CHAPTER 12 – PLANTATION AND HUSBANDRY
PLANTATION and ANIMAL HUSBANDRY

**Plantation:** A large contiguous area in which a forest crop raised either by direct sowing or transplanting.

**Plantation crop:**
In original sense the term plantation refers to a forest crop raised artificially either by direct sowing or planting. In horticulture sense the term plantation crop refers to a woody perennial crop grown on a large contiguous area, managed by an individual or a company, the produce of which is consumed only after processing.

**Requirements of a crop to be categorized under plantation crop:**
1. It should be a woody perennial (palm, tree, shrub or vine).
2. It should be grown on a large contiguous area (estate or plantation)
3. It should be managed by an individual or company.
4. The produce is suitable for consumption only after processing.

**Estate or plantation:**
The term estate or plantation refers to a large scale agriculture unit, usually of a single crop or a large contiguous area usually under a single crop managed by individual or company. Plantation crops are cultivated on an extensive scale. Produce has to be processed before they are put to use. They are high value commercial crops. All are perennials. Areca nut, Cacao, cashew nut, coconut, coffee, oil palm, betel vine, rubber and tea are some of the plantation crops.

**Economic importance:**
- They are export oriented. Ex: cashew nut, betel vine, tea comprise of 75% of total export earnings from the export of all agricultural produce.
- They provide gainful employment: Cashew cultivation employs 2 lakh people; processing industry employs 3 lakh people. Areca nut crop employs 6 million people. Coconut crop employs 10 million people. They occupy only 2% of total cultivated area, but generate 36,000 million rupees per annum.
- They support many ancillary industries.
They conserve soil and eco system.

Tea and coffee are cultivated over hill slopes; cashew nut is cultivated on waste lands. They protect soil from erosion losses.

Geographical distribution of plantation crops:

Almost all plantation crops are restricted geographical distribution to the tropics. Certain plantation crops are sun loving (coconut, cashew nut, rubber, oil palm, areca nut), others are shade loving (cocoa, tea, coffee, betel vine). In general coconut and cashew nut are cultivated in coastal belt. The sun loving plantation crops should always be raised under mono culture as sole crop, while the shade loving plantation crops (cocoa, coffee) may be raised as inter crop in the inter spaces of grown up sun loving plantation crops (coconut, oil palm and areca nut) or grown along with shade or nurse trees (silver oak) to have either shade (coffee, tea) or support (betel vine) or both (betel vine)

Importance and Area of Plantation Crops

Importance of Plantation Crops:

The term Plantation crops refers to those crops which are cultivated on an extensive scale in a large contiguous area, owned and managed by an Individual or a company. The crops include tea, coffee, rubber, cocoa, coconut, arecanut, oil palm, palmyrah, cashew, cinchona etc. These plantation crops are high value commercial crops of greater economic importance and play a vital role in our Indian economy. The main draw back with this sector: of crops in India is that major portion of the area is of small holdings (except Tea) which hinders the adoption of intensive cultivation. In the case of coffee 97.13 per cent of the growers have holdings below ten hectares and in Rubber, 82 per cent of the total area is of small hojdings having an average size of 0.5 ha.

The Economic Importance of these Crops are:

1. They contribute to national economy by way of export earnings. These crops occupy less than 2 per cent of the total cultivated area (i.e. 3.82 per cent of total crop land) but they generate an income of around Rs. 16,000 million or about 12.72 per cent of the total export earnings of all commodities or 75 per cent of total earnings from the export of agricultural produces.

2. India is the leading country in the total production of certain plantation crops in the world. For instance, our production meets the share of 47 per cent in tea and 66 per cent in each of cashew and arecanut,

3. Plantation industry provides direct as well as indirect employment lo many millions of people. For instance, tea industry offers direct employment to 10 lakhs and indirect
employment to 10 lakh people, while cashew processing factories alone provide employment to 3 lakhs people besides 2 lakhs farmers are employed in cashew cultivation.

4. Plantation industry supports many by-product industries and also many rural industries. For example, coconut husk is used to produce coir fiber annually to a tune of 2,19,600 tones in India.

5. These crops help to conserve the soil and ecosystem. Tea planted in hill slopes and cashew in barrel and waste lands protect the land from soil erosion during the rainy season or due to heavy winds.

