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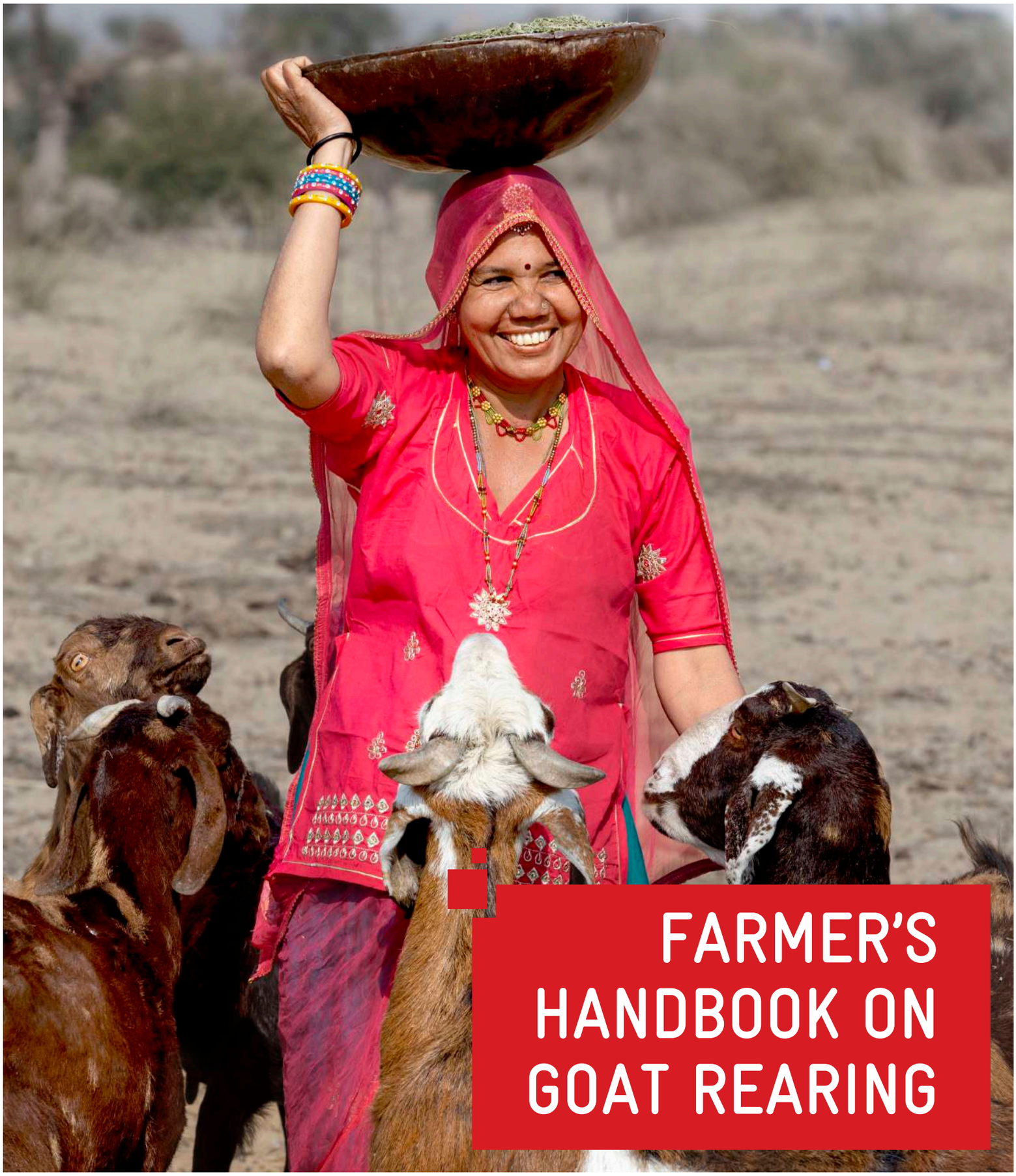

FARMER'S HANDBOOK ON GOAT REARING

ENHANCING RURAL RESILIENCE THROUGH APPROPRIATE DEVELOPMENT ACTIONS

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LIST OF ABBREVIATIONS

g - Grams

kg - Kilograms

cm - Centimeters

sq. ft. - Square Feet

% - Percent

DCP - Digestible Crude Protein

TDN - Total Digestible Nutrients

GNC - Groundnut Cake

TOC - Til Oil Cake

ATM - Automated Teller Machine (used metaphorically for financial buffer)

SC - Schedule Caste

ST - Schedule Tribe

BPL - Below Poverty Line

PMAY - Pradhan Mantri Awas Yojana

MGNREGA - Mahatma Gandhi National Rural Employment Guarantee Act

PPR - Peste des Petits Ruminants

ET - Enterotoxaemia

CCPP - Contagious Caprine Pleuropneumonia

FMD - Foot & Mouth Disease

SHG - Self-Help Group

MFI - Microfinance Institutions

NABARD - National Bank for Agriculture and Rural Development

NLM - National Livestock Mission

ABOUT THE HANDBOOK

The goat rearing is one of the oldest livestock-based livelihoods. Our ancestors identified goats as an important source of food and feared that if we hunted regularly, one day, the goats would be exhausted, and we would die of hunger. So, they started domesticating goats and came to know that goat rearing is very easy as it is less dependent on the farmers for their feeding, breeding, and care & management.

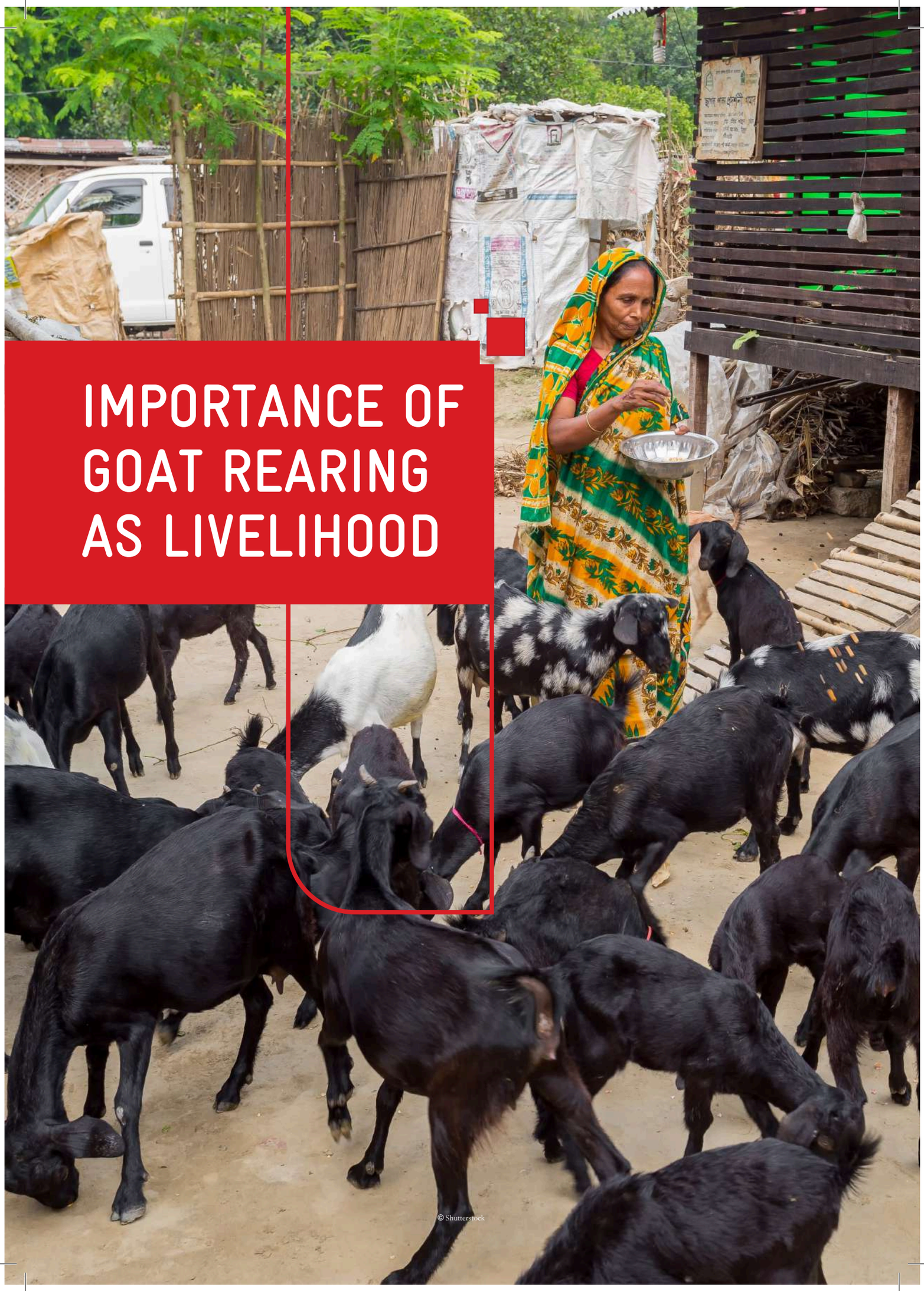
Domestication also give maximum return on minimum investments, and is being widely accepted by the rural farmers. In the present situation, the rearing system does not require any major resources, but it needs round-the-year casual labor engagement for grazing and care, along with some space in the house. Despite many advantages of goat rearing, like emergency support and contribution to planned expenditures like festivals, ceremonies, education, etc., it has many challenges like uncertain mortality, slow weight gain, and lack of space for rearing and marketing.

In recent years, farmers and actioners have tried to understand the reason behind the losses and have formulated various interventions to overcome them. Evidently, if the current goat rearing is supplemented with better management practices, the benefits can be maximized.

