INDEX

TOPIC 1 & 2

Importance of livestock in the national economy

1) Livestock census and production trends
2) Milk production
3) Meat production
4) Animal draught power
5) Transportation
6) Trade
7) Employment generation

1) Livestock census and production trends

Category	Population (In million) 2012	Population (In million) 2019	% growth
Cattle 1st	**190.90**	**192.49**	**0.83**
Buffalo 1st	**108.70**	**109.85**	**1.06**
Sheep 6th	**65.07**	**74.26**	**14.13**
Goat 2nd	**135.17**	**148.88**	**10.14**
Pig	**10.29**	**9.06**	**-12.03**
Mithun	**0.30**	**0.38**	**26.66**
Yak	**0.08**	**0.06**	**-25.00**
Horses & Ponics	**0.63**	**0.34**	**-45.58**
Mule	**0.20**	**0.08**	**-57.09**
Donkey	**0.32**	**0.12**	**-61.23**
Camel	**0.40**	**0.25**	**-37.05**
Total Poultry 5th	**729.21**	**851.81**	**16.81**
Total Livestock	**512.06**	**535.78**	**4.63**

- Livestock plays an important role in Indian economy.
- About 20.5 million people depend upon livestock for their livelihood.
- Livestock contributed 16% to the income of small farm households as against an average of 14% for all rural households.
- Livestock provides livelihood to two-third of rural community.
- It also provides employment to about 8.8 % of the population in India. India has vast livestock resources.
- Livestock sector contributes 4.11% GDP and 25.6% of total Agriculture GDP.

2) Milk production

- Milk Production in India has increased manifold and in the last financial year, the total milk production in the country crossed the mark of 196.18 MT.

- ❖ Among all states in India, Uttar Pradesh is the leader in milk production in the country with an annual production of more than 18 MT.

India ranks 1st in the milk production with 196.18 million tones milk production in the year (2019-20).

Buffalo, cow, goat, share 56, 42 and 2% respectively.

Per capita consumption -322 gms / day /capita,

where as ICMR recommended 283 gm/day.

Annual milk production and per capita availability from 1950-2019

Financial Year	**Production (million tones)**	**Per capital availability (gm/day)**
1950-51	17.00	132
1960-61	20.00	127
1973-74	23.20	111
1980-81	31.60	128
1990-91	53.90	178
2000-01	80.60	220
2011-12	121.4	263
2012-13	132.4	290
2013-14	137.7	293
2014-15	137.7	322
2019-20	196.18	326

Milk production and productivity

COUNTRIES	**MILK PRODUCTION (%) in 2020**
1. INDIA	196.18 Mt
2. USA	99.16 Mt
3. PAKISTAN	47.30 Mt
4. BRAZIL	35.17 Mt
5. CHINA	32.67 Mt

Production of milk in India is 196.18 Mt during 2019-20

STATES	MILK PRODUCTION (%) 2019-20
1. UTTAR PRADESH	18%
2. RAJASTHAN	11%
3. ANDHRA PRADESH	10%
4. GUJRAT	8%
5.PUNJAB	7%

Milk and milk products utilization pattern

Milk Production	Utilization %
Liquid Milk	**88**
Dahi	**3.09**
Ice- Cream	**1.71**
Paneer	**1.69**
Ghee/Butter	**1.69**
Chhana	**0.95**
Kulfi	**0.92**
Tea	**0.59**
Khoa	**0.60**
Sweetened milk	**0.31**

3) Meat production

India ranked 5th in the world in terms of production volume.

India is responsible for 3% of the total meat production in the world.

The nation has the world's largest population of livestock at about 515 million.

- ✓ Flesh foods are rich in protein and good source of vit.B-12.
- ✓ Average meat production 6.2 MT (2019-20) and Fish production 10.16 MT
- ✓ Also produce 78.48 billion eggs (2019-20)
- ✓ Per capita consumption of meat is 4.4 kg / capita/ year , but 11 kg

recommended by ICMR.

- ✓ Egg availability is just around 55 /capita/year but ICMR recommended 180 eggs per year.

4) Animal draught power

The horse power obtained from one bullock pair is about 0.75 HP.

Mechanization of agriculture has been done only 30%.

Drought power of 65 million animals has been estimated 30,000 MW in terms of electric power equivalent to half the present generation capacity of India. In terms of energy it is equivalent to 50,000 million units worth Rs.10,000 crore.

Draft animal power saves six million tones of fossil fuel per year , valued at Rs.12000 crores.

5) Farm yard manure

A minimum of 10 – 12 kg of dung is obtained on an average from every cow or buffalo and excellent source of FYM or compost manure.

Dung cakes used for fuel also.

Helpful in the maintaining the soil fertility

Beside cow dung poultry dropping and goat excreta can also better for utilized as organic manure.

Helpful in maintaining the carbon : nitrogen ratio.

If dung is passed through a gobar gas plant it would yield about 13 cubic feet of cooking gas per animal per day.

Each animal would produce about 73 kg. of nitrogenous fertilizer per year.

It is reported that fermentation of 75 % of the animal dung collected would yield an estimated 195 million MW energy and nearly 236 million tones of organic manure would provide around 35 million tones of nitrogen, more than the existing nitrogen chemical fertilizer manufacturing capacity in country.

6) Transportation

About 2/3 of rural transportation is carried by bullock carts.

Rural transportation is estimated to 25000 million ton km of freight per year saving 6 million of diesel worth Rs.4000 crores annually.

7) Trade

India's export earnings from livestock products as 469.6 million US dollar in 2002-04.

The export of meat and meat products, dairy products and eggs during this period as 72.8%, 13.4% and 10.4% of total livestock export in 2002-04, respectively.

8) Employment generation

Livestock sector provide or generate regular employment to millions of people.

Employment in animal husbandry sector 22.45 million, which is 5.50 of the total working population of the country. Out of 22.45 million engaged in Animal husbandry sector, 16.84 millions are females.

Women employees constitute 69 % of the labour force in livestock as against 35 % in crop farming.

DIFFERENT LIVESTOCK DEVELOPMENT PROGRAMME
Dairy Development Programmes:

1) **Dairy co-operatives:**

Amul and the Anand pattern; India's white revolution had its origin in a single small enterprises started in Gujarat state.