**Post-Harvest Management**

Improper harvesting, handling transportation and distribution of fruits and vegetables result in the significant losses which cause ultimately economic loss. The reduction of post-harvest losses reduces the dependence on imports of commodity fertilizers pesticides and other chemicals save a substantial amount of foreign exchange. It is estimated that total loss of vegetable and fruits in India due to inadequate post-harvest handling transportation of storage at less 20-25%.

The importance of reduction in post-harvest loss of fruit and vegetable is of vital importance countries like India, Malaysia and knowledge of post-harvest management and loss of fruits and vegetables.

Several factors influence the post-harvest losses due to physical, physiological, mechanical and hygienic conditions. Fruits and vegetables are characterized by high metabolic activities and known to possess short shelf life. Recent development has improved shelf life of fruit and vegetables.

**Supply Chain Management in Horticulture**

Some case studies of organized supply chains of some horticultural commodities in the first chapter. However, there is a need to make an in depth analysis of the issues regarding supply chain management of horticultural produce in India. The chapter covers an all India scenario of horticulture sector, followed by a case study of supply chain management issues prevailing in A.P., as the scenario is, more or less, same through the country.

**Horticulture production in the National context**

India has witnessed voluminous increase in horticulture production over the last few years. Significant progress has been made in area expansion resulting in higher production. Over the last decade, the area under horticulture grew by about 3% per annum and annual production
increased by 5.4%. During 2016-17, the production of horticulture crops was about 295.2 million tonnes from an area of 24.9 million hectares. The production of vegetables has increased from 58.5 million tonnes to 175 million tonnes since 1991-92 to 2016-17.

India is second largest producer of Vegetables and Fruits. The different types of fruits are exported to the outside World. Grapes occupies the premier position in exports with 232.9 thousand tonnes. Other fruits which have attained significant position in exports are Banana and Mango. Fresh vegetable (e.g. Peas, Potatoes etc) exports have been on the rise.

**Domestic consumption and exports**

Fruit and Vegetable (both fresh and processed) based products constitute close to 17% of the food and groceries consumption of the Indian households. Consumers in India are used to buying fruits and vegetables in the primary form and process the same at their homes. Households spend time in cleaning, sorting and cutting, before cooking food. Close to 80% of the fruits and vegetable are consumed in primary form with little value addition. In case of tertiary products, confectionery products and potato chips have a major share. Consumer spending on categories such as canned food, jams, pickles, and other ready to eat processed products is still at a low level in India, thereby showing high potential for growth. An opportunity exists for players to offer tertiary processed products, which can substitute the home, based processing — such as soups, ready-to-eat meals, and canned food amongst others.

**Animal Husbandry**

Ever since the beginning of civilization, humans have depended on animals for many requirements, such as that of food (milk, meat and egg), clothing (hide or wool), labour (pulling, carrying load) and security etc. The development of desirable qualities in all such animal species, through creating better breeds, has been an important human achievement. For this, humans have consistently tried to improve the breeds of domesticated animals to make them more useful for them. In this lesson, you will learn about the common breeds of such animals, their uses and some methods of improving their breeds.

The branch of science, which deals with the study of various breeds of domesticated animals and their management for obtaining better products and services from them is known as Animal Husbandry. The term husbandry derives from the word “husband” which means ‘one who takes care’. When it incorporates the study of proper utilization of economically important domestic animals, it is called Livestock Management.

**Different Categories of Animals**
**Wild** – Those that breed better where they are free than they do when they are captivated. They have no common use for humans. Example Lion, Tiger, Rhinoceros, Deer etc.

**Tamed** – Those, which are caught from the wild and trained to be useful to humans in some way. Elephant, Chimpanzee, Gorilla, Yak etc.

**Domesticated** – Those that are of use at home and are easily bred and looked after by humans. Common domesticated animals are dog, horse, cow, sheep, buffalo, fowl etc.

**Importance of domestic animals**

On the basis of utility, domestic animals are categorized into the following functional groups:

1. **Milk giving animals** Cattle, buffalo, goat, sheep etc.
2. **Draught (used for load)** Bullock, horse, donkey, mule, bearing) animals camel, elephant, yak etc.
3. **Fibre, hide and skin yielding** Sheep, goat, cattle, buffalo, camel etc.
4. **Meat and egg yielding animals** Fowl (hen) and duck, goat, buffalo, pig etc.