The burgeoning demand for goat meat and milk, often sold at premium rates, presents a lucrative opportunity for farmers to increase their earnings. Furthermore, the government's various schemes and efforts are bolstering the growth of this sector, providing additional support to farmers.

This comprehensive farmers' handbook is designed to equip farmers with the knowledge of improved goat management systems, various enabling environments, challenges, and the necessary actions to transform goat rearing into a better, more profitable, and sustainable livelihood option.

IMPORTANCE OF GOAT REARING AS LIVELIHOOD



1. IMPORTANCE OF GOAT REARING AS LIVELIHOOD

Goat rearing is one of the important sources of livelihood for landless, small, and marginal farmers in India. Goat rearing helps farmers in times of financial need and emergencies and gradually creates assets and wealth for the family when it is scaled up.

1.1 Why Goat Rearing is Ideal for Rural Livelihoods

There are certain conditions and special characteristics of goats that favor rearing by the rural poor farmers, such as:

- Goat rearing is comparatively less capital-intensive. It requires less resources – land, labor, space, and capital.
- The goats are resistant and adaptable to different climatic conditions. It has been deeply associated with our living conditions, society, and culture for ages.
- The goats are easily reared by any old person, women, and/or children.
- Goat rearing acts as an ATM for the household because it provides financial support for the family in times of emergencies – and acts as a buffer.
- It requires less space for housing and does not fight with other species of animals.
- It thrives well on a variety of feeding systems, from free grazing to zero grazing.
- They thrive not only on high-quality nutritious fodder but also on poor-quality fodders.
- Risk is lower as the investment is less compared to rearing large animals.
- There is a continuous demand for goat meat in the market.

1.2 Issues and Challenges in Goat Rearing

Despite so many advantages and favorable conditions for goat rearing, the farmers are unable to capitalize on the optimized benefits from it. The main challenges are:

- Goats have the genetic capacity to breed and give multiple births, but there is high mortality due to poor nutrition, lack of preventive healthcare support, and inappropriate managemental care.
- Adult goats also suffer significant mortality due to diseases and poor immunity due to nutritional imbalance and worm load.
- The growth of kids is slow due to the lack of proper feeding for growth by most farmers. Also, nutrition availability is dependent on nature and agriculture.
- Lastly, the final products get lower prices in the market due to the unorganized market practices.

1.3 How to Improve Income from Goat Rearing

It is important to understand the various dimensions of goat rearing by farmers and seek support and build an ecosystem to maximize income. The country also has rising demand for goat meat and milk products.

The important steps required by the farmers to improve the income from goats are:

a. **Investment in Goat Shed:** The farmers must invest and construct comfortable sheds for goats, preventing many diseases and allowing herd growth.

b. **Care and Management:** The goats require special care and management during pregnancy and the kidding period. The extra feeding during breeding seasons also helps in multiple births. Caring for kids in the early stage of their life prevents mortality.

c. **Cultivation of Fodder Trees to Meet Nutritional Needs:** There is a decline in forest coverage, pasturelands, common lands, and available nutrients in the plants. Moreover, there is a lack of availability of green fodders in different seasons. Therefore, farmers need to grow fodder trees in their backyard to provide better nutrition to the goats.

d. **Prevention of Diseases:** Farmers must vaccinate and deworm their goats to prevent diseases and increase productivity. State livelihood missions and NGOs have been developing local resource individuals like Pashu Sakhi, Prani Mitra, etc., to provide first aid support at farmers' doorstep.

e. **Selling at a Fair Price:** The farmers need to rely on alternative methods for the cash flow to avoid distress selling of goats at cheap rates. Also, it is advisable to estimate the goat price by weighing them before selling.

HOUSING MANAGEMENT OF GOATS

2. HOUSING MANAGEMENT OF GOATS

2.1 Importance of Shed

- If goats are provided that comprises proper housing with drainage, ventilation, raised platforms, provision of sunlight, water, and feed, their productivity will increase phenomenally.
- Goats prefer living on a raised platform.
- Sheds protect the animals from getting affected by seasonal changes (heavy rain, extreme cold and heatwaves) and from falling sick.
- It protects the animals from predators like dogs, foxes, hyenas, etc., as well as from theft.
- It provides comfort to the diseased, pregnant, and newborn animals.
- It protects animals from contracting communicable diseases.
- It becomes easy to manage daily activities related to animal rearing.
- Shed reduces animal-human conflicts, like encroachment into other farms or houses.

Advantages of Raised Floor (Platform) are:

a. The goats usually like dry places, so they easily climb and sit on machans.

b. Ammonia produced in the goat shed tends to accumulate close to the floor, since it is a heavy gas. It damages the lungs and makes the goats prone to respiratory infections.

c. The shed remains clean as the urine and droppings fall below the floor.

d. There is also good ventilation below the shed.

e. There will be less worm infestation

f. The raised floor should be at 3 feet height from the ground level.

g. The goats have the habit of perching and climbing so providing an elevated place for sitting is desirable.

h. In places of heavy rainfall, the goat shed with a raised floor is must.

i. The raised flooring can be made of bamboo, wood or plastic.

2.2 Space Requirement and Quality of a Good Shed

A good quality goat shed should have the following features:

i. The shed should be warm in winter and cool in summer with sufficient ventilation.

ii. The space availability in the shed per animal should be -

   a. **Buck:** 15 square feet

   b. **Doe:** 10 square feet

   c. **Kids:** 5-10 square feet (as per life stage)

iii. The goat shed should have a facility for clean drinking water, feed, and hooks/hay racks to hang the tree leaves.

iv. The shed must be covered in case of heavy cold.

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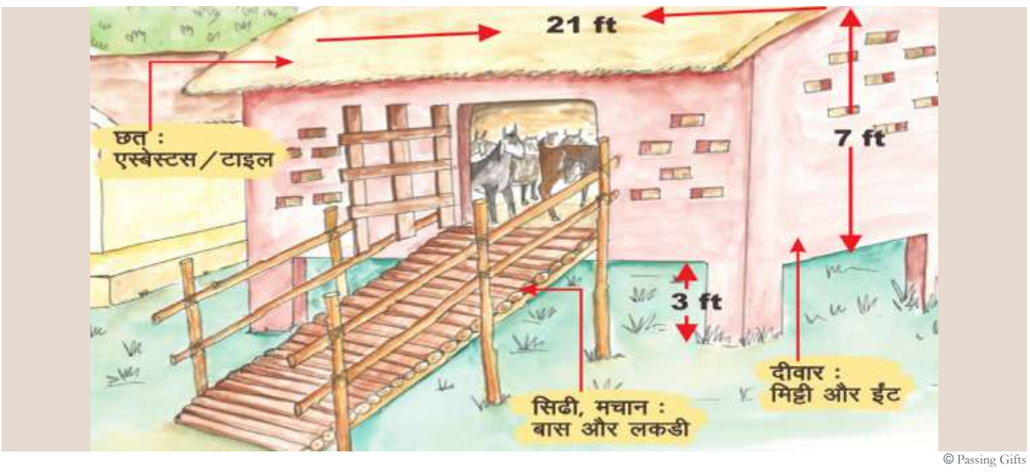
2.3 Site Selection and Layout of the Shed

- The selected site should have raised ground or elevated land that is well-drained and includes a separate from the house.
- The site should be at an elevated place that cannot be flooded by rainwater.
- The shed should be located in such a way that its length is in east-west direction.
- The site should be protected from direct sunlight (shade from trees) and have ample fresh air.
- It should be at least 8-10 meters away from the residential area.
- It should be suitable for manure disposal, connected to reliable water and electricity sources.
- The farmer's shed should have a fenced area, where the goats can be kept open in the daytime for resting.



Layout of Goat Shed

2.4 Material Required for Shed Construction

i. Clayey soil and brick, (for wall construction).

ii. Bamboo/wood (for wall construction, raised platform and gates with lock).

iii. Asbestos/tile for roofing, (at higher side 9 feet and at lower side 7 feet to maintain ventilation for temperature regulation - thatching in summers).

iv. Non-slippery concrete flooring with a raised platform made from bamboo.

2.5 Importance of Daily Cleaning

a. The goat shed must be cleaned daily to minimize the worm loads.

b. In the rainy season, farmers can spread ashes from the cooking stove mixed with lime to keep the shed dry and warm.

c. The mud floor shed needs to be scrapped once every 2-3 months to change the soil.

STRATEGIC FEEDING OF GOATS

3. STRATEGIC FEEDING OF GOATS

Goats are basically browsers, which feed on green leaves and pods of trees and thorny bushes. They are very efficient in digesting fibrous feeds and can make use of agricultural by-products. Their ability to feed roughage makes them withstand harsh environments and climatic variability. Goats can be reared under intensive and extensive systems. However, if the feed is deficient in required nutrients, their growth and production will be affected.

3.1 General Feeding Behaviour of Goats

i. Goats are browsing animals. They also do not eat foul-smelling and trampled feed, so it is advisable to feed them by hanging fodders and fodder trees.

ii. The goats are very selective and have various feed options, so provide different types of leaves in a day.

iii. Unlike cows, goats prefer soft grass and dry leaves.

iv. They try to eat more in the afternoon while grazing. In the morning, they prefer selective feeding in small quantity.

v. Inside the house, they must be kept away from the household kitchen grains or cooked food.

vi. Sometimes they take rotten fruit on the streets which may cause indigestion and sometimes lead to death.