In 1946 at the suggestion of Sardar Vallabhbhai Patel, the farmers in Kaira district formed a co-operative union to supply milk directly to Bombay milk scheme (BMS), cutting out private dairy and middlemen who were then supplying to BMS.

The 3 tier co-operative system.

Tier-I – The village milk producers co-op. society.

Tier- II – The District Dairy co-op. union.

Tier- III- The co-op milk marketing federation.

2) Key village scheme(KVS):

It was taken up in August 1951 as a part of the first five year plan of india.

First step initiated for systematic cattle improvement in the country.

It comprised of a comprehensive programme incorporating all aspects necessary for improving the productivity of cattle as under:

i) Introduction of superior bulls

ii) Castration of undesirable inferior bulls.

iii) Use of AI

iv) Improved fodder production

v) Prevention and treatment of disease

vi) Distribution of mineral feed supplement.

3) Intensive cattle Development Projects (ICDPS)

vii) ICDPS was launched in 1965 for augmentation of milk production in areas around large dairy plants so as to enable to work their full capaicity and to meet the growing demands of milk.

viii) During the third and fourth five year plan it gained its significance by its activites such as

ix) a) Formation of NDDB ,

x) b) Establishing progeny testing farms,

xi) c) establishing forzen semen stations

xii) d) Institute of Buffalo research

xiii) e) Embryo transfer technology

4) Operation Flood

xiv) Operation flood programme was launched in 1970, for replicate Anand Pattern and create a flood of milk in Indian's villages.

xv) The programme involved in, organizing dairy co-operatives at village level, the physical and institutional infrastructure for milk procurement, processing, marketing and production enhancement services at the union level and establishment of city dairies.

xvi) Programme involved in three phaes:

xvii) i) Operation Flood – I – 1970 – 81

xviii) Ii) Operation Flood –II – 1981-85 (extended upto 1987)

xix) Iii) Operation Flood –III – 1985- 96 (extended upto 1997)

5) Special livestock breeding programme (SLBP)

SLBP was operating as a part of Integrated Rural Development project (IRDP) during the sixth five year plan. The scheme was transferred to Animal husbandry in 1986-87. The objectives of SLBP are to

a) generate additional employment and income to small, marginal farmers and agricultural labors.
b) increasing livestock production.

6) Technology mission on dairy development

c) It was launched in seventh five year plan with a budget of Rs. 1070 crores to increase India's milk production to 61 million tonnes by 1995 and per capita availability of milk to 186 gm.

7) Artificial Insemination Programme

d) The use of frozen semen was introduced in the year 1965 in an organized manner. Central frozen semen bank was established in Karnataka in the year 1969 for

processing and distribution of frozen semen from bulls of exotic breeds to various states.

8) Fodder development programme

For the propogation of good varities of fodder and to serve also as demostration centres,

8 regional stations were started in various parts of country.

These are at

a) Kalyani in WB,
b) Srinagar in J&K,
c) Suratgarh in Rajasthan,
d) Hissar in Haryana,
e) Gandhinagar in Gujarat,
f) Almadi in T.N.
g) Hydrabad in A.P. and
h) Hessarghatta in Karnataka.

The main objective of these regional stations is to demonstrate successful cultivation of good quality fodder crops and grasses suitable to the region and to provide seed for farmers.

9) Milk & milk products order (MMPO)

The Govt. of India has issued this programme during 1992 under the liberalization policies.

It stipulates that those dairy plants exceeding its utilization of 10000 liters per day must register with Govt. for its modernization, product manufacturing and to collect milk in specified areas.

B. Sheep Development Programmes

The central & state Govt. have started financing sheep husbandry through sheep development programmes like

a) Special Animal Husbandry Programme: Sheep production scheme.
b) Special livestock production programme: Sheep production.
c) European Economic Committee (EEC) sheep development project.
d) Intensive health cover for sheep.
e) Sheep rearing programme.
f) Sheep programme with special central assitance.
g) Integrated wool Improvement programme (IWIP).

c) Piggery Development Programmes

h) Piggery development was started with the establishment of regional pig breeding stations, and model piggery units with the exotic pig breeds in various states all over India during II,III,and IV plan periods.

Special schemes for piggery development like;

a) Establishment of piggery development block.
b) Distribution of exotic boars for upgrading desi pigs.
c) Strengthening of piggery units.
d) Scheme for fattening crossbreed weaners.

TOPIC 3

TERMINOLOGY

Common Terms Used in Livestock Production and Management

1) **Animal husbandry:** Animal husbandry may be defined as a biological science and an art of management of domesticated animals, including scientific breeding, feeding, heeding, housing and health cover.
2) **Ad libitum:** It refers to allowing the animal to consume the greens and dry roughages free of choice.
3) **Artificial Insemination:** The act of deposition of spermatozoa in the female reproductive organ by artificial methods rather than by male genital at proper place and time.
4) **Breed**: Animals which have common origin and so the common characteristics which distinguish them from other group of within the same species
5) **Breeding**: It is the manipulation of hereditary material in accordance of the terms of demand dectates.
6) **Branding**: It is method of imprinting permanent number or any identification mark on the skin of animals by hot iron or chemical or coolant.
7) **Bull**: A mature uncastrated male bovine,
8) **Buller**: Cow always in oestrus condition is called a buller.
9) **Castration**: Act of crushing the spermatic cord by burdizzo's castrator
10) **Colostrum**: The first secretion from the udder of cow after parturition (Giving birth to young one). It is rich in nutrients and antibodies, vitamins and serves as a food for the newly born calf.
11) **Close breeding:** Mating of closely related individuals such as parents to their offsprings or between full sibs
12) **Cross breeding:** It is mating of two or more different breeds
13) **Culling**: It is the process of removal of unproductive or undesirable animal from the herd.
14) **Dehorning**: It is the term used to denote the removal of horns within a week after the birth of young one.
15) **Ear notching:** It is method of V shape cut/ notches at specific place along the border of ear with the help of scissor or pincers. This method of marking is common in pigs.
16) **Fecundity:** The potential capacity of the female to produce the functional ova
17) **Fertility:** It refers the ability to reproduce
18) **Fertilization:** It is union of male and female gamete
19) **Full sibs:** Individuals with common parents
20) **Gestation:** The period of pregnancy
21) **Grading Up:** Grading up is defined as mating of purebred sire with nondescript females and their offsprings for generation after generation till the progenies are reached nearly 98 to 99 per cent inheritance of original breeds
22) **Grooming:** It is the care full brushing and combing of the body hair coat and dead hairs and scalp.