**MILK AND MEAT YIELDING ANIMALS**

Depending upon the availability and regional considerations different animals are reared for the purposes of yielding milk and meat in India. India is the world’s largest producer of milk. The majority of the milk consumed is also in liquid form in India. Over 53% of milk produced in India is from the water buffalo and a majority of milk processing plants in the country depend upon buffalo milk.

The **National Dairy Development Board (NDDB)** is the main agency behind the cooperative movement in India. India is now seeking joint ventures and financial participation from the private sector including foreign investment for production of milk and milk products in India.

- **Cattle**

Cattle mainly include cow, bull, oxen, goat, sheep etc. The females of the species provide milk, which in turn contribute animal’s protein to the diet of people. While the female species of these cattle are used for milk, the male species play an important role in the agricultural
economy by providing labour, meat and hide. Milk itself is taken in many forms like ghee, curd, butter and cheese etc. The excreta of these animals (dung) is used as manure, in biogas and as fuel. There are several important breeds of cattle in India and abroad.

- **Milk yielding animals**

**What is a breed?**

A breed is a group of one species of animals, which have the same descent and are similar in body shape, size and structure.

**Categories of Important breeds:**

There is following three categories

1. Indian breeds
2. Exotic Breeds
3. Improved breeds

(1) **Indian Breeds**

Gir, Sahiwal, Red Sindhi, Thararkar, Kankrej etc. are some high yielding varieties of Indian cattle

(2) **Exotic Breeds (Imported breeds)**

Hilstein, Friesian, Jersey, Swiss etc. are some of the high yielding varieties that have been imported from abroad and reared widely in India.

(3) **Improved breeds of Indian cattle**

Certain improved breeds have been developed by making a cross between two desired breeds. A cross between Sahiwal and Friesian varieties has been named as Friewal, Karan Swiss is another improved breed for milk production in large quantities. Table 33.1 shows some Indian breeds, their milk yield and distribution.
Cattle feed

The main feed of cows and buffaloes are grass but this does not provide them all the nourishment. They require balanced diet in the form of roughage which is fibrous food containing large amount of fibres such as hay fodder, leguminous plants-soya beans, peas and cereals like maize, jowar etc. The diet of cattle mainly consists of roughage (dry or green fodder or fibrous food) and concentrates like grains, oil cakes and seeds, mineral salts and vitamins.

Dairy Products

Milk as drawn from the animals is known as full cream milk. When the cream is separated and the remaining milk is called toned milk. This milk contains no fat and is known as skimmed milk. On the basis of fat contents the various milk product are as follows:
Cream: It is prepared by churning milk, the fat comes on the top which is separated by draining out the liquid. It is known as cream with 10-70% fat contents.

Curd: Milk is converted to curd due to bacterial activities.

Butter Milk: It is the left over liquid after removal of butter.

Ghee: After heating butter, the water evaporates and fat contents are almost 100%.

Condensed milk: Milk is concentrated by removing water contents with or without adding sugar. It has 31% milk solids with 9% fats.

Powdered milk: It is the powdered form of milk.

Cheese: It is coagulated milk protein-casein with fat and water.

Khoya: A desicated milk product prepared by evaporating water contents and reducing the bulk to about 70-75%.

Cattle Dung: Cattle dung is mainly used to make dung cakes for burning as fuels. It is used mainly in villages of India. The farmers also use cattle dung to produce bio gas and the leftover residue as manure.

- Biogas plant (Gobar gas plant)
  Bio gas plant is a chamber where animal excreta (Cow dung, buffalo dung etc) and some anaerobic bacteria are fed into airtight biogas chamber. Decomposition of excreta produces methane gas used as a smoke free gas for cooking. This gas can also be utilized for lighting. The left over solid residue serves as a good manure.

- Meat yielding animals
(i) Sheep

Sheep is the second largest species reared by mankind and it provides wool, meat, milk and hide. Their droppings form good manure. Important breeds of sheep in India are as follows:

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<th>Breeds of Sheep</th>
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<td><strong>Breed</strong></td>
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<td>Hissardale</td>
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<td>Nellore</td>
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<tr>
<td>Bellary, Hassan, Mandya</td>
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<td>Mecheri, Kalikarsal, Vembur</td>
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* Exotic Breeds

The main exotic breeds of sheep are Toggen berg, Saanen, French, Alpine and Nuibian and Angora.