3.2 Requirement of Feed and Fodders for Goats

The requirement of feed for goats is generally calculated based on body weight. A Black Bengal breed of goat with a 10 kilograms body weight requires 400 grams of dry matter (4% of body weight) per day. This can be provided to the animals in three forms:

- Green fodder (50%) = 200 grams dry matter (1 kilogram green/fresh matter)
- Dry fodder (30%) = 120 grams
- Balanced concentrate (20%) = 80 grams

A balanced ration for goats can also be prepared with locally available low-cost materials – like bran (choker), cereals (anaaz), and oil cakes (khalli) at the ratio of 2:1:1 (it contains 3 portions of carbohydrate ingredients and 1 portion of protein).

Or,

Ingredients	Parts	Percentage
Bran (Wheat/Rice Bran, etc.)	Two parts	50%
Cereals (Maize, Broken Rice, etc.)	One part	25%
Oil Cakes (Groundnut cake, Till oil cake, etc.)	One part	25%
Total	**Four parts**	**100%**

For example, a goat of 25 kilograms body weight requires 100-200 grams balanced ration (dana), 0.5 kilogram dry fodder and 2 kilograms green fodder.

Daily Ration for Goats

Ration	Goat (25kg body weight)	Pregnant goat	Lactating goat	Buck (meat purpose)	Buck & Doe (for breeding)	Kids (> 3 months)
Water	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum
Dry Fodder	1kg	1.5kg	2kg	1kg	1kg	Slowly increase up to 1kg (till 8 months of age of kids)
Green Fodder	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum
Mixed Feed	100g	150g	200g	200g	100g	Slowly increase up to 1kg
Mineral Mixture	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum	Ad. libitum

[1]International Livestock Research Institute (ILRI)
[2]A balanced ration is the amount of feed that will supply the proper amount and proportions of nutrients needed for an animal to perform a specific purpose such as growth, maintenance, lactation, or gestation.

3.3 Guiding Principles for Feeding Goats

i. The goats should be grazed at least 6-7 hours a day in a field rich with a variety of plants.
ii. If there are less hours for grazing, they must be provided tree leaves in the house.
iii. Providing concentrates at least 100g per day for adult goats after grazing is good for growth, milk production and pregnancy. This is for small breed goats like black Bengal, which produces less milk.
iv. The big breed goats require 200 grams of concentrates per litre of milk production.
v. The kids aged 21 days and above should get 10-15 grams of creep feed. The feed should increase as the kids grow and can go up to 40-50 grams daily for meat goats/female growing goats.
vi. The farmer must feed a mineral mixture at least 5 grams per day, regularly to have better growth and fertility.
vii. The goats should be provided with clean water for 24 hours.

3.4 Creep or Starter Feeding

- From birth, up to the third day, the kids are given their mother's milk, i.e., colostrum. After the third day, the quantity of milk to be given to kids is reduced to about 100 ml/day.
- Helping the kids to feed on mothers' milk is important. At times, it is done by physical assistance.
- Along with mothers' milk, green tender grasses, pasture or some legume fodders like lucerne, berseem, and cowpea are fed.
- Creep feed contains 14-18% digestible crude protein and 65-70% total digestible nutrients (TDN).

Creep Ration

Formulation 1		Formulation 2	
Ingredients	**Parts/%**	**Ingredients**	**Parts/%**
Maize	60	Maize	20
Groundnut Oil Cake	20	Groundnut Oil Cake	22
Fish Meal	10	Fish Meal	35
Wheat Bran	07	Wheat Bran	20
Mineral Mixture	02	Mineral Mixture	2.5
Salt	01	Salt	0.5
Total	100	Total	100

Source: Ruminants Nutrition: Books for reference (iasri.res.in)

3.5 Mineral Block Preparation

Material Required: 1 kilogram red soil, 1 kilogram salt, 5-6 roasted eggshells (outer non-consumable part of an egg), handful of wheat/rice flour or straw.

Method of Preparation:

i. Roast the eggshells and crush the roasted shells.

ii. Grind and strain the soil and make it a fine powder.

iii. Mix the soil, salt, eggshells and flour with water to make it a paste/dough.

iv. The mould should be shaped as a block with a hole in the middle, to hang.

v. Dry the blocks in the sunlight and then cool it till they become hard.

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How to Feed:

i. Hang the block in the shed.

ii. Let the animals lick the blocks.

3.6 Hygiene Maintenance of Sheds

i. Goat sheds should be cleaned regularly to minimize disease incidences and parasitic infections.

ii. Goats should be separately kept for biosecurity reasons.

iii. There should be a covered manure pit at the side of the shed.

iv. A drain of about 1 feet width and 0.5 feet depth should be constructed on the sloped side of the floor.

v. Manure pits should be constructed for the disposal of farm wastes and to convert them into farm manure.

vi. Rainwater should not enter the manure pit.

vii. The drain should be gradually sloped towards the manure pit.

viii. Closer to the shed, there should be provision of water, where the farmers can wash their feet and hands after taking care of goats.

ix. The bamboo platform should be regularly cleaned and repaired if the need arises.

3.7 Fodders for Better Nutrition of Goats

Growing fodder and fodder trees: Goats like different variety of fodder leaves. Farmers can plan growing Subabul, Jackfruit, Guava, Moringa, Mulberry (Sahtoot) trees, etc. for goats.

i. Fodder Yield of Different Fodder Shrubs on Farm Boundaries

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Boundary plantation of different fodder shrubs for fodder production for goats

Fodder shrubs/crop on boundary	First cutting after sowing	Space between rows (cm)	Average fodder Yield (kg/meter running length cutting) after well established
Shevari (Sesbania sesban)	6 months	40	8
Dashrath grass (Desma thus leptophyllous)	2.5 months	30	1.2
Perennial Pigeon pea (Cajanus cajan)	4 months	40	9
Hybrid Napier (Pennisetum purpureum)	3 months	40	3.5

ii. Fodder Yield

Fodder Name	Fodder yield (kg/sq. m)
Mulberry (Morus species)	6.5
Subabul (Leucaena leucocephla)	8.4
Shevari (Sesbania aegyptiaca)	8.6
Drumstick (Moringa oleifera) + Dashrath (Desmanthus Virgatus)	1.8

Dashrath | Subabul | Mulberry | Moringa + Hybrid Napier

Fig: Fodder shrubs for feeding of goats

iii. Fodder Trees: Availability of Leaves/Pods

Common name	Leaf availability	
	Leaves	Pods
Babul	May – February	May – June
Ardu	May – March	May – June
Fig	December – August	March – July
Subabul	July – December	March – July
Khejri	January – December	June – August

[3]Self-sustaining goat farming model for livelihood improvement of small and marginal farmers. ICAR-National Institute of Abiotic Stress Management Baramati, Pune, Maharashtra 413115
Source: CIRG, Makhdoom, Mathura, UP

iv. Azolla Cultivation

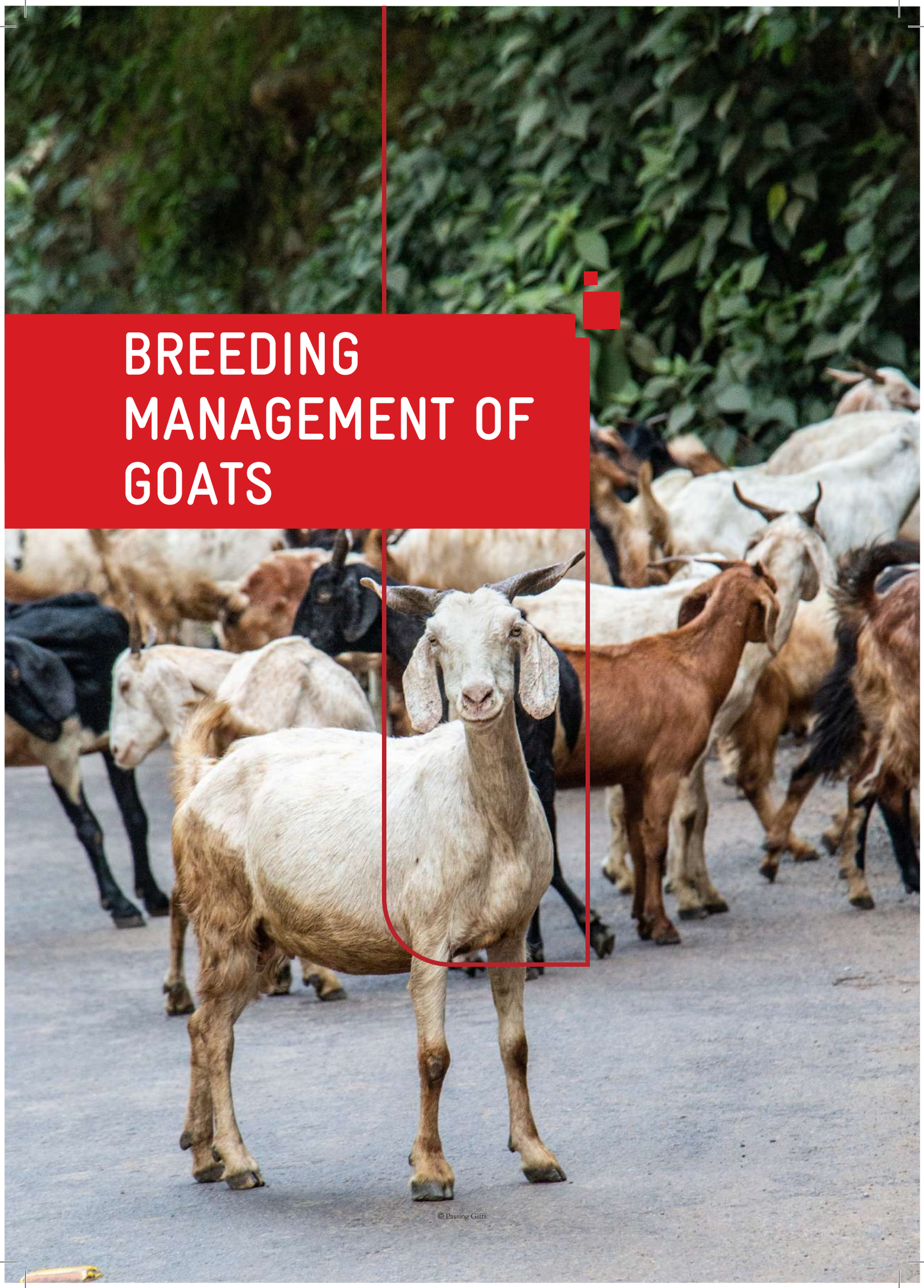
Azolla can be grown easily in the house, in an 8-inch-deep pit, insulated from all sides. The pit should be filled with 4-inch water, along with equal quantities of soil and 7-day-old cow dung are mixed well and poured into the pit. A 10 x 3 square feet pit requires 10 kilograms of soil and dung each. 10 grams Azolla seeds brought from any other pit are to be spread over it. It takes 15 days for the first harvesting to grow and 200 grams can be extracted daily.