23) **Half sibs:** Individuals with one common parent
24) **Herd:** A group of cattle of same breed or mixed breed
25) **Heredity:** Transmission of genetic or physical traits/ characters from the parent to their offsprings
26) **Milking:** Milking is skillful act of drawing milk from udder of lactating animal
27) **Offspring:** Young one of either sexes produced by their parents
28) **Parturition:** The act of giving birth to young one
29) **Pedigree:** It is record or history of ancestors of an individual
30) **Pregnancy/ Gestation:** A condition os female carring developing young one in its uterus
31) **Prepotency:** It is an ability of an individual animal to stamp a given set of characteristics on its offsprings.
32) **Prolificacy:** Giving birth to many or few offspring from given mating
33) **Puberty**: It is stage of life of animal indicating first sexual activity
34) **Ration**: it is feed allowed to a given animal during a day of 24 hours.
35) **Service**: the process in which mature male covers the female in heat with the aim to deposit the spermatozoa in female genitalia.
36) **Species**: A group of individuals which have certain common characteristics that distinguish them from other group of individuals within a genera or genus.
37) **Tagging**: tagging is method of fixing tag on the ear / neck of animals to identify them.
38) **Tattooing**: It is process of puncturing a desired number or letter on the inside of ear with the help of tattoo forceps and then rubbing it with tattooing ink on punctures.
39) **Teaser**: A vasectomized (castrated) male used to detect heat or estrus of a female in the herd.
40) **Broiler**: the hybrid chicks having rapid growth and attaining 1.50kg weight during the period of 6 week of age
41) **Brooding**: The process of rearing the young chicks from day old stage to 4 to 6 weeks of age, during which warmness is provided by artificial means.
42) **Brooder**: A device for providind artificial heat to the chicks.
43) **Chick**: A young male or female of fowl below 8 weeks of age.
44) **Cock**: A matured male of chicken above 20 weeks of age.
45) **Cockrel**: A young male of chicken from 5 to 8 weeks of age.
46) **Debeaking**: The act of removing beak of the birds by instrument called debeaker. Preferably done in first week of age
47) **Hatching**: A process by which the fully developed foetus (chick) leaves the protecting shell environment of egg and emerges into the world (birth).
48) **Hen**: A matured female chicken of above 20 weeks of age
49) **Layer**: An egg laying female chicken upto one year after starting laying the eggs.
50) **Moulding:** A process of shedding old feathers.

Animal	Male	Female	Newly born	Castrated male	Group	Act of mating	Act of parturition	Meat
Cattle	Bull	Cow	Calf	Bullock	Herd	Service	Calving	Beef
Buffalo	Buffalo bull	She buffalo	Calf	Buffalo bullock	Herd	Service	Calving	Buffen
Sheep	Ram	Ewe	Lamb	Weather	Flock	Tupping	Lambing	Mutton
Goat	Buck	Doe	Kid	Witus	Trip	Service	Kidding	Chevon
Fowl	Cock	Hen	Chick	Capon	Flock	Foaling	Hatching	Chicken
Pig	Boar	Sow	Piglet	Hog	Stock	Coupling	Farrowing	pork

TOPIC 4 & 5

IMPORTANT INDIAN AND EXOTIC BREEDS OF CATTLE AND BUFFALO

A) Indigenous milch breeds of cattle

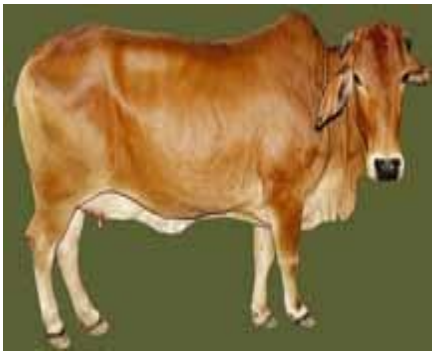
1. Gir

- This breed is otherwise known as Desan, Gujarati, Kathiawari, Sorthi, and Surati.
- Originated in Gir forests of South Kathiawar in Gujarat.
- Basic colours of skin are white with dark red or chocolate-brown patches or sometimes black or purely red.
- Horns are peculiarly curved, giving a ‘half moon’ appearance.
- Milk yield ranges from 1200-1800 kgs.
- Age at first calving 45-54 months and inter calving period from 515 to 600 days.

2. Red Sindhi

- This breed is otherwise called as Red Karachi and Sindhi.
- This breed mostly found in Karachi and Hyderabad district of Pakistan.
- Colour is red with shades varying from dark red to light, strips of white.
- Milk yield ranges from 1100-2600 kgs.
- Widely used in crossbreeding programmes.
- Age at first calving 39-50 months and inter calving period from 425-540 days.

3. Sahiwal



- Originated in Montgomery district in present Pakistan.
- This breed otherwise known as Lola (loose skin), Lambi Bar, Montgomery, Multani, Teli.
- The colour is reddish dun or pale red, sometimes flashed with white patches.
- The average milk yield of this breed is between 2,725 and 3,175 kgs in lactation period of 300 days

B) Indigenous Draught breeds of cattle

1. Hallikar

- Originated from the former princely state of Vijayanagarm, presently part of Karnataka.
- The colour is grey.
- They are compact, muscular and medium size animal.
- The breed is best known for its draught capacity and especially for its trotting ability.

2. Amritmahal

- Originated in Hassan, Chikmagalur and Chitradurga district of Karnataka.
- Amiritmahals are grey cattle but their shade varies from almost white to near black.
- Horns are long and end in sharp black points.

3. Khillari

- Originated from Solapur and Satara districts of Maharashtra.
- Grey-white in colour and have quick gait

4. Kangayam

- Originated in Kangayam, Dharapuram, Perundurai, Erode, Bhavani and part of Gobichettipalayam taluk of Erode and Coimbatore district.
- The Kangayam breed was developed by the efforts of the late Pattogar of Palayakottai, Sri N. Nallathambi Sarkari Manradiar.
- Coat is red at birth, but changes to grey at about 6 months of age.
- Bulls are grey with dark colour in hump, fore and hind quarters.
- Bullocks are grey.
- Cows are grey or white. However, animals with red, black, fawn and broken colours are also observed.
- The eyes are dark and prominent with black rings around them.

