consumers.

Dairy farming in India has evolved from just an agrarian way of life to a professionally managed industry. A large number of rural families in India are engaged in dairy production, for whom this is an important source of secondary income.

In India, raw milk is perceived to be fresh by most consumers and has a large market. Conventional dietary habits in India account for about 60 per cent of milk consumption in liquid form, and the remaining in the form of ghee, cheese, curd, paneer, ice cream, dairy whiteners and traditional sweets.

Dairying provides a source of daily income with a relatively low level of risk. Most of the dairy farmers in India raise animals at a small scale in traditional ways. The productivity of these farmers can be enhanced if they run their business in a scientific manner. Most of such farmers are not aware of the modern methods of dairy farming. As a result, some farmers lose their investment instead of making profit. To ensure maximum production and profits from dairy farming, it is essential that these farmers adopt proper business plans and good dairy management practices.

Nearly 43 per cent of Indian farmers are small cultivators, and about 26 per cent are agricultural labourers who have one or two milch animals (Planning Commission, GOI, 2009). This indicates that dairy sector provides basic sustenance for small farmers, landless people and agricultural labourers, especially for people in draught affected areas in Rajasthan and Gujarat.

Employment potential in dairying

India's share in the world milk trade is quite low, and compared to the total milk produced, only small quantity



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of it is processed. In the informal sector, milk vendors collect milk from local producers and sell it in urban and semi-urban areas. These milk vendors handle around 65–70 per cent of the total milk production.

The increase in human population has a direct effect on the demand for food. However, globally there is shrinkage of cultivable lands, which makes the role of livestock sector even more important, not only in terms of nutritional security but also employment generation.

The Agricultural and Processed Food Products Export Development Authority (APEDA) is the regulator for import and export of dairy products in India. Indian milk desserts are quite popular with many communities, including the Indians settled abroad. A good example of this is the *rasgulla*, which has earned a place of honour as a sweet meat worldwide. It is clear that the demand for such products is expected to increase in future, thereby boosting the potential for export. Considering the production economics of dairy products globally, countries which have low cost of milk production such as India are expected to derive maximum benefit from the booming dairy upsurge. Thus, from the emerging scenario in the dairy sector, nationally as well as internationally, it is evident that a lot of employment generation and potential for entrepreneurial activities exist in the dairy sector.

Practical Exercise

Activity 1: Evaluate the potential for employment in dairy farming in India.

Material required

Computer, Internet

Procedure

1. Collect data from the site of animal husbandry and labour ministry (<http://dahd.nic.in>; <http://labour.gov.in>).
2. Note down the number of people involved in dairy sector during the last 20 years.
3. Evaluate the data, and calculate the increase in the number of persons involved in the dairy sector.



Check Your Progress

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A. Multiple choice questions

1. APEDA regulates _____.
(a) import of milk products (b) export of milk products
(c) Both (a) and (b) (d) None of these
2. Majority of milk produced in India is handled by _____.
(a) cooperatives
(b) private milk vendors
(c) government agencies
(d) big milk processing companies
3. Which state produces maximum quantity of milk in India?
(a) Uttar Pradesh (b) Madhya Pradesh
(c) Punjab (d) Haryana
4. Which of the following states has the highest per capita milk availability?
(a) Uttar Pradesh (b) Madhya Pradesh
(c) Punjab (d) Haryana
5. The contribution of buffalo milk to the total milk production in India is about _____.
(a) 25 per cent (b) 49 per cent
(c) more than 60 per cent (d) None of these

B. Fill in the blanks

1. Per capita milk availability in India in the year 2015–16 was _____.
2. The share of goat milk in the total milk production in India is about _____ per cent.
3. The livestock sector contributes significantly in terms of nutritional security and _____.

C. Mark true or false

1. In India, the maximum quantity of milk is sold to the market in the form of milk products.
2. Per capita milk availability in India is 100 grams.
3. Dairy provides seasonal income to the farmers in India.
4. India is the biggest consumer of dairy products in the world.
5. A majority of dairy farmers in India raise animals on a small scale.