Azolla is extracted, cleaned, and can be mixed with any grain and salt to feed.

It is rich in protein and helps boost the growth of animals.

Maintenance: Protect the pit from direct sunlight, add water every 7 days, and replace the soil-dung mix every 15 days.

BREEDING MANAGEMENT OF GOATS



4. BREEDING MANAGEMENT OF GOATS

4.1 Quality of Good Goats for Purchasing

The goats are reared mainly for meat, milk, and fibre/wool. The milk-producing breeds in India are Jamunapari, Jhakrana, etc. Some breeds are known for their meat quality like Black Bengal, Osmanabadi, etc., and some are dual purpose, such as Beetal, Sirohi, etc.

The size stature is different for different Indian breeds. The breeds of Rajasthan, Madhya Pradesh, and Uttar Pradesh are bigger in size, whereas goats of hilly regions are smaller in size.

i. Purchasing of Goats

The farmers need to purchase goats for breeding and rearing purposes and sometimes for consumption. The selection of goats depends on the requirement, and the following points need to be remembered while purchasing goats for rearing:

a. Always purchase goats from nearby villages and never from the market.
b. The best age of goats for breeding are 1.5-2.5 years.
c. A goat which has at least one kidding is to be preferred.
d. The new goats should not be mixed immediately with the existing goats at home. Quarantine them for at least 10-15 days or separately rear them.
e. The first three days are very critical for the new goat to adapt to the new environment.
f. Allow proper resting, deworming and vaccination of new goats on arrival at the shed.

ii. Characteristics of a Good Quality Milk Goat

Goats can produce milk up to 2-3 litres per day. In India, Jamunapari goat produces the highest milk. The characteristics of a good milker goat are:

a. The goat should have a deep body with a good stomach capacity.
b. The neck should be straight and erect.
c. Both hind legs are well placed apart with a capacious udder.
d. Both the teats of the udder should be equal in shape and size.
e. The udders should shrink after milking.
f. It should not be hard.

iii. Characteristics of Good - Quality Meat Goats

The goats producing meat have good muscle growth in the hind legs, loin, and lumbar regions. The goats should be active and good feed converters. The famous meat goats from India are Black Bengal, Osmanabadi, etc.

4.2 Breeds of Goat

The common breeds of goat and their characteristics are given below:

1. JAMUNAPARI

The Jamunapari breed is native to the north-west arid and semi-arid regions of Etawah district in Uttar Pradesh, although they are currently found in a number of states, from Assam and West Bengal in the East to Uttarakhand and Jammu and Kashmir in the North, Madhya Pradesh, and Jharkhand in Central India, and Karnataka in the South.

1. They are white with tan or black markings on the neck and ears.
2. **Beard is present in both bucks** and does, with a **tuft of long hair on the hind legs.**
3. They are considered **the largest and most elegant of the long-legged goats of India.**
4. They have long and pendulous ears (26-28 cm), tubular with an opening towards the front.
5. The horns are short, flat, horizontal, and twisting backwards.

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- **Kidding occurs once a year,** resulting mostly in single births and at times twins.
- The Jamunapari breed is a **dual-purpose** breed with good meat and skin.

2. BLACK BENGAL

The Black Bengal is found in the eastern region of India, in the states of West Bengal and adjoining areas in Jharkhand, Bihar and Orissa, Assam, Mizoram and Tripura, with a few numbers found in Jammu and Kashmir, Himachal Pradesh and Punjab.

Breed Characteristics:

1. The animals are predominantly black, brown, or grey and sometimes white.
2. They have soft, glossy short hair and are **dwarfed in size.**
3. The **legs are short** with a straight back and a **beard is found in both sexes.**
4. The horns, averaging 5.8 cm in both bucks and does, are slightly tilted upward or straight.
5. It is the **most prolific one among Indian breeds.**
6. Multiple births are common - 2, 3 or even 4 kids are born at a time.
7. Kidding takes place twice a year with an average litter size of 2 kids.

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- The **meat is excellent and palatable.**
- **Milk yield is low** and is barely sufficient to feed the kids.
- **Skin** of the Black Bengal goat is **used for making chamois leather** – a highly valued specialty leather.

3. SIROHI

The Sirohi breed is native to the Sirohi district of Rajasthan where its purest form is found. It is now widespread in the neighboring district of Udaipur and the districts of Nagaur and Ajmer. A few thousand are also found in Karnataka. The breed is also known by other names such as Devgarhi, Parbatsari, and Ajmeri.

Breed Characteristics:

1. They are compact medium-sized animals.
2. The colour of the coat is predominantly brown with light or dark brown patches.
3. Very few are completely white.
4. The body is covered densely with hair which is short and coarse.
5. The hair grows at the rate of about 2 cm annually.
6. Ears are flat and leaf-like, medium sized and drooping.
7. Both sexes have small horns, curved upward and backwards.

4. BARBARI

The Barbari breed has mainly evolved and adapted in the north-western arid and semi-arid regions, and more specifically in the Etah, Etawah, Hathras, Mathura, Agra, and Aligarh districts of Uttar Pradesh.

1. Barbari is a dual-purpose (milk and meat) goat breed and is maintained on browsing and grazing stubble of cultivated crops and tree leaves.
2. The colour varies greatly but white with red or tan spots is considered typical.
3. They have a small body with short legs and their ears are small and erect.
4. The horns are of medium size and slightly twisted, directed upwards and backwards.
5. Does are prolific breeders; kidding takes place twice in fourteen months.
6. Twinning is a common phenomenon in this breed; almost 50% of births are twins.
7. Milk yield per lactation is about 110 Kilograms, with a daily milk yield of about 1 Kilogram.

5. BEETAL

Beetal is native to the districts of Gurdaspur, Amritsar and Ferozepur in Punjab. Amongst native breeds, Beetal is one of the heaviest dairy-type goat breeds, well-known for milk production and has largely been used in cross-breeding and other goat improvement programmes.

1. Beetal is second to the Jamunapari in size but is considered superior to it as it is more prolific and adapts more easily to different agroecological conditions and stall feeding.
2. They are predominantly black, red, tan or heavily spotted on white.
3. Males usually possess a beard.
4. They have long pendulous drooping betel leaf-shaped pinna.
5. Their horns are horizontal with backwards and outwards twisting.
6. The average milk yield per lactation is 288 kilograms.
7. In addition to being considered a good dairy breed, Beetal is also known for its good quality meat and skin.

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6. SURTI

The Surti breed is traditionally found in the Surat and Vadodara districts of South Gujarat.

1. Surti is a medium-sized breed, white in colour, with a highly developed udder.
2. Ears are medium in size.
3. Both sexes have small horns directed backwards.
4. The breed is known to be a good dairy breed and yields an average of 2 kilograms of milk per day.

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4.3 How and Why to Breed the Goats

The goats are seasonal breeders and their oestrous is related to the availability of favourable weather and plenty of feed. They come in heat, twice a year, during the February to March and September to October months. The female goats come into heat after attaining an age of 7-8 months and the mother goats after 45 days of kidding.

It is advisable to keep the breeding bucks in the vicinity or the same household. Taking the goats away to large distances for breeding decreases fertility. The goats should be kept in observation for repeating oestrous cycles, and in case there is no oestrous for the next 45 days, there is a high chance that the goat has conceived.

i. Oestrous Signs in Goats

The following oestrous signs are noted:

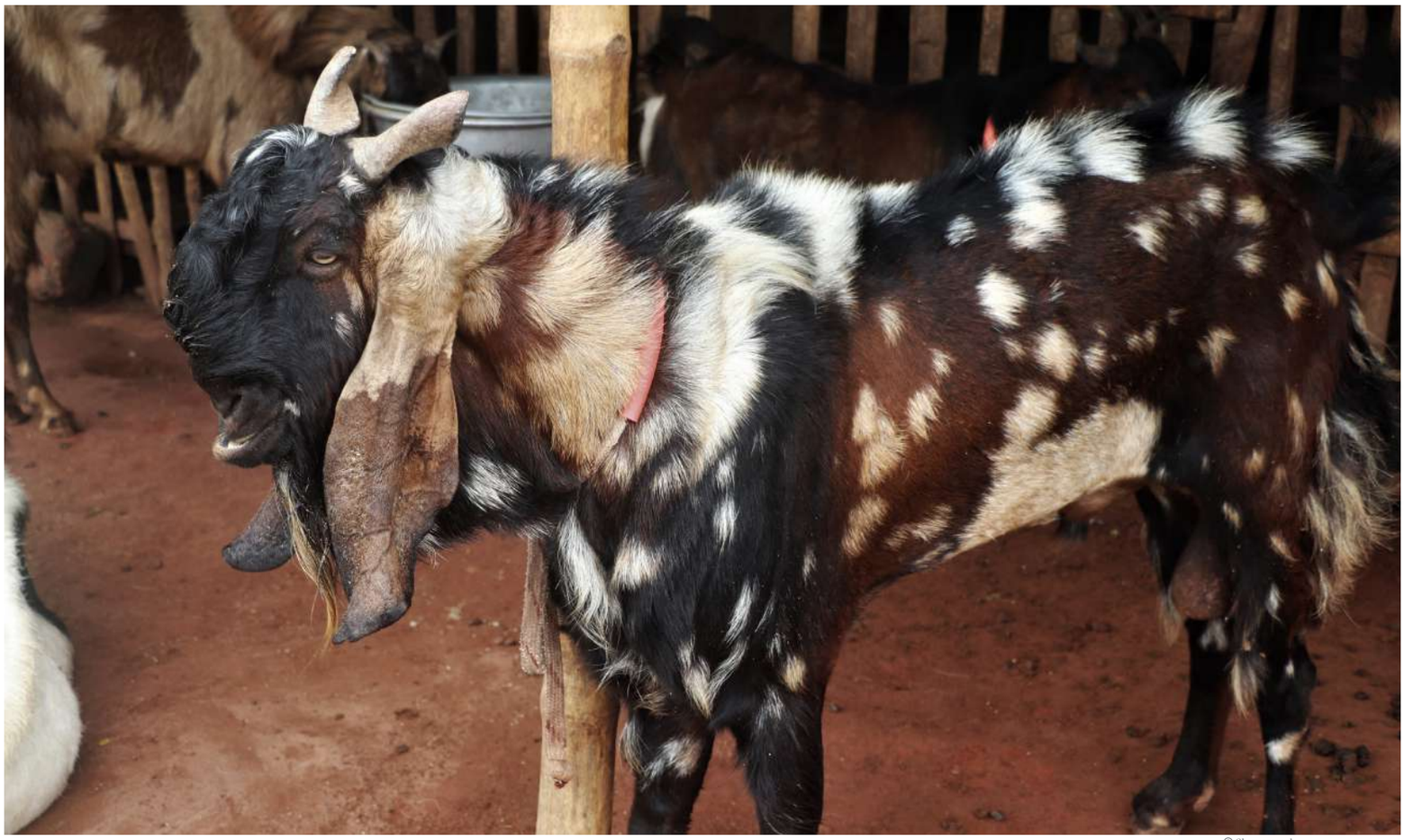
a. Tail wagging
b. Frequent urination
c. Constant bleating
d. Male seeking

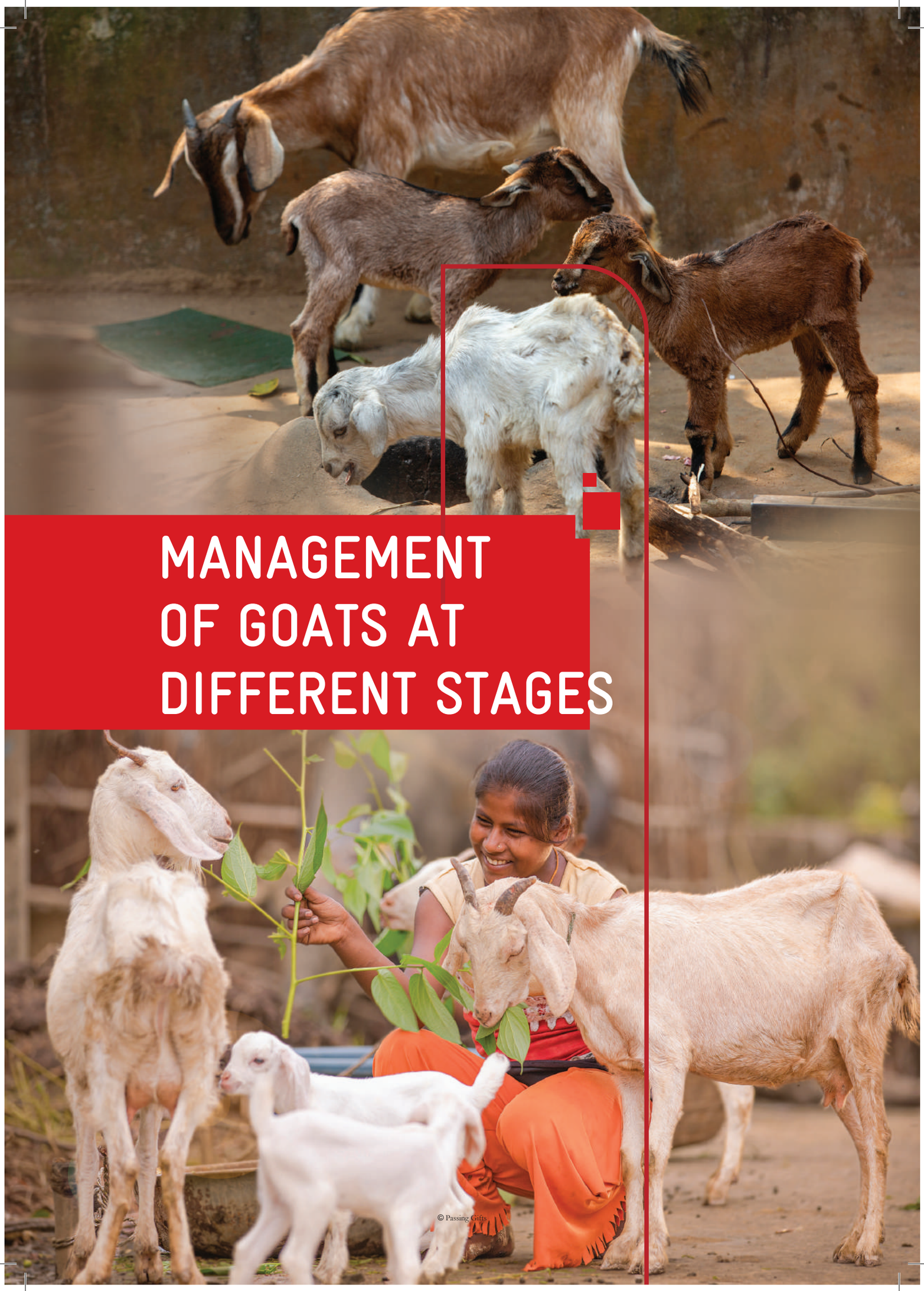
The oestrous signs in goats repeat after 19-21 days and the oestrous period lasts for 24-36 hours.

ii. Breeding Management of Herd

The goats are kept in herd, so the following practices must be adopted for better production

a. The sex ratio should be 1:20 or less. This means there should be one buck for every 20 breed-able female goats. In small herds of 7 and above, it is also advised to have separate bucks to avoid disease transmission.
b. In the breeding season, all the males and females should be mixed, while grazing and housing.
c. The adult females should be provided with extra concentrate and ration during the breeding season.
d. The bucks should be exchanged after 18-24 months to avoid inbreeding in the herd.





MANAGEMENT OF GOATS AT DIFFERENT STAGES

5 . MANAGEMENT OF GOATS AT DIFFERENT STAGES

The goats need special care during the kid stage, pregnancy, and lactating period because most of the disease and mortality happens during this period.

5.1 Care and Management of Does

- Does have an average 21-day heat cycle.
- Good feeding and management induce regular heat/oestrous, resulting in twining and triplets.
- In the weeks before mating, does should be fed a bit extra, as they must be fit and strong for mating. However, overeating must be prevented.
- Better feeding and care during kidding (parturition) of does results in proper inter kidding interval.
- Does should not be mated on first and second oestrous.
- The gentilia of the does should be odour and discharge free.

5.2 Management of Pregnant Goats

i. The pregnancy period is 154 days in Black Bengal goats and 1-5 days more in other breeds.

ii. Once the farmer is assured that the goat is pregnant, it should be separated from the bucks and young males.

iii. The goat should be given 75-100 grams of concentrate feed daily along with grazing. The feed needs to be supplemented with 1% mineral mixture (100 grams mineral in 10 kilograms feed).

iv. As the goats advances to pregnancy in 3-4 months, they need to be separated from the herd.

v. Pregnant does should be provided with plenty of clean and fresh water.

vi. Good feeding at the end of pregnancy increases the birth weight of the kids, which results in a higher survival rate of kids.

vii. Do not allow them to mix with recently aborted animals.

viii. If the goat continues to produce milk, stop milking her at least 6 to 8 weeks before the expected kidding.

ix. Proper records need to be maintained.

5.3 Management of Goat at Kidding

The care during kidding is very important and little assistance may be required. The goat becomes restless and starts bleating. They sit and look upwards and bleat. The hind portion of the goat becomes loose and the vulva becomes swollen. The following care and management steps are required for such goats:

i. Keep the area clean.

ii. No animals and humans stranger to the goat should be nearby.

iii. The goat lies down to stretch and sometimes stands and tries to push the foetus.

iv. The kidding is completed in 2-3 hours. If it is getting delayed, professional assistance will be required and an experienced person needs to be called. The farmer must keep clean warm water, blade, and antiseptic ready.

v. The goat gives 2-3 kids one by one and remove the placenta within 6 hours of kidding.

vi. After kidding, they should be cleaned with old dry clothes, and must be provided with fresh water. After providing fresh water, any medicated water like gud, turmeric water can be provided after some time.

vii. The teats must be cleaned and checked for milk letdown. The kids are to be assisted to learn suckling.

viii. The farmer must take the help of Pashusakhi/Paravet for post-natal care of the kids. The management includes the safe cutting of the naval cord and iodine application.