5. Bargur

- Found around Bargur hills in Bhavani taluk of Erode district.
- Bargur cattle are of brown colour with white markings. Some white or dark brown animal are also seen.
- Animals are well built, compact and medium in size.

6. Umblachery

- It is otherwise called as Jathi madu, Mottai madu, Molai madu, Therkathi madu.
- Originated in Thanjavur, Thiruvarur and Nagappattinam districts of Tamil Nadu.
- Umblachery calves are generally red or brown at birth with all the characteristic white marking on the face, on limbs and tail.
- The practice of dehorning of bullocks is peculiar in Umblachery cattle.

7. Pullikulam / Alambadi

- This breed is commonly seen in Salem and Coimbatore district of Tamil Nadu and part of Bangalore district of Karnataka.
- Pulikulam / Alambadi bulls are dark grey, almost black and cows grey or white.
- They have the typical backward curving horns of Mysore type cattle.
- They are active, useful draught animals but not fast trotter.

C) Indigenous dual purpose breeds of cattle

1. Tharparkar

- Originated in Tharparkar district of southeast Sind in Pakistan.
- Otherwise known as White Sindhi, Gray Sindhi and Thari.
- Body colour is white or light grey.
- The bullocks are quite suitable for ploughing and casting and the cows are good milch animals (1,800 – 2600 kgs).
- Age at first calving ranges from 38-42 months and inter calving period from 430 to 460 days.

2. Hariana

- It was originated from Rohtak, Hisar, Jind and Gurgaon districts of Haryana.
- Horns are small.
- The bullocks are good workers.
- Hariana cows are good milkers yielding on an average 1.5 kg/cow/day in a lactation period of 300 days.
- Average milk yield is 600 to 800 kgs per lactation. The age at first calving is 40-60 months.

4. Kankrej

- It is otherwise called as Wadad or Waged, Wadhiar.
- Originated from Southeast Rann of Kutch of Gujarat and adjoining Rajasthan (Barmer and Jodhpur district).
- Colour of the animal varies from silver-grey to iron-grey or steel black.
- The gait of Kankrej is peculiar called as 1 ¼ paces (sawai chal).
- Kankrej is valued for fast, powerful, draught cattle. Useful in ploughing and carting.
- The cows are good milkers, yielding about 1360 kgs.

5. Ongole

- Otherwise known as Nellore.
- Home tract is Ongole taluk in Gantur district of Andhra Pradesh.
- Average milk yield is 1000 kgs. Age at first calving is 38-45 months with an intercalving period of 470 days.

6. Krishna Valley

- Originated from black cotton soil of the water shed of the river Krishna in Karnataka.
- Animals are large, having a massive frame with deep, loosely built short body.
- Tail almost reaches the ground.
- Common colour grey white with a darker shade on fore quarters and hind quarters in male. Adult females are more whitish in appearance.
- The bullocks of this breed are powerful animals useful for slow ploughing, and valued for their good working qualities.
- The cows are fair milkers, average yield being about 916 kgs during the lactation period.

7. Deoni

- This breed otherwise known as Dongerpati, Dongari, Wannera, Waghyd, Balankya, Shevera.
- Originated in Marathwada region of Maharashtra state and adjoining part of Karnataka and western Andhra Pradesh states.
- Body colour is usually spotted black and white.
- Age at first calving ranges from 894 to 1540 days with an average of 1391 days.
- Milk yield ranges from 636 to 1230 kgs with an average of 940 days.
- Caving interval averages 447 days.

D) Exotic dairy breeds of cattle

1. Jersey

- It is the smallest of the dairy types of cattle developed on island of Jersey, U.K.
- In India this breed has acclimatized well and is widely used in cross breeding with indigenous cows.
- The typical colour of Jersey cattle is reddish fawn.
- Dished fore head and compact and angular body.
- These are economical producers of milk with 5.3% fat and 15% SNF.

2. Holstein Friesian

- This breed was developed in the northern parts of Netherlands, especially in the province of Friesland.
- They are ruggedly built and they possess large udder.
- They are the largest dairy breed and mature cows weigh as much as 700kg.
- They have typical marking of black and white that make them easily distinguishable.
- The average production of cow is 6000 to 7000 kgs per lactation. However, the fat content in their milk is rather low (3.45 per cent).

3. Brown Swiss

- The mountainous region of Switzerland is the place of origin of Brown Swiss breed.
- It is famous in its home tract for its rugged nature and good milk production.
- The Karan Swiss is the excellent crossbred cattle obtained by crossing this breed with recognized Indian breeds of cattle.

4. Red Dane

- The typical body colour of this Danish breed is red, reddish brown or even dark brown.
- It is also a heavy breed; mature males weighing up to 950 kgs and mature female weigh 600 kgs.
- The lactation yield of Red Dane cattle varies from 3000 to 4000 kgs with a fat content of 4 per cent and above.

5. Ayrshire

- Origin Ayrshire in Scotland is considered as most beautiful dairy breed. These are very active animals but hard to manage.
- They do not produce as much milk or butter fat (only 4%) as some of the other dairy breeds.
- The breed was also known as Dunlop cattle or Cunningham cattle.

6. Guernsey

- Originated from Small island of Guernsey (France).
- The milk has a golden colour due to an exceptionally high content of beta carotene which may help to reduce the risks of certain cancers.
- The milk also has a high butterfat content of 5% and a high protein content of 3.7%.
- Guernsey cows produce around 6000 litres per cow per annum.
- The Guernsey cow has many notable advantages for the dairy farmer over other breeds includes high efficiency of milk production, low incidence of calving difficulty and longevity.

BUFFALO BREEDS

1. Murrah

- It is the most important breed of buffaloes whose home is Rohtak, Hisar and Jind of Haryana, Nabha and Patiala districts of Punjab and southern parts of Delhi state.
- This is otherwise called as Delhi, Kundi and Kali.
- The colour is usually jet black with white markings on tail and face and extremities sometimes found.
- The tightly curved horn is an important character of this breed.
- The buffalo cows of this breed are one of the most efficient milk and butter fat producers in India.
- Butter fat content is 7%. Average lactation yield is varying from 1500-2500 kgs and the average milk yield is 6.8 kgs /day.
- It is also used for the grading up of inferior local buffaloes.