* Feeding of sheep
They feed on green grasses and other wild plants. When sheep are reared for a particular purpose, they are given protein, minerals and vitamin rich food. The main constituents of their food are as follows: **Leguminous fodder**: Urad, mung, berseem etc.

- **Oil cakes**: Groundnut, sesame cake, (rich in proteins)

- **Grains**: Maize, barley, oats and jowar.

- **Lime, common salt**: Sterilised bone meal (rich in mineral salts)

(ii) Goat

Important breeds of goats used for milk, meat and hide. There are about 19 well known Indian breeds, apart from a number of local non-descript breeds that are scattered throughout the country. The breeds are mentioned below on the basis of their location.

**Himalayan Region (hilly track)**

- Cham, Gadd: Kashmir, Himachal Pradesh, Jammu and Kashmir
- Pashmina: Himachal Pradesh, Ladakh, Lahul and Spiti valley
- Chegu: Kashmir

**Northern Region**

- Jamunaparu – Uttar Pradesh, Madhya Pradesh
- Beetal – Punjab
- Barhari – Delhi, Uttar Pradesh, Haryana

**Central Region**

- Marwari, Mehsana and Zelwadi – Rajasthan, Gujarat and Madhya Pradesh
- Kathiawar – Gujarat and Rajasthan

**Southern Region**
Surti – Gujarat
Deccani, Osmanabadi – Andhra Pradesh, Tamilnadu
Malabari – Kerala

Eastern Region
Bengali – West Bengal, Assam and Tripura

- **Feeding of goat**

The goats are fed on open fields with enough green. They can be only given cereal and grain products. Sometimes however, a milk goat requires a balanced feed with 4-5 kg of fodder and a mixture of crushed grains such as yellow maize, jowar and other cereals and ground nut or linseed oil meal or steamed bone meal.

(iii) Pig

Pig farming is gaining importance in India. Pigs provide only 8% of total meat production in our country. Pig skin, fat and hair are required for leather, soap, oil, hair-brush industry respectively. Pig manure is rich in nitrogen, phosphorus and potassium. Pigs contribute about 5% of total meat production in India, and constitute a rich source of animal protein available at low cost. The calorific value of Pork (pig’s meat) is much more than the other edible meats. Pigs can feed on farm waste, garbage and spoiled grains.

- **DRAUGHT ANIMALS**

**Draught animals** are animals need for carrying load. From time immemorial a number of animal species have been used for special purposes by humans, utilizing their mechanical strength, endurance and speed. These include horse for riding and swift running; elephant for riding, strength and heavy load lifting, camel for riding in sandy desert and ability to survive without water for long duration, donkey and mule (a hybrid of male donkey and female horse) for carrying load. Most of the draught animals are herbivorous and survive on leaves of trees, shrubs and bushes. While raising them, they are also fed on grains, beans, cottonseeds, maize and bran besides dry/ green fodder. In Rajasthan, camel is used for yielding milk also.
Horse

The horse has fast movement, great stamina and endurance. Its body is suited for ride, load pulling, mountain climbing and forest travelling. So the horse is an important draught or work animal. They learn fast and can be maintained easily in various climatic conditions. Due to their ability to move swiftly in rough areas, they are still useful in hills and in the deserts.

- **FIBRE, HIDE AND SKIN YIELDING ANIMALS**

Besides providing meat, milk and transport, livestock provide many commercially useful products such as fibre, skin and hide. Generally sheep and goat provide fibres for making of products like wollen strings, ropes, carpets, clothing and brushes etc.

- **EGG YIELDING ANIMALS**

This category consists of egg producing animals whose eggs are used as food by mankind to provide proteins. **Poultry farming is defined as a term for rearing and keeping of birds such as fowl, duck and hen for egg and meat.** Poultry farming has become popular because it is comparatively easy to start and maintain. It gives quick return within one to six month of investments is easily manageable and requires less space and labour. Poultry birds and their eggs are a rich source of nutrients.