5.4 Management of Kids After Birth

After birth, the kids are most vulnerable to death due to many factors. It has been found that the kids are easily preyed on by eagles, dogs, jackals, snakes, etc., if not properly managed. The kids are also trampled by other animals. The following care and management are required for the kids right after birth:

a. Care and Management of Newborn Kids:

- Clear the mucus from the mouth and nostrils. Carefully rub each kid dry with a piece of cloth.
- Hold the kids up by their hind legs with head downwards for a few seconds. This will aid in clearing their respiratory tract.
- Colostrum feeding should be done in the first 2-3 hours of birth.
- Ensure that the weak, deprived or last-born kids, in case of twinning and triplets, receive adequate quantities of colostrum.
- The kid should get their first of colostrum within 30 minutes of birth. If the kids do not suck properly, the teats should be held by the hand and pressed into their mouths.
- The naval cord should be cut 2.5 to 3 cm away from the body and should be disinfected by using an iodine solution or any antiseptic cream to prevent naval illness and tetanus.
- Give the kids a warm and clean bedding area, and if possible a source of heat in winters. Dampness should be strictly prevented.

b. Management of Kids From Birth to Third Month of Age

After 4-5 days the kids learn how to suckle, play and identify their mothers. They are still vulnerable to many accidents and atrocities. The following care and management will be required:

a. Keep the kids of two mother goats separately.

b. The male and female kids can be kept separately.

c. After 25 days, start giving small quantities of crushed grains in plate for licking.

d. After 30 days, give the first deworming to the kids.

e. Castration - after 30-45 days, the male kids need to be castrated for meat production, followed by a provision of creep feed.

f. Wean the kids at 8 weeks of age.

g. The male kids who need to be promoted as buck, should not be castrated.

c. Management of Kids After 3 third Month to Marketing Age

This is a very important phase of rearing; these kids are called growers. They are very important and called cash crops. The following care and management will be required:

a. Separate the male and female kids at this stage; they can be reared in different pens.

b. The kids for meat production should be fed with 40-50 grams concentrates, and they should gain at least 50-55 grams daily.

c. The vaccination should start after the age of 4 months.

d. The kids need to be dewormed every 3 months till they are sold.

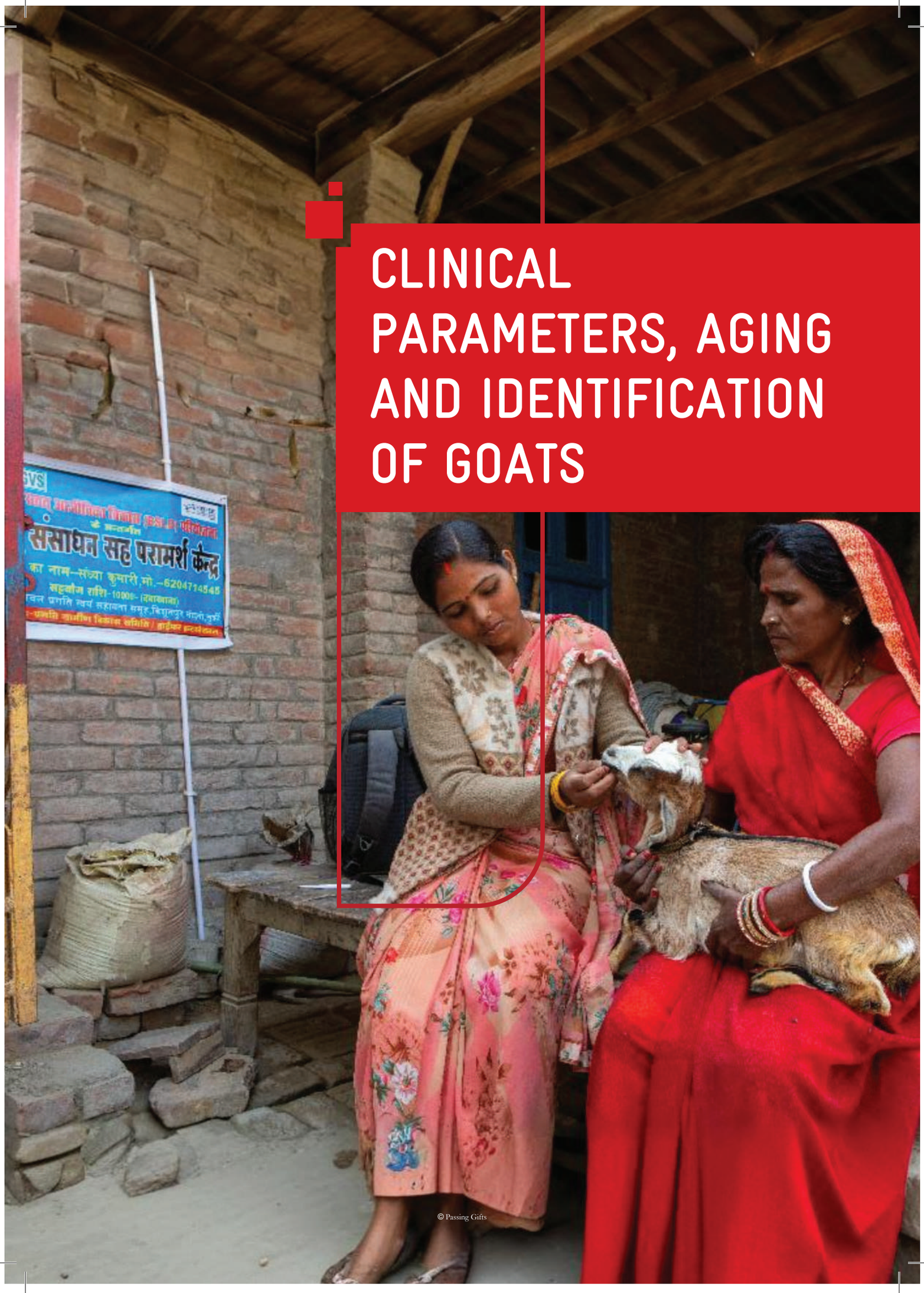
e. They must get 1% mineral mixture in feed.

5.5 Care and Management of Bucks

- Bucks should be kept in separate compartments.
- Age should be 10 months and above for breeding.
- Gentle handling of the bucks should be done.
- Exchange the buck after 12-18 months to prevent inbreeding.
- Services of bucks should be taken till 5-6 years of age.
- Bucks should be provided with quality feed and fodder rich in protein.
- In breeding season, they should be fed at least 150 grams of concentrate mixture.

5.6 Management of Castrated Bucks

- Castration of bucks should be done at 21 days of age. The testicles should start shrinking in 1 week time after castration.
- The kids should be fed normally after castration.
- This marks the most crucial life stage of goat farming and any misshaping in this stage can cost highly to the farmer so extra care of stock in this stage is required.
- Adequate provision of feed and water should be provided to the fatteners.
- The bucks should be kept in a stress and disease-free environment. Overcrowding and high temperatures can cause high-stress factors.
- The ideal age to sell the castrated bucks is 10-12 months of age.



CLINICAL PARAMETERS, AGING AND IDENTIFICATION OF GOATS

6. CLINICAL PARAMETERS, AGING AND IDENTIFICATION OF GOATS

The goat is a small ruminant animal, which has four compartments in the stomach and digests the food through rumination and fermentation. The ruminant stomach is developed to digest the rough-age materials like grasses and raw grains. The large quantity of cooked food and highly fermentable grains like rice, floor, etc. can cause indigestion and bloating.

6.1 Normal Clinical Parameters and Aging of Goats

Farmers should know the following things about their goats:

a. The goats have incisor teeth on the lower jaw and dental pads on the upper jaw. The number of incisor teeth helps to assess the age of the goats:
   i. No incisors (milk teeth only)
   ii. 1st pair of incisors: 14-15 months (approx. 1 year)
   iii. 2nd pairs of incisors: 24-25 months (approx. 2 years)
   iv. 3rd pair of incisors: 36-38 months (approx. 3 years)
   v. 4th pair of incisors: 48-50 months to 96 months (approx. 4-8 years)
   vi. All broken teeth: More than 100 months (more than 8.5 years)

b. The goats have a normal body temperature of 102-102.5ºF.

c. The normal respiration rate is 20-25 per minute.

6.2 Identification of Goats

In small herds, the farmers are well acquainted with their goats by their colour, behaviour, or age. Sometimes farmers also give names to the goats. There are not many records maintained at small farmers' sheds.

In large herds, the farmers need to give numbers to their goats through ear tagging. This ear tagging is also required for insurance.

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COMMON DISEASES IN GOATS

7. COMMON DISEASES IN GOATS

Some of the common diseases in goats and their causes, symptoms and management are given below:

i. Peste des Petits Ruminants (PPR)

PPR is a viral disease that can be spread through close contact, air, and water. It is a fatal disease and causes high mortality in goats.

Purulent Eye and Nasal Discharge

Mouth Sores

Swollen & Eroded Lips

Diarrhea

Other Signs-

Sudden fever, pneumonia and coughing. Affected animals appear restless, and have a dull coat, dry muzzle, and depressed appetite. Pregnant animals may abort.

Transmission and Spread

- Direct contact with infected animals.
- The spread of disease is more in young flocks.
- Contact with contaminated water and feed troughs.
- Inhalation when affected animals sneeze.
- Contact in markets where animals from different sources are brought together.

Control

- Vaccination is mandatory to prevent theses diseases.
- Separate sick animals from the healthy ones.
- Keep their house clean and neat on a regular basis.
- Proper care should be taken if animals are kept in confinement as this seems to favour outbreaks.

ii. Enterotoxaemia (ET)

It is a bacterial disease that occurs in growing kids/goats who are well-fed and healthy. It can progress so quickly that animals may be found dead with no previous signs of disease.