2. Surti

- The breeding tract of this breed is Kaira and Baroda district of Gujarat.
- Coat colour varies from rusty brown to silver-grey. Skin is black or brown.
- The horns are sickle shaped, moderately long and flat.
- The peculiarity of the breed is two white collars, one round the jaw and the other at the brisket.
- The milk yield ranges from 900 to 1300 kgs.
- The peculiarity of this breed is very high fat percentage in milk (8-12per cent).

3. Jaffrabadi

- The breeding tract of this breed is Gir forests, Kutch and Jamnagar districts of Gujarat.
- The horns are heavy, inclined to droop at each side of the neck and then turning up at point (drooping horns).
- The average milk yield is 100 to 1200 kgs.
- The bullocks are heavy and used for ploughing and carting.
- These animals are mostly maintained by traditional breeders called Maldharis, who are nomads.

4. Bhadawari

- Home tract of this breed is Agra and Etawah district of Uttar Pradesh and Gwalior district of Madhya Pradesh.
- The body is usually light or copper coloured is a peculiarity of this breed. Eye lids are generally copper or light brown colour.
- Two white lines ‘Chevron’ are present at the lower side of the neck similar to that of Surti buffaloes.
- The average milk yield is 800 to 1000 kgs.
- The bullocks are good draught animal with high heat tolerance.
- The fat content varies from 6 to 12.5 per cent. This breed is an efficient converter of coarse feed into butterfat and is known for its high butter fat content.

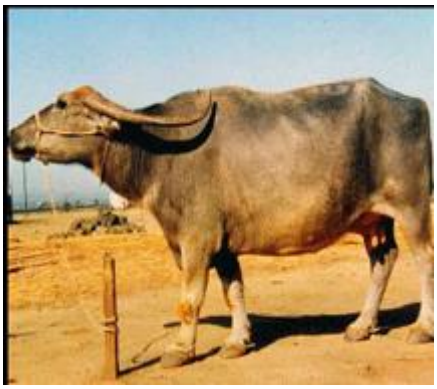
5. Nili Ravi

- This breed is found in Sutlej valley in Ferozpur district of Punjab and in the Sahiwal district of Pakistan. (Bred around Ravi river).
- The peculiarity of the breed is the wall eyes.
- The milk yield is 1500-1850 kgs per lactation.
- The intercalving period is 500-550 days and age at first calving is 45-50 months.

6. Mehsana

- Mehsana is a dairy breed of buffalo found in Mehsana town in Gujarat and adjoining Maharashtra state.
- The breed is supposed to have been evolved out of crossbreeding between the Surti and the Murrah.
- The milk yield is 1200-1500 kgs. The breed is supposed to have good persistency.
- The intercalving period ranges between 450-550 days.

7. Nagpuri



- The breeding tract of this breed is Nagpur, Akola and Amrawati districts of Maharashtra.
- These are black coloured animal with white patches on face, legs and tail. This is also called as Elitchpuri or Barari.
- The horns are long, flat and curved, bending backward on each side of the back. (Sward shaped horns).
- The age at first calving is 45-50 months with an intercalving period of 450-550 days.

8. Toda

- Toda breed of buffaloes is named after an ancient tribe, Toda of Nilgiris of south India.
- The predominate coat colours are fawn and ash-grey.
- These buffaloes are quite distinct from other breeds and are indigenous to Nilgiris hills.
- Thick hair coat is found all over the body.
- They are gregarious in nature.

TOPIC 6
PRINCIPLES OF MAXIMIZATION OF LIVESTOCK PRODUCTION

Present day domestic animals, unlike their remote ancestors, are put to abnormal use they have to stand artificial condition of life.

For instance, cow's milk was not intended purpose) by nature for human consumption.

Originally it was meant to be utilized by it calf, selective breeding by man over centuries to improvement of the productive capacity of the cow to such an extent that milk today serves as an important item of the diet of man.

This artificial method of increased milk production is a strain on her bodily resources.

Unless animal are carefully, well looked after housed properly in well ventilated, spacious, comfortable, sheds, fed on liberal, nourishing and well balanced ration and supply of clean water they will deteriorate.

Thus, livestock are to be maintained in comfortable condition for them to produce and reproduce ideally.

It has been stand that livestock productivity can be adversely affected in discomfort, thus emphasizing the importance of contended animals.

Recent research in biological and chemical sciences has brought us to a close understanding of the scientific principles that underlined this relationship between physiologically and productivity.

The universally recognized essentials of livestock improvement that are based on experience and
experiment are "breeding, weeding, feeding, and heeding.

1) Breeding :
It is mating of selected male and female animals of superior merit and known potentialities for desirable qualities. Such mating result in progeny of better production capacity.

2) Culling :
It is the practice of elimination of uneconomic, unhealthy and low producing animals from the herd so that they do not reproduce and give inferior progeny, now over the income through low productivity

3) Feeding :
It comprises of giving balanced ration correct quantities to each animal proportionate to its bodily requirements and reproductive capacity

Both over feeding and under-feeding should be avoided as the former is wasteful and the latter deficient and result in lowering the productivity of animals in the long run.

4) Heading :

It is the term coined to imply day management of animals including sanitation, hygiene and disease control, housing and care.

These four essentials are like four pillars for livestock industry. Each of them, through by itself of very great importance in raising livestock, must operate together for fuller result.

Since the well being of domestic animals is in the hands of the man to women they belong two basic considerations must be borne in the mind by anyone starting animal farming viz. Whether one can afford to maintain that led to domestication of different species of animals.

TOPIC 7
FEEDING AND MANAGEMENT OF CALF, HEIFER AND MILKING ANIMAL

FEEDING AND MANAGEMENT OF CALF

We must give good feeding and management for the calves so that they develop well and, useful for replacement stock. The feeding and care of the calf being before its birth .The dam should be dried 6-8 weeks before expected calving and should be fed well. Under fed animals will give weak and small calves.

A) Early Management:

1. Immediately after birth remove any mucous or phlegm from those nose and mouth.
2. Normally the cow licks the calf immediately the birth. This helps' dry off the calf and helps in stimulating breathing and circulation. When the cows does not lick or in cold climate, rub and dry the calf with a dry cloth or gunny bag. Provide artificial respiration by compression and relaxing the chest with hands.
3. The Naval should be tied about 2-5 cm away from the body and cut 1cm below the ligature and apply Tr. Iodine or boric acid or any antibiotic.
4. Remove the wet bedding from the pen and keep the stall very clean and dry in condition.
5. The weight of the calf should be recorded.
6. Wash the cow's udder and teats preferably with chlorine solution and dry.
7. Allow the calf to suckle the first milk of the mother i.e. Colostrums.
8. The calf will be standing and attempts to nurse within one hour. Otherwise help too weak calves.