- **Common breeds of Poultry birds**

Indian poultry breeds provide good quality meat but produces small sized eggs. They have natural immunity against common diseases as compared to exotic varieties bred abroad which require greater protection and immunization. The chicken is commonly classified on the basis of its origin.

(a) American,  
(b) Asiatic,  
(c) Mediterranean and  
(d) English

1. Plymouth Rock, Rhode Island Red, New Hampshire - American  
2. Brahma, Cochin, Langshan - Asiatic  
3. Leg horn, Minoxa - Mediterranean  
4. Cornish, Australorp – English
Indigenous Breeds

Aseel – Rajasthan, Andhra Pradesh, Uttar Pradesh
Busra – Gujarat and Maharashtra
Chittagong – Eastern India
Karaknath – Madhya Pradesh

(i) Indian Breeds

The Indian breeds of hen include Aseel, Chittagaog, Ghagus and Basra. Their egg laying capacity is around 200 eggs per year.

(ii) Exotic Breeds

These breeds are important from other countries and include White leghorn, Minorca, Rhode Island red. These birds have high egg laying capacity but carry less flesh as compared to Indian birds.

(iii) Upgraded variety

Some improved varieties have been developed in India by hybridisation such as B 77, ILS 82 etc. They grow fast and also have as high an egg laying capacity as the exotic varieties and are better suited to the Indian climate.

Poultry Feed

Depending upon the requirement of meat or egg production, poultry feed mainly consists of maize, rice, wheat bran, ground nut cake, fish meal, lime stones, bone meal, common salt, vitamins and minerals.

GENETIC IMPROVEMENT IN ANIMALS

The application of laws of animal health and reproduction genetics has contributed towards increase in milk, egg and meat productivity. The increase in egg production brought about the
silver revolution in the area of animal husbandry. The methods being widely used are artificial insemination and embryo transplant.

(i) Artificial insemination

Artificial insemination involves collection of semen from a healthy bull of the desired breed, its storage at low temperatures and introduction into the females of cattle of other breeds for bringing about fertilization using sterilized (germ free) equipment. Advantages of this method are:

(a) Up to 3000 females can be fertilized from semen collected from one bull.
(b) The semen can be stored for a long period and transported over long distances.
(c) Economical and high success rates of fertilization.

(ii) Embryo transplant

This method of breed improvement has been quite successful in sheep and goat. In this method, embryos (depending on their period of development) from superior breeds are removed during the early stages of pregnancy and are transferred to the other female with inferior characters, in whose body the gestation period is completed. By this technique, quality and productivity in the livestock can be improved. Unlike artificial insemination, this method has low success rate due to greater chances of contamination.

Agricultural Practices and Animal Husbandry

Our food items are either plant products, such as grains, vegetables or fruits or animal products like milk, egg, mutton, chicken etc. We eat various parts of plant as food. For example, grains of rice, wheat and corn are seeds; radish and carrot are roots; potatoes and ginger are the stem. We also eat leaves and stem of spinach and plenty of fruits. Thus, human beings depend on plants and animals for food.

AGRICULTURE AND AGRICULTURAL PRACTICES

The branch of science which deals with methods of food production is known as agriculture. Besides studying the new methods of food production, in this branch of science we also study about how new and better varieties of crops can be grown, how animals and birds like cows, hens, etc. can be reared well and made to give more milk or better quality eggs? All these new methods which scientists develop come under agricultural practices. We need vegetables,
fruits, cereals, pulses, etc. as food. For our clothes, we need the fibre of plants or animals. We get all these foods and fibres by farming or agriculture.

**Need for animal husbandry**

We have a large number of animals in our country. Yet we do not get as much food from these animals as we possibly can and need for our large population. Besides the food, which we get from animals, we need them to do a lot of our work. In India, we have about 80.4 million cattle, which work in the fields. If we take the ratio of working cattle to the area of land, which is being used for cultivation we find that only two individuals of cattle are available to plough 3.8 hectares of land. You all know that cattle wastes like urine and faeces are natural manure which enrich our soil. Unfortunately, in India we do not use all the cow dung available and a lot of it goes waste. Gobar gas plants have been developed so that we can make use of the cattle dung both for fuel as well as to make manure. Thus, we find that animal husbandry is a very important field which helps us to improve our livestock and other useful animals and make the maximum use of them.