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Clinical Signs

- The animals may abruptly go off feed, have acute indigestion and become lethargic.
- Signs of abdominal pain

  - Kicking at their belly, repeatedly laying down and getting up, laying on their sides, panting, and crying out.
- **Profuse diarrhea,** blood in the loose stool.
- Animals may lose the ability to stand, lay on their sides, extending their legs, with their head and neck extended.

  - This posture is caused by the effects of the toxins on the brain. Death commonly occurs within minutes to hours after this sign is seen.
- Sudden death.

Prevention and Treatment-

- Vaccination is the best choice.
- Do not feed too much grains and lush green fodder which are rich in carbohydrates.
- Fluid thepary, Anasgesic and Antibiotic treatment is done.

iii. Goat Pox

Goat pox and sheep pox are characterized by pyrexia, generalized skin, internal pox lesions, and lymph-adenopathy. Typical pox lesions appear on the skin and on the respiratory and gastrointestinal mucosa. It is a viral disease and transmission occurs via an aerosol during direct or close contact between infected and susceptible animals. Transmission may also occur by skin abrasions.

Visible signs

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1) Goat muzzle:
The muzzle contains several papules and is partially covered by hemorrhagic nasal exudate.

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2) Goat: Abundant thick nasal exudate covers the muzzle and partially occludes the nares.

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3) Goat: Two pox on the ventral tail have desiccated, dark red, undermined (necrotic and sloughing) centers.

Prevention and Treatment-

- Vaccination to be done in epidemic areas.
- Treatment protocol: broad-spectrum antibiotics, topical antibiotic ointments

iv. Contagious Caprine Pleuropneumonia (CCPP)

CCPP is highly contagious and one of the most severe diseases of goats characterized by fibrinous pleuropneumonia and hepatization of the lungs. The disease is caused by Mycoplasma.

Transmission-

- Highly contagious
- Direct contact

– Inhalation of infectious respiratory droplets

Visible signs

Violent Coughing

Mucopurulent Nasal Discharge

Stand With Limbs Abducted and Neck Extended

Prevention & Control

- Quarantine and disinfection measures.
- Vaccination gives good protections.
- Antibiotic treatment is done.

7.1 Healthcare Management of Goats

The main objective of the healthcare management of goats is to reduce mortality, increase daily growth, and prevent major diseases to augment the productivity and production of goats. The main methods of health management include:

i. Daily Management

Daily management of goats, mainly taking care of kids and pregnant goats, can solve about 70% of the production-related problems of the herd. Apart from this, pneumonia and worm defects can be reduced by making clean separate houses for goats. Daily cleaning of sheds and availability of clean drinking water helps overall performance and welfare of animals.

ii. Balanced Diet

Feeding balanced ration to goats keeps the daily weight gain on track. Apart from this, many diseases which occur due to lack of salt and minerals can be reduced by supplementation. It also boosts the immunity of animals which fights against diseases.

iii. Vaccination and Annual Health Calendar for Goats

Vaccination schedule of goats is given below: -

Diseases	Vaccine name	Dose & Route	Primary injection		Repeat vaccination
			First injection	Booster injection	
Peste des Petits Ruminants (PPR)	PPR vaccine	1ml S/c	At 3 months of age	Not required	After 3 years
Goat pox/Sheep pox		1ml S/C on inner aspect of thigh	At 3-5 months of age	3-4 weeks after 1st injection	Annually (preferred in December)
Contagious Caprine Pleuropneumonia (CCPP)	CCPP or IVRI vaccine	2 ml S/C	At 3 months of age	3-4 weeks after 1st injection	Annually (preferred in January)
Enterotoxaemia (ET)	ET vaccine	5 ml S/C	At 3-5 months of age	3-4 weeks after 1st injection	Annually (recommended in May-June)
Foot & Mouth Disease (FMD)	Polyvalent FMD vaccine	3 ml S/C	At 3 months of age	3-4 weeks after 1st injection	Twice in a year (preferred in September & March)
Anthrax	Anthrax spore vaccine	1ml S/C	At 6 months of age	3-4 weeks after 1st injection	Annually (in affected area only) in May-June

[4]ICAR – Indian Veterinary Research Institute (IVRI), Izatnagar, UP (India)

The Peste des Petits Ruminants (PPR), Goat Pox and Enterotoxaemia (ET) vaccines are to be done everywhere due to high prevalence. Always follow the instructions of the manufacturing company before the administration of any vaccine.

iv. Vaccination and Cold Chain Maintenance

The farmers must check that special care is given for storing, transporting and maintenance of the vaccines. Once the temperature of the vaccines exceeds 8ºC, it is destroyed and cannot be cured again.

v. Deworming: Prevention From Endo-parasites (Parasites of GI Tract)

- Primarily deworming should be done at the age of 3 months.
- Deworming should be done before the onset of Monsoon, which is May/June of every year.
- In the area where water logging is a problem, deworming should be done twice a year, i.e., pre-monsoon and post-monsoon.
- Commonly used drugs for deworming are Albendazole, Fenbendazole, Nilzan, Ivermectin, etc.

- To avoid drug resistance, one must change the medicine every time during deworming.
- The first anthelmintic is given at 25-30 days. Then it should be given every month for three months. After that anthelmintic medicine should be given at every three months interval or need base.

vi. Dipping: Prevention From Ectoparasites (Ticks, Lice, Fleas)

- Dipping should be done twice a year (one each before the onset of summer and winter).
- Dipping can be done by making 0.1% solution of Butox or Tickomax in water.
- All animals should be given ad-lib drinking water before dipping.
- A test dipping can be done by dipping 5 to 10 animals a day before the schedule dipping and if everything remains normal the entire flock can be dipped the next day.
- Avoid dipping during rainy season.

The goats are also infested with various external parasites that cause irritation and itching. They also destroy the skin and make the goats anaemic and weak. Different parasitic infestations occur in different conditions, such as:

→ Lice- In cold period

→ Ticks- When goats are reared along with dogs and other infested cattle.

→ Mites- When reared very close to dirty shed.

vii. Drenching for Coccidiosis:

- The disease is more prevalent in young ones, i.e., animals between 1-6 months of age group.
- Primarily drenching can be done at an age of 1-3 months, anticoccidial drugs like Amprolium can be given @ of 50-100 mg orally for 5 days.

viii. Managing Disease Outbreaks

What to do during the outbreak of any kind of disease:

- Sick animals or goats should be isolated from other herd members.
- Separate feed and water should be provided to the sick animal.
- Pashu Sakhi/veterinary doctor should first check healthy animals every day and then take care of sick animals. They will keep themselves clean so that disease cannot spread.
- Dead animals should be buried properly.
- To investigate and find out the disease properly, get the postmortem done and send the samples to the laboratory for examination.

IMPORTANCE OF GOAT PRODUCTS FOR CONSUMERS

8. IMPORTANCE OF GOAT PRODUCTS FOR CONSUMERS

The goats are reared for meat, milk, and wool production. There are specific breeds of goats and areas where the product is produced like goat fiber is produced in the Himalayan region. The farmers rear milk breeds of goats like Jamunapari, Beetal, Jhakhrana, etc. in other parts of the country. The goat products have unique features which make them premium products to fetch good prices. However, farmers unknowingly sell them at very cheap prices.

i). Goat Milk

Goat milk has lots of advantages: It can decrease bad cholesterol, has antioxidant properties for body healing, is easily digestible and improves digestion, provides calcium for bone growth, antidiabetic and anti-cancerous properties too.

The Jamunapari goats yield milk of up to 3 liters per day, which can be used for home consumption and sold in the market for family income.