B) Feeding of Calves:

1. Feed colostrums i.e. the first milk of the cow for the first 3 days. The colostrums is thick and viscous. It contains higher proportions of Vitamin A Care and management of dairy animal 53 and proteins. The proteins are immune globulin which gives protection against many diseases. Colostrums contains anti trypsin which avoid digestion of immunoglobulin in the stomach and is absorbed as it is.
2. Whole milk should be given after 3 days it is better to teach to, drink the milk from the pail or bucket. Feed twice a day which should be warmed to body temperature. For weak calves feed thrice a day.
3. The limit of liquid milk feeding is 10 % of it's body weight with a maximum of 5-6 liters per day and continue liquid milk feeding for 6.10 weeks. Over feeding causes 'Calf Scours'.
4. The milk replaces can be given to replace whole milk.
5. Give calf starter after one month of age.
6. Provide good quality green fodder and hay from 4'h month afterwards.
7. Feeding of antibiotics to calves improves appetite, increases growth rate and prevents calf scours. E.g. aureomycin, Terramycin etc

Management practices

1. Identity the calf by tattooing in the ear at birth, and branding after one year.
2. Dehorn the calf within 7-10 days after birth with red hot Iron or caustic potash stick or electrical method.

3. Deworm the calf regularly to remove worms using deworming drugs. Deworm at 30 days interval.
4. Fresh water should be given from 2 -3 week onwards.
5. House the calves in individual calf pens for 3 months afterwards in groups. After six months males and females calves should be housed separately.
6. Weigh the calves at weekly interval upto 6 months arid at monthly interval afterwards to know the growth rate.
7. Mortality in calves is more in first month due to pneumonia. Diarrhea (calf scous) and worms.
8. House them under warm condition, clean condition to avoid above condition.
9. Extra teats beyond 4 should be removed at 1-2 months of age.
10. 8-9 weeks of age, males should be castrated.
11. Keep the body clean and dry to avoid fungal infection.
12. Mineral-blocks should be provided, so that the calves lick and no changes for mineral deficiency.
13. Wean the calf from the mother and feed through pail feeding system.

CARE AND MANAGEMENT OF HEIFER

Better Care and Management of heifer will give high quality replacement stock to the dairy farm. The following care and Management practices are recommended for a heifer.

1. Feed the heifer sufficiently to produce normal growth. During the early stage relatively more protein than energy is needed. Most heifers grow well if excellent hay is given as much they can eat. The amount of growth depends upon the quality of forage fed.
2. The heifers should be provided with a dry shelter free from drafts. A loose housing system with a shelter open to one side is sufficient.
3. The size rather than the age of a dairy heifer at breeding time is important. Breeding under sized animals is never profitable. They may be stunted or slow to reach maximum size. Small heifers are more likely to have difficulty in calving. Though the heifer that is bred to calve at an older age yields higher milk yield in the first lactation, the total milk produced by such a cow will be less when compared to the heifers that freshens at an
4. The heifer should be growing and in good flesh at calving time. This is necessary so that she can produce milk at the most profitable level.
5. Place the heifer in a separate shed about 6-8 weeks before she is due to calve.
6. Feed 2 - 3 kg of concentrate daily and all the forage she eats.
7. Before calving let the heifer becomes accustomed to handling and to the procedures used in the milking herd. Always handle her gently and with kindness.
8. Maintenance of health among heifers is very important for proper growth. The health among the heifers is maintained by hygienic housing, water balanced feeding and taking necessary preventive steps against common diseases.

9. Periodically the heifers in the herd should be checked for their proper growth and other progress. Animals lagging behind below the required standards should be removed from the herd.

CARE AND MANAGEMENT OF MILKING ANIMALS

a. Feeding

Immediately after calving, the parturient cow should receive mild laxative, palatable and energy giving feeds. Usually 2 kg bran+ 1/2 kg jaggery moistened with lukewarm water is given. The gruel prepared from Bajra grains 1.5 kg + jaggary 0.5 kg + 125 gm of soaf + 125 gm of Balat Sepu, be mixed and the mixture be cooked on mild fir. After cooking, it should be allowed to cool, and thereafter be given to the cow. The gruel feeding should be continued for first 3 days after calving and thereafter the cow should be brought on normal feed. After 3 days of calving, a mixture of bran + GNC cake + Maize bran be given.

Feeding should be planned to get peak production in about 40 days. Roughage portion of diet should include green legume and dry fodder to avoid possibility of bloat. Usually concentrate allowance is given at the time of milking which stimulate the process of let-down of milk For a indigenous cow 1 kg of concentrate mixture per 2.5-3.0 kg of milk produced is given in addition to maintenance allowance. The concentrate mixture should contain required quantity of important minerals like Ca and P, the feed is generally preferred than mash feed for milking animals

b. Housing

Each cow requires about 5 x 1.2 m barn space. Each cow requires 1.5 x 1.2 m standing space and 0.6 to 0.7 m feeding space. The shed for milking animals should be at higher plane and near to the calf pen and milk collecting room. Flooring should be hard, imperviousd, non slippery and with slope. House should be well ventilated and should protect the milking stock from rains, strong sunlight, wind etc. There should be separate manger for each cow, to allow measured quantity of ration which should not be carried away and shared by another cow.

c. Management

Milking cows should be handled with kindness. Milking shed, milking parlour and cow should be washed before milking. Grooming should be preferred 2 hours before milking to avoid contamination of milk with hair, dust, dirt or dung particles. Before milking udder should be washed with 0.1 % KMnO, solution and is wiped-off with a clean cloth Gentle, rapid and complete milking should be done by adopting correct methods. Avoid excitement of cow before and during milking. For safe milking secure hind legs with anticow kicking device or 8 shape loops and quick release knot, usually cows are milked two times a day. However in cow giving more than 10 liter of milk per day are milked three times a day. Follow regular milking time and uniform intervals between two milking. Animals should be inspected daily for any health problem. Periodical checking for mastitis should be done.