SESSION 2: IMPORTANT BREEDS OF CATTLE

A breed is a sufficiently large group of animals evolved by human efforts through the principles of breeding over the past several centuries. The controlled rearing of domestic animals to improve their desirable qualities is called animal breeding. Some of the major techniques of animal breeding are selective breeding and cross-breeding. The members of a breed have a common ancestry and possess similar physiological and economic characteristics that are inherited in that breed. In India, a number of indigenous (*desi*) cattle breeds as well as crossbred cattle are engaged in milk production (Table 1.1). Crossbred cattle are developed by crossing the indigenous (*Bos indicus*) and exotic cattle (*Bos taurus*) breeds. Exotic dairy cattle breeds originated in different climatic conditions and have higher milk production potential, but these breeds are not well adapted to the Indian climatic conditions.

In India, large percentage of cattle population is mainly reared for milk and draught/draft purposes. Only about 22–25 per cent of the cattle population is classified as breed and rest is considered as non-descript. One of the interesting characteristics of indigenous cattle is the presence of hump. Based on the utility, cattle breeds are classified as milch purpose breed, dual purpose breed and draft purpose breed. There are 41 well-known registered indigenous cattle breeds in India, some of which are of milch type, such as Gir, Haryana, Sahiwal, Red Sindhi and Tharparkar (Table 1.2).

Table 1.1: Indigenous cattle breeds of economic importance

Breed	Other names	Habitat	Colour	Distinguishing characteristics	Utility
Gir	Kathiawari, Surti, Desan	Kathiawar region of Gujarat	Red with black hue. A few white spots are also found in some cows.	The dewlap is big and thick. The hump is well developed. The limbs are widely placed but are not so muscular.	Cows are good milkers. Bullocks are heavy and powerful animals, but are medium paced in movement.



Hariana		Haryana, Western U.P. and Eastern Rajasthan	White or light grey	Pole on the top of forehead. Long narrow face and flat forehead. The short curved horns emerge from the outer angle of pole. Ears are sharp and small. Dewlap is small, and the udder is well formed.	Bullocks are good draught animals particularly for fast ploughing and road transport. Cows are good milkers.
Sahiwal	Montgomery, Multani, Lola	Montgomery district of Pakistan	Reddish or pale red and sometimes with white patches	The forehead is broad with bright eyes and blunt thick horns. The hind quarters are well developed.	Bullocks are used both for ploughing and for carting. Cows are good milkers.
Red Sindhi	Sindhi	Karachi and Hyderabad regions of Pakistan	Deep dark red	A white mark on the forehead is present. Well-proportioned head with moderate size. Thick horns emerging laterally. Rounded drooping quarters, well-developed hump, dewlap and milk veins.	Cows are very good milkers. Bullocks are used for heavy load on roads.
Tharparkar	Thari	Marwar region in Rajasthan and Gujarat	White or light grey	Animals have short straight and strong limbs. They have moderately long face with broad pole and slightly bulging forehead. Males give a general impression of virility. Horns are of medium size. In young animals, particularly, there is a white or light grey line along the spine.	Bullocks are used for ploughing and carting. Cows are very good milkers.