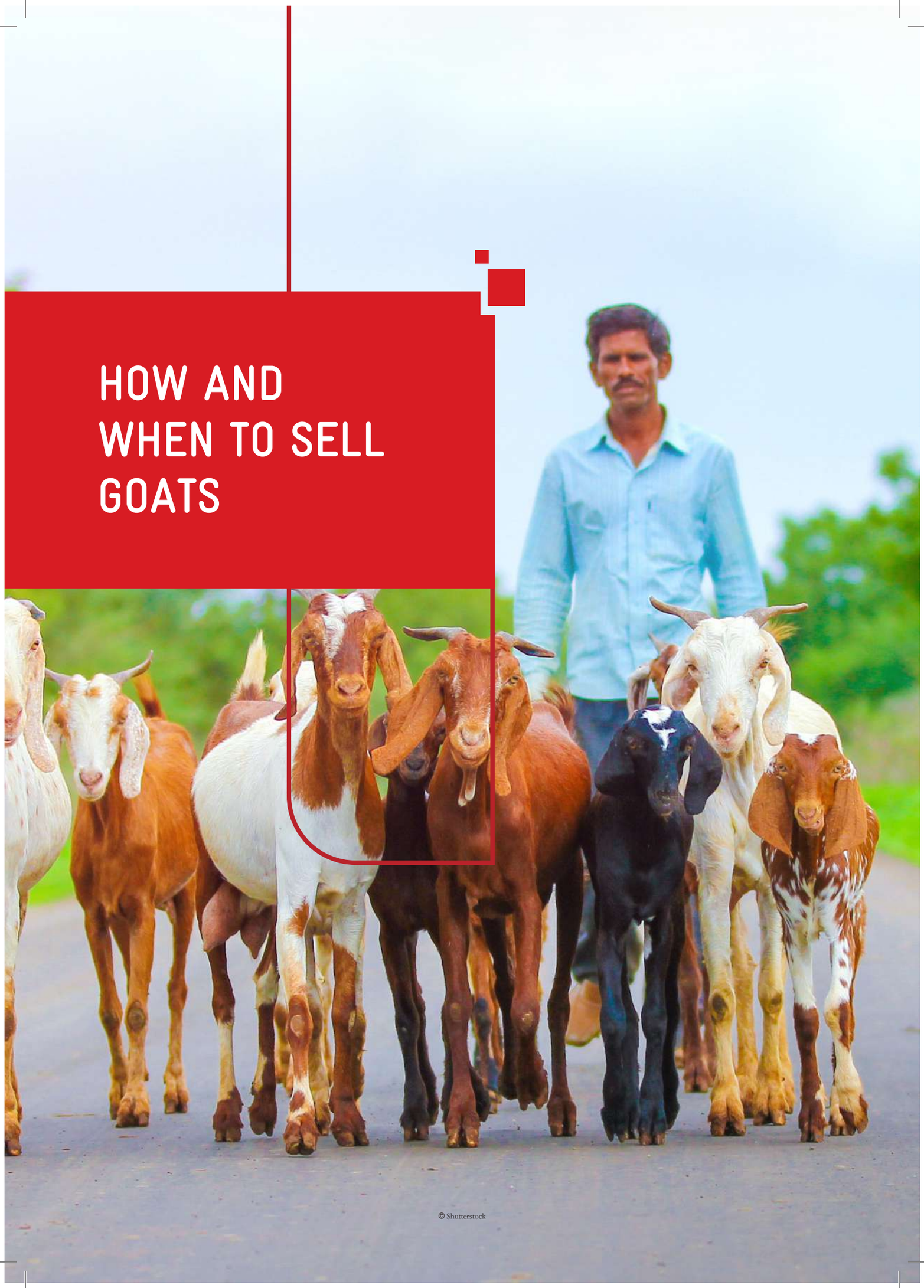
ii). Goat Meat

The goat meat has less fat and is rich in protein. There is high demand for goat meat across the country. There is no social as well as religious restriction for the consumption of goat meat.

iii). Other Products From Goats

The goat breeds in hilly areas produce fine-quality warm wool. The cashmere is produced from many hilly goats which is in high demand, pashmina is produced from goats, and mohair is produced from angora goats. The fiber from goats is of high quality and commands a premium price in the market.

HOW AND WHEN TO SELL GOATS



9. HOW AND WHEN TO SELL GOATS

The live goats are sold for meat purposes or further rearing. The farmers can sell goats at any age but for maximum profit, the following points need to be considered:

i. Sell the male goat once it attains maturity and attains the market weight (18 kilograms in Black Bengal Goats, 27-30 kilograms in big goats). The growth becomes slow after that and the goats eat more.

ii. There is a requirement to plan cash flow to avoid distressed selling.

iii. Always sell the goats based on weight, not on visual appraisal (estimation) to fetch a better price.

iv. It is highly recommended to target the festive months for higher prices, but there is a price fluctuation risk.

v. Don't sell sick animals to anyone.

vi. It is good to sell the goat at the doorstep to save time and energy.

vii. If you take goats to the market for selling, never return the animals to your home/village as it may carry diseases from outside.

LOANS, SCHEMES, AND INSURANCE FOR GOAT REARING

10. LOANS, SCHEMES, AND INSURANCE FOR GOAT REARING

The income from goats is dependent on the number of does reared in the household. Usually, in the eastern states (Odisha, Bihar, Jharkhand, etc.) most of the households rear small herds (3-5 goats), in comparison to bigger herd sizes in the western Indian states (Rajasthan, Gujarat, Telangana, etc.). The various conditions which cause them to rear small herds are -

- Lack of fodder availability or grazing patch in the area.
- Lack of capital for investments
- Lack of infrastructure to support the bigger herd like shed and space.
- Also, availability of full-time labour for grazing.
- Higher mortality rate in goats.
- Lack of knowledge of goat farmers.
- Lack of assured market facilities for selling goats.

10.1 Financing Options on Goat-based Livelihoods

The requirement of capital varies from farmer to farmer. There is a requirement of a few thousand by a Self Help Group member to a few lakhs by youth or entrepreneurs. The various external financing mechanisms available for goat rearing are:

a. **SHG Finance:** The financing from SHG is easy and requires no documentation. The individual's credit repayment history and availability of cash at SHG play an important role. The SHG revolution by the (National Rural Livelihood Mission (NRLM)) and NGOs has played an important role in financing for goat livelihood. The SHG can also be a medium of indirect linkage to banks for financing goat. The amount of financing from SHG is meager to purchase 2-3 goats, but it can be availed many times with good repayments.

b. **Support From Microfinance (MFIs):** The MFIs also play an important role in strengthening goat-based livelihoods. This loan comes with high interest but is available at the doorstep with minimum documentation. The range of MFIs is INR 20,000 to 2 lakhs.

c. **Support From Banks:** The routine government banks also support goat rearing under the guidance of NABARD. The banks need project reports for financing. The agriculture lead bank and nearest branch can be approached for financing.

10.2 Schemes on Goat

The government runs various schemes, which provide grant support to the farmers for the promotion and strengthening of livelihood. The various schemes for goat rearing are:

a. **National Livestock Mission (NLM):** The NLM supports the establishment of a 500-unit goat breeding farm and provides subsidies up to 50 lakhs. The NLM scheme needs professional experience and lots of documentation for processing. The more information is available on https://nlm.udyamimitra.in.

b. **Goat Development Schemes in States:** There are programs in various states that are implemented by Animal Husbandry Department of the state. It supports the establishment of 10+1, 20+1, and 40+1 goat farms with grant support of up to 60% (SC&ST) and 50% for others. The grants vary from state to state. The local veterinary officer can be approached for the scheme details.

c. **NABARD:** NABARD has incorporated the goat support activity in the Area Development Schemes for some of the states in selected districts. It supports the establishment of goa trearing units of 10+1 with a back-end subsidy of 25%. The NABARD office can be helpful in the district, but local banks can also provide support for schemes.

d. **Schemes in Tribal Subplan:** In some of the states there is a provision for grants under the Tribal subplan for ST people. The scheme is implemented by the tribal development societies or agencies.

e. **State Rural Livelihoods Missions (SRLMs):** There are some schemes that are supported by the state governments through the SRLMs like in Bihar, there is Satat Jeevikoparjan Yojana (SJY), which also support goat asset creation.

10.3 Insurance of Goats

The insurance of goats is required to compensate the farmers' losses due to the mortality of goats. It requires providing information about the goat, ear tagging and paying premiums. The goat insurance is available at a premium of 10% of the goat's value for three years.

The insurance of goats is provided by government insurance companies and private insurance companies. The local veterinary officer of the area provides health certificates for insuring the goats.

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GETTING SUPPORT FROM MGNREGA

11. GETTING SUPPORT FROM MGNREGA

The MGNREGA is the largest rural employment program in the country, and it is popular and present in every village. Most of the farmers are well aware about the process of getting employment and schemes.

There are schemes under MGNREGA to support the goat-based livelihood directly and indirectly.

11.1 Supports in MGNREGA

There is one scheme which directly supports goat rearers:

a. Provision of goat sheds construction under MGNREGA- The scheme supports the construction of a goat shed of 7.5 square meter (80 square feet), for rearing of 5-6 goats and their kids. The four walls can be constructed up to 2.2 meter, with roof of iron sheets and Murom floor. The goat shed is entirely constructed with the Government fund. The scheme is limited to the Schedule Caste (SC), Schedule Tribes (ST), Below Poverty Line (BPL), Pradhan Mantri Awas Yojana (PMAY) beneficiaries, and single women households only.

The other indirect schemes of MGNREGA which support goat livelihood are:

a. Schemes to improve the drinking water availability.
b. All watershed development works, which improve the green grass coverage.
c. Schemes which improve the agriculture and fodder availability.

11.2 Process of Getting MGNREGA Support

The process of getting MGNREGA support on the individual-owned land are:

a. Get registered in MGNREGS and avail the job card.
b. The individual must belong to a special category of ST, SC, BPL, SEC deprived, PMAY beneficiary.
c. They must have land for the construction of the shed.
d. They must participate in Gram Sabha and put the demand for the shed to the Sarpanch.
e. Follow up with Rojgar Sahayak regarding the approval and implementation time.

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ANNEXURES: RECORDS TO BE MAINTAINED AT SHED

i. Deworming Table

Activity Plan		Activity Performed				
Plan	Date	Date	Name of Drug	No. of Animals Dewormed		Total Amount
				Small	Big	
1st						
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
11th						
12th						
13th						
14th						
15th						
16th						
17th						
18th						
19th						
20th						
21st						
22nd						
23rd						
24th						

ii. Vaccination Table

Activity Plan		Activity Performed				
Plan	Date	Date	Name of Drug	No. of Animals Vaccinated		Total Amount
				Small	Big	
1st						
2nd						
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						

iii. Selling of Stock

Stock available for sale			Stock sold			
No. of Animals	Kgs	Date	No. of Animals	Kilograms	Rate	Amount

iv. Housing Rating Chart

Housing Rating Chart			
SN	**Parameters**	**Total score**	**Score obtained**
01	Separate Housing Area for Goats	2	
02	Location of the House	2	
03	Adequate Space as per Herd Size Approx. 8-10 Square Feet /Doe	1	
04	Partitions	1	
05	Open Space for Exercise	2	
06	Roof with Adequate Sunlight	2	
07	Adequate Ventilation	2	
08	Proper Drainage	2	
09	Dry Floor	2	
10	Proper Raised Platform (Height and Breadth)	3	
11	Cleanliness and Repairs	2	
12	Protection From Cold and Rains	2	
13	Footbath	2	
14	Feeder for Greens and Concentrate (Separate)	2	
15	Waterer	1	
16	Compost Pit	2	
	Total Score	**30**	

Grading Criteria:

- Score of 24 (80%) and above is excellent.
- 70 to 79% is very good.
- 60 to 65% is good.
- Less than 60% is not satisfactory.

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