Cows in herd should be tested each year for contagious diseases like Tuberculosis, John's disease and Brucellosis. Routine vaccination and deworming schedule should be followed. Regular spraying of insecticides should be practiced to control ectoparasites.

d. Exercise

Confining cows too long without exercise cause stiffness in their limbs and overgrown hoofs leading to possibly lameness, Exercise keeps animal fit, growing and maintains the appetite.

TOPIC 8
FEEDING AND MANAGEMENT OF DRY, PREGNANT, DRAFT ANIMALS AND BREEDING BULL

FEEDING AND MANAGEMENT OF DRY ANIMAL

In a dary farm all dry cows are usually pregnant or carriers. They are dried, to give them so that they can catter to the needs of growing foetus. A cow must be kept dry for 8 to 10 eks before calving. If the cow is not kept dry for at least 8 weeks, she is likely to suffer from ets Aconsiderable amount of calcium and other minerals are drained out along with milk se minerals are required for the development of the skeleton of the foetus and at the same e normal physiological activities of the pregnant cow. A cow should not be kept dry more han 10 weeks as there will be production loss and it will affect the economy of the farm.

Drying-off a cow

Three methods of drying off a cow are in use. The methods are

i) Incomplete milking

ii) Intermittent milking

iii) Complete stop of milking

Application of one of these three methods is normally enough to make a cow dry. If necessary combination of more than one method may be tried if the cow does not become dry only one method. The complete stop of milking can be safely recommended for a cow producing as much as 10 liters of milk a day. It means 3000 kg milk on an average, for 300 days.

In incomplete milking the cow is milked incompletely before few days of actual drying-off In case of intermittent milking, a cow is milked irregularly as well as incompletely before a few days of actual drying off

b. Feeding

Provide light and easily digestible feed. Animal should have free access for grazing on good pasture. During initial 3/4" period of pregnancy, a maintenance allowance of concentrate mixture 1.25 kg/day for deshi cow and 1.50 kg/day for crossbred cow is sufficient. During last quarter (1/4") of pregnancy, increase the concentrate allowance by 1.75 kg and 2.00 kg per day for deshi and crossbred cows, respectively. In addition to maintenance allowance extra allowance of concentrate mixture is given during last quarter of pregnancy is called as steaming up. This helps to bear the additional load of pregnancy i.e. nutrient requirement for growth of foetus, development of mammary gland and preparation for the incoming lactation. Give injection of vit D3 @ 10 million 1.U. intramuscularly, a week before parturition to avoid milk fever. It occur in cows which are heavy producers.

c. Housing

A house for pregnant animal should be clean, well ventilated and disinfected. Housing should protect animal from environmental stress like heat, cold wind, rain or snow. Flooring should be non-slippery, usually pregnant animals are transferred to calving box, 2-3 weeks before expected date of calving. The number of calving boxes required is 10 per cent of cows on a farm. The calving pens should have covered area of 3 x 4 m and open paddock of 4-5m. The calving box should have one feet bedding material on floor. Being pregnant, she requires rest. During, rest she can use the bedding for comfort and ease.

FEEDING AND MANAGEMENT OF PREGNANAT ANIMALS

Before Parturition

Turning cow into a loose box : To isolate from other animals, animal of advance pregnancy must be separated into calving box which must be cleaned and properly disinfected, bedded with clean, soft & absorbent litter.

Guarding Against Milk Fever

In advanced pregnancy stage high yielding & first calves are susceptible to Milk fever.

To avoid it, provide enough minerals especially calcium by bone meal in daily diet.

Give large doses of Vitamin D about a week period to calving.

Avoid Milking : Prior to parturition this is likely to delay parturition by few hours.

Watch for parturition signs : Signs to know primary stage of parturition which are udder become large and distended, depressed or hollow appearance on either side of tail head, vulva enlarged in size, thick mucus discharge from vulva, and uneasiness of the animal.

During Parturition

Dilation Phase : Consists of the acts Let down & get ups, uneasiness due to labour pain, observe these acts from safe distance without making disturbances to animal.

Parturition period :

1. In normal case, period is of **2-3 hrs** while in first calving 4-5 hrs or more. Observe from safe distance without disturbing.
2. Pregnant animals should be watched carefully, particularly during the last stages of pregnancy to avoid abortion due to fights or other physical trauma.
3. Special care should be taken regarding mineral and vitamin deficiencies because they can have a serious adverse effect on the new-borns calf. Feeding trace mineralized salt plus recommended amounts of calcium and phosphorus is usually sufficient to avoid these problems. Care must be taken that calcium and phosphorus should not be taken in excessive amounts.

4. During the last few weeks of pregnancy there is a tendency of prolapse of vagina which may be caused by constipation, mineral deficiency and debility. Balanced and laxative rations should be fed to maintain the normal tone of the reproductive tract.

5. Sometime udder edema occurs before calving. This can be avoided by moderate exercise for a half an hour, two to three times per day. Massaging the udder for a few minutes is also helpful. Use of diuretics and prepartum milking may be helpful in severe cases.

6. Isolate the pregnant animal 8-10 days before the expected date of calving and keep it in a clean well bedded, dry and disinfected maternity pen.

7. A good calving environment reduces the exposure of cows and newborn calves to infectious disease. A clean and comfortable area that provides cows with good footing minimizes the potential for injuries

8. Calves are usually born without assistance. Any abnormality in their presentation requires immediate attention by a competent person to correct the position of the calf so that it can be delivered.

9. After removal of calf, milk animal it will help in removal of placenta. Placenta is normally expelled within 2 to 6 hours after calving. If placenta fails to be expelled with 12 hours it is considered retained placenta

10. The animal should be closely watched for health problems after calving. In addition to observing feed intake and milk production, rectal temperature

Care with regards to feeding

1. Types of feeds provided - milk laxative, palatable &c nutritious.

2. Suitable feeds - Wheat bran, oats, and linseed oil seeds.

3. DCP & TDN of ration must be 16-18% & 70% respectively.

4. 40-60 gms. Sterilized bone meal & 40 gm common salt may be adder', to grains.

5. Succulent green, palatable fodders containing 50-60% legumes are suitable while amount concentrates should be increased gradually in three weeks.