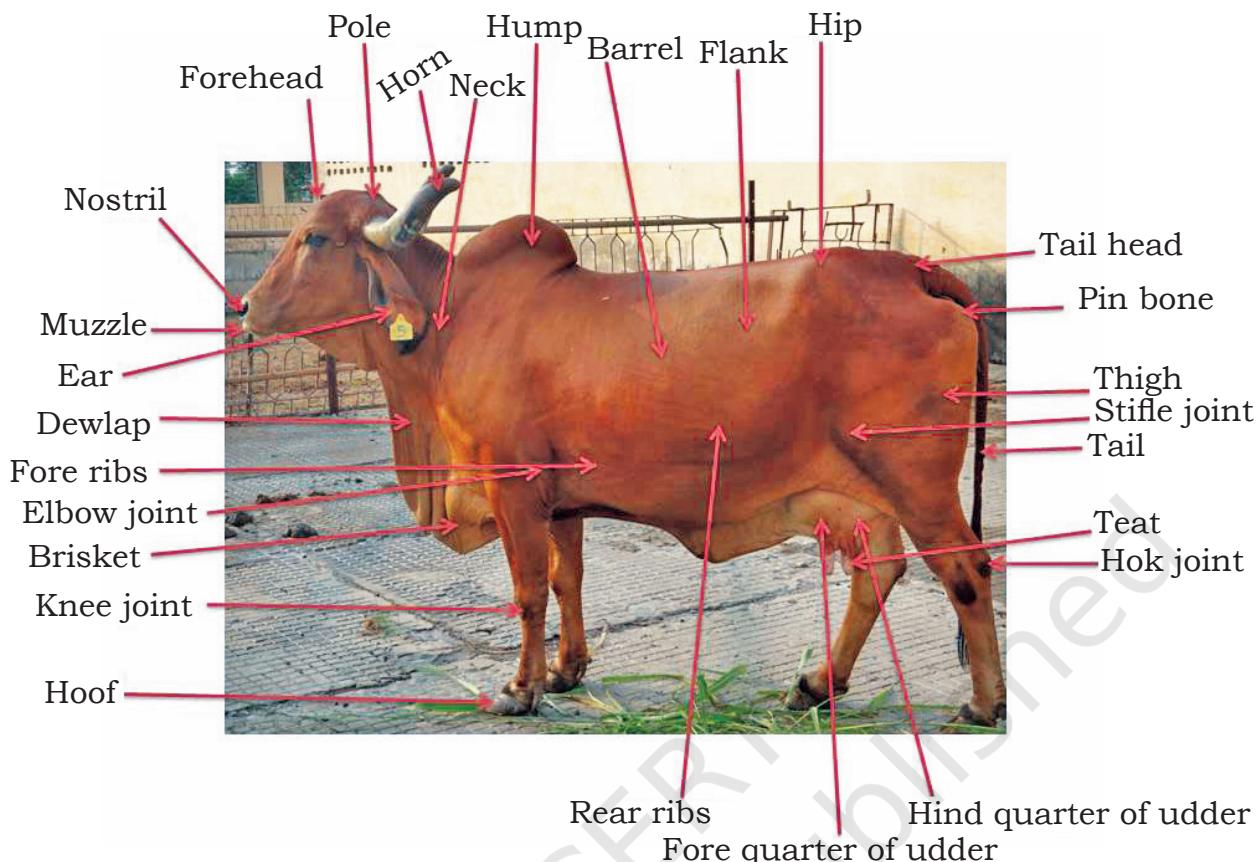


Fig. 1.2: Different body parts of cattle



Fig. 1.3 (a) Gir



Fig. 1.3 (b) Sahiwal

Fig. 1.2 shows the different body parts of cattle, which would help you in understanding the distinguishing characteristics of the different indigenous breeds.

Table 1.2: Performance of Indian milch cattle breeds

Breed	Average age at first calving (months)	Average calving interval (months)	Average lactation yield (Kg)
Gir	45	14	900–1600
Hariana	50	15	1140–4500
Sahiwal	40	15	1350–2100
Red Sindhi	44	14	1700–3400
Tharparkar	42	14	1660–2500

Exotic cattle breeds (*Bos taurus*)

Exotic breeds of cattle have been introduced in India with the objective of improving milk production. Some of the exotic cattle breeds are Holstein Friesian, Brown Swiss, Jersey and Ayrshire (Table 1.3).



Table 1.3: Exotic cattle breeds

Breed	Country of origin	Body colour	Average lactation yield (litres)	Milk fat (%)
Holstein Friesian	Holland	Black and white	6100–6200	3.5
Jersey	Island of Jersey in the English Channel	Light brown with or without white markings on the body	4000–4500	5.5
Brown Swiss	Switzerland	Distinctly brown	5200–5400	4.0
Ayrshire	Scotland	Light to deep cherry red with or without white markings on the body	4800–5000	4.1



Fig. 1.3 (c) Tharparkar



Fig. 1.3 (d) Red Sindhi

Fig. 1.3 (a-d): Some indigenous breeds of milch cattle



Fig. 1.4 (a) Holstein Friesian



Fig. 1.4 (b) Jersey

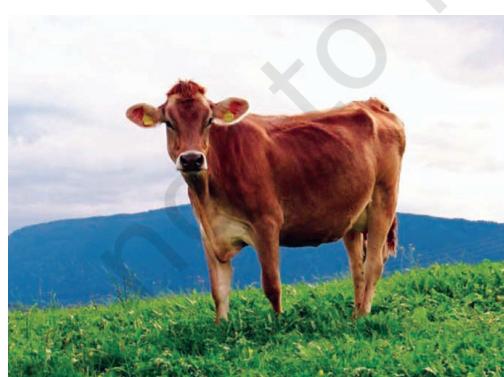


Fig. 1.4 (c) Brown Swiss



Fig. 1.4 (d) Ayrshire

Fig. 1.4 (a-d): Some important exotic breeds of cattle



Crossbred cattle

Cross-breeding of cattle means the mating of animals from different established breeds, for example, Holstein Friesian with Sahiwal. The progeny of cross-breeding is called crossbred, which exhibits a mixture of qualities of both the parent breeds. The programme of cross-breeding of dairy cattle has played a role in increasing milk production in India. Important crossbred cattle developed in India are mentioned in Table 1.4.

Table 1.4: Popular crossbred cattle available in India

Name of the crossbreed	Cross between		Place of origin
	Indigenous breed (female)	Exotic breed (male)	
Sunandini	Local cows	Brown Swiss	Kerala
Karan Swiss	Sahiwal and Red Sindhi	Brown Swiss	Haryana
Frieswal	Sahiwal	Holstein Friesian	Military dairy farms
Karan Fries	Tharparkar	Holstein Friesian	Haryana
Phule Triveni	Gir	Holstein Friesian, Jersey	Maharashtra

Indian buffalo breeds

There are two general types of buffaloes, *viz.*, swamp buffaloes and river buffaloes. Major buffalo population of India are of river buffalo type. India can take pride in having the best buffalo breeds in the world. Buffaloes are present in almost every part of India and can be considered the backbone of the milk supply and milk processing industry in India. About half of the total milk produced in the country is contributed by buffaloes, although their population is almost half of the cow population. There are 13 well-known indigenous breeds of buffaloes in India.

Out of the two types of buffaloes—swamp and river buffaloes—the swamp buffalo prefers marshy lands, where it wallows in mud and feeds on coarse marsh grass. They are predominantly found in parts



of Assam, Nagaland, Manipur and Mizoram, and are of non-descript type. The river buffaloes prefer clean water of rivers, irrigation canals and ponds to wallow. They are docile in nature, and extensively reared for high-fat percentage milk. Some of the important breeds of river buffaloes are Murrah, Nili-Ravi, Surti, Mehsana, Jaffarabadi and Bhadawari. Table 1.5 mentions the habitat and characteristics of major buffalo breeds of India. Table 1.6 shows the performance of important buffalo breeds of India.

Table 1.5: Habitat and characteristics of major buffalo breeds of India

Breeds	Breeding tract/ Habitat	Horn characteristics
Murrah	Rohtak, Jind, Hisar, Bhiwani, Sonepat districts of Haryana	Flat, short, tightly spirally curving inwards
Nili-Ravi	Ferozpur district of Punjab	Small and coiled tightly
Surti	Kaira and Baroda districts of Gujarat	Flat and sickle-shaped and form a hook at the tip
Jaffarabadi	Kutch, Junagarh and Jamnagar districts of Gujarat	Heavy horns, inclined to droop at each side of the neck and then turn up (drooping horns)
Mehsana	Mehsana, Sabarkantha and Banaskantha districts of Gujarat	Curled at the tip but not so much as in Murrah breed. Horns are longer than Murrah and sometimes of irregular shape.
Banni	Kutch district of Gujarat	Vertically upward with inverted single or double coils
Bhadawari	Agra and Etawah districts of Uttar Pradesh and Gwalior district of Madhya Pradesh	Curl slightly outwards



Fig. 1.5 (a) Murrah



Fig. 1.5 (b) Jaffarabadi



Fig. 1.5 (c) Bhadawari





Fig. 1.5 (d) Surti



Fig. 1.5 (e) Nili-Ravi



Fig. 1.5 (f) Mehsana



Fig. 1.5 (g) Nagpuri

Fig. 1.5 (a-g): Some important breeds of buffalo

Nagpuri	Nagpur, Akola and Amravati districts of Maharashtra	Long and sword-shaped
Marathwadi	Beed, Parbhani, Jalna, parts of Nanded, Latur, Hingoli and Osmanabad districts of Marathwada region of Maharashtra	Mostly round, short, parallel to the neck and not extended beyond the hump
Pandharpuri	Solapur, Sangli and Kolhapur districts of Maharashtra	Long, sword-shaped, sometimes twisted
Kalahandi	Eastern part of Andhra Pradesh and adjoining areas of Odisha	Broad and half curved running backwards towards the tip of the horn
Chilika	Surrounding area of Chilika lake in Odisha	With age, the horns grow upwards, lateral and finally in a typical sickle shape.
Toda	Nilgiri hills of Tamil Nadu	The horns are wide apart, curving inwards and then outwards, forming a crescent shape.