6. During early stages of pregnancy, there is no need of special feeding for heifers. The system of feeding and management recommended for heifers before breeding may continue. During last three months of pregnancy when foetal growth is very rapid, a special pregnancy allowance of about 1-2 Kg of concentrate should be offered.

7. After normal birth, the dam is alert and willing to eat and drink within one or two hours of calving. Warm water and some wheat bran should be offered to dam after calving. It is necessary to encourage the dairy animals to rise and to move to the

manger for feeding after calving, especially on the day of calving and the first 2 days after calving.

CARE AND MANAGEMENT OF DRAFT ANIMALS

Bullocks are important working animals on dairy farms from physically working point of view Bullocks are required for different types of farm operations. Transportation of fodder from fodder plots to dairy Carting of manure, carting of cattle yard waste etc. Hence bullocks should be cared properly. These animals require energy for physical work. They should be fed properly, so that they will get sufficient amount of nutrients for maintenance of body and production of work-energy. Following points are considered

1)They should be property housed and protected from cold, rains and hot sun during summer.

2) On the farm the work should be so distributed that all the bullocks share light and heavy work equally and uniformity.

3)While using for threshing grains, they should be properly shoed, otherwise there is possibility of injury to their feet. The shoe should be made to fit the natural shape of the hoof

4) Animals on road work may require shoeing once a month. Those working on farm require renewal once in 3 month. Soft hoof animals requires shoeing frequently. Black coloured hoofs are strong while, albino or carrot colour hoofs are soft and easily tornished.

a. Feeding of Working Bullocks

When the supply of feed is adequate, the working animal first draws-up carbohydrates followed by fats of the feed. If the supply of feed is insufficient body fat is used for the purpose of release of and in case of the last resorts the muscles and other protein tissues are utilized to produce energy. If there is abundant supply of carbohydrates, then the working animals need very little additional proteins for use by the body.

Nutrient Requirement for Working Bullocks

Nutrient requirement of working animals depend upon amount of work performed. For heavy work digestible carbohydrates in the ration are needed. The ration should include, good quality cereal hay, legume hay obtained from threshing of leguminous crops like Tur, Gram, Soyabean, Peas are included Ground nut hay and grass-hay are also included These fodders supply good amount of DCP and DE. Each bullock should receive 2.5 kg of concentrate and 12 kg of dry roughages. The concentrate should have 16 % DCP and 70% TDN, when there is light work; 1.5 concentrate, 12 kg of dry roughage will meet the requirement Clean drinking water should be made available free of choice. Mineral mixture should be added to the concentrate @2%.

b. Washing

Due to work, exertion and sweating take place. The skin of the bullocks becomes rough and dusty. Through sweating salts are thrown out of the body. Hence to keep the skin

clean and free of salts, it is necessary to wash the bullocks frequently; so that they will feel comfortable. During summer season washing plays important role for maintaining body temperature

c. Grooming

Grooming of the bullocks should be done in the morning before going for work. This processes will remove the dead hair and will enhance the blood circulation. After the work is finished at the close of the day, the bullock pair should be again groomed.

d. Health cover measures

Bullocks should be vaccinated against the Haemorrhagic Septicemia, Black Quarter, Anthrax, Rinderpest and Foot and Mouth disease every year. The vaccination schedule should be followed as per the advice of expert veterinarians.

e. Housing of Bullocks

Bullocks should be housed in a good ventilated shed. Sufficient space should be provided for each bullock as per the norms. The feeding mangers should be cleaned daily.

CARE AND MANAGEMENT OF BREEDING BULL

Breeding bull plays an important role in producing good progeny. Bull is said to be "Half of the Herd" as it passes 50 per cent inheritance to the offspring.

Therefore the quality of the future herd depends on the quality of bull maintained and used. In view of this bull must receive all the necessary care to grow properly and attain full size. Physical and physiological maturity depends on how-best the bull is cared for.

a. **Selection of Bull**

Bull should be true to the breed characters.

Bull should be healthy, masculine and vigorous.

It should be free from phy.sical deformities or defect. Bull should be free from diseases like Tuberculosis, Vibrosis, Trichomoniasis and Brucellosis.

Bull should be selected from good pedigree to get superior inheritance.

Examine the quality and quantity of bull semen, very often to ensure its effective potency.

b. Feeding of Bull

Under feeding as well as over feeding of bull should be avoided for maintaining optimum breeding efficiency.

Over feeding cause fattiness that leads to reduce sexual libido as well as stress and strain on their feet and legs.

Under feeding may lead to nutritional deficiencies reflected by reduced breeding performance. Feeding schedule of bull should be based on body weight and intensity of service (usually 2.5 kg DM intake *1100* kg body weight)

Feeding of good roughage like legume hay and dry jowar fodder and 2 - 3 kg of concentrate mixture per day is essential.

The concentrate mixture should carry 20 % DCP and 72 % TDN.Avoid phosphorus deficiency which leads to sterility problems.

C. Management

i) Ringing of Bull

For convenience in handling and protection from a vicious bull a nose ring of convenient size of about 2.5" diameter should be fixed at the age of one year. This may be replaced by ring of about 3.5" diameter in older bull of over 2 years of age. Nose ring should be made from non-rusting metal of uniform thickness. Copper rings are better. They are non-rusting.

ii) Training of Bull

For leading a bull, bull-leader or bull-holder should be used. In case it is regularly tied in the pen a strong halter may be used. Bull should be trained at an early age, so that they can be safely handled and easily teachable at this age.

iii) Disbudding a Bull Calf

For safe handling the bull may be kept without horns.

iv) Pen Housing

Pen housing system is the best system for breeding bull.

It provides ample spece of 12.00' x 12.00' or an area of 140.00 to 150.00 Sq.Ft.

vii) Breeding

One bull for a herd of 20 cows is sufficient to cover by natural service. Bull can be used for breeding after 2.5 years of age. The number of services is restricted to one per week in young bulls and 2 - 4 per week in matured bulls. Breeding efficiency of bull increases up to 4 years and is maintained up to 8 years then gradually it declines, though bull can be used up to 12 years of age.

viii) Miscellaneous

i) Brushing and grooming is advisable in morning hours.

ii) The bull should be handled by different person so that it will not

have habit of handling by one person.

iii) The bull should be washed frequently.

ix) Disposal of Bull

Bull can be used for service up to 12 years of age. After this they become uncertain breeders. therefore older bulls should be culled or sold.