Table 1.6: Performance of important buffalo breeds of India

Breed	Age at first calving (months)	Calving interval (months)	Average lactation yield (litres)	Milk fat (%)
Murrah	44	15	1000–2050	6.9–8.3
Jaffarabadi	45	15	2150–2340	6.8–8.5
Bhadawari	45	13–16	540–1400	6.0–12.8
Surti	45	15	1650	7–8
Nili-Ravi	40–53	15	1600–1900	5.1–8.0
Mehsana	43	16	2000	5.2–9.5
Nagpuri	57	14	760–1500	7.0–8.8

Source: Animal Genetic Resources of India (<http://www.nbagr.res.in/nbagr.html>)



Practical Exercise

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Activity 1: Identify the various breeds of cows and buffaloes in a dairy farm.

Material required

Chart of different breeds of cow and buffalo showing typical characteristics

Procedure

- With the help of the dairy workers of the farm, examine and record the various characteristics of the dairy animals. Identify the different breeds of cows and buffaloes being maintained at the farm.

Check Your Progress

A. Multiple choice questions

1. Which of the following is not an exotic breed of cattle?
(a) Jersey (b) Holstein Friesian
(c) Tharparkar (d) Brown Swiss
 2. Which of the following is a breed of buffalo?
(a) Murrah (b) Sahiwal
(c) Tharparkar (d) Gir
 3. Which of the following is not an crossbred cow?
(a) Karan Swiss (b) Karan Fries
(c) Sunandini (d) Gir
 4. Where is the pole located?
(a) in the base of the tail (b) in the flank region
(c) in between two horns (d) None of these
 5. In which state is the Toda breed of buffalo found?
(a) Haryana (b) Tamil Nadu
(c) Maharashtra (d) Punjab

B. Fill in the blanks

1. _____ cattle are developed from the indigenous and exotic breeds.
 2. _____ is considered the best buffalo breed in terms of milk production.
 3. Sunandini breed of cow is found in _____.
 4. The _____ breed of buffalo usually has sickle-shaped horn.
 5. The scientific name of exotic cattle is _____.

C. Mark true or false

1. Exotic cattle breeds have higher milk production potential.
 2. Exotic breeds are well adapted to the Indian conditions.
 3. Jaffarabadi buffalo breed is mainly found in Gujarat and Rajasthan.
 4. Jersey breed of cow is mainly found in Canada.
 5. Brown Swiss breed of cow originated in Turkey.



D. Match the following**A**

1. Sahiwal
2. Mehsana
3. Sunandini
4. Bhadawari
5. Brown Swiss

B

- (a) Gujarat
- (b) Switzerland
- (c) Punjab
- (d) Kerala
- (e) Uttar Pradesh

E. Crossword

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P	Z	S	T		I
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	L				

Across

1. A breed of buffalo found in Rohtak, Jind, Hisar, Bhiwani and Sonepat districts of Haryana

Down

2. Part of body found in indigenous cattle
3. Part of hind leg of cattle
4. Famous buffalo breed of Gujarat
5. Popular exotic cattle breed for Indian dairy farmers
6. Part of mouth of cattle

GLOSSARY

Crossbred animals: Animals produced by crossing indigenous breeds with exotic breeds.

Dairy: A business enterprise established for the production and processing of milk for human consumption.

Dairy animals: Animals reared for milk production.

Dairy farmer: One who manages dairy animals and milking operations to ensure maximum milk production. The responsibilities vary according to the size and type of operations.

Draft/Draught animal: The males of domestic cattle used for drawing heavy loads and other farming operations such as ploughing.

Exotic cattle: Cattle breeds developed in other countries such as Jersey and Holstein Friesian.

Indigenous cattle: Breeds of cattle originated in India with a distinctive hump.

Livestock: Domestic animals such as cow, buffalo, goat, sheep, swine, poultry, horse, etc., reared for home use or for profit, especially on a farm.

Wallowing: Rolling of buffaloes in mud and water to keep their body cool and to avoid biting insects.