**Management of livestock**

When we study about improving our livestock we learn how they must be sheltered, fed, and mated, what kind of drinking water should be given to them and how the sick and diseased animals ought to be treated? This way we learn to manage our livestock for better production and utilization.

**1. Feeding of animals**

All animals must be fed properly. The food should contain the requisite nutrients i.e. carbohydrates, proteins, fats, minerals, vitamins and water. The food which is given to cattle can be divided into two categories:

- **Concentrates** like cotton seeds, oilcakes, cereal grains, bran etc. They are very rich in most of the nutrients.
- **Roughage** includes fibrous and rough food like straw and stems of cereal crops. Generally roughage has a low nutrient content. An average Indian cow eats about 15-20 kg of green fodder and 4 to 5 kg drygrass, which is mixed with a sufficient amount of grain. A cow drinks about 32 litres of water. Goat and sheep eat grass, herbs and waste products from the farms. Pigs are usually given cereals and their products to eat. Poultry birds are given a mixed feed consisting of cereals, bone meal, minerals and vitamins.
2. Housing of animals

We must protect our animals from too much heat, rain and cold. We must, therefore, be careful where we house them. Their houses should have proper sanitation and ventilation. Too many animals should never be kept in a small space. Different animals require different types of houses. Hens and fowls are kept in cages while sheep and goats stay in open yard, which is partially covered with roof made of straw. This open yard should have a hedge of iron wires all around to prevent the animals from running away.

3. Water and its supply

To keep these animals healthy they should be given clean water to drink and in sufficient quantities. For example, on an average a cow consumes about 27-36L of water, pigs require 5-23L, camel 8-90L and poultry birds require about 240mL of water. Besides this we must also bathe the cattle with clean water.

Transfer of Technology

Use of technological and marketing interventions in the production, processing and distribution of livestock products will be the central theme of any future programme for livestock development. The generation and dissemination of appropriate technologies in the field of animal production as also health care to enhance production and productivity levels will be given greater attention. Integration of Animal Research Institutes with the Department of Animal Husbandry and Dairying is essential to facilitate transfer of technology as well as to undertake sanitary and phyto-sanitary measures. This would provide an effective delivery machinery to the Department enabling it to work primarily as a regulatory body in the liberalised era.

Human Resource Development and Extension

Sustainable rapid growth and development in this sector can only be ensured if the livestock owners, service providers, veterinarians and planners become knowledge based and acquire the ability to absorb, assimilate and adopt developments in the veterinary sciences and related technologies. Efforts will be made to improve the skills and competence of all stakeholders by involving village schools, veterinary colleges and universities in collaboration with the ICAR and its institutions including Krishi Vigyan Kendras (KVK), State Agricultural Universities and their field stations. Steps will be taken to ensure that veterinary education is regulated as per the guidelines of the Veterinary Council of India. Introduction of animal science education (rearing of poultry, cattle, sheep, goat and pig) in the school curriculum will be one of the focus areas during the Tenth Plan. Training of para-veterinarians, Artificial Insemination (AI) technicians,
and laboratory technicians on a regular basis will be given priority. Similarly livestock extension, which is primarily based on providing services and goods, will be treated differently from crop-related extension activities that are primarily based on transfer of knowledge. Livestock extension will be driven by technology transfer. As women play an important role in animal husbandry activities, deployment of women extension workers will be encouraged and they will work as links between farmers, the animal husbandry department and workers of NGOs.

**Integration of Programmes**

Besides the Ministry of Agriculture, schemes relating to animal husbandry and dairying are being implemented by other ministries viz. Ministry of Rural Development, Ministry of Nonconventional Energy Sources etc. Many schemes operated by these ministries have similar and overlapping objectives and target the same population. Generic components like extension, training, and infrastructure get repeated in most of such schemes and are not complementary. Efforts will be made to consolidate and bring in convergence in these areas.

**Livestock Services**

Most of the livestock services like artificial insemination/natural service, vaccination, deworming etc. are time-sensitive, which Government institutions, at times, are not able to deliver due to financial as well as bureaucratic constraints. This necessitates the providing for efficient and effective decentralized services in tune with demands emanating from users. Efforts will be made to provide such services at the farmer’s door, linked with cost recovery for economic viability. Availability of credit in time and technology support are the two important services needed for livestock development in the rural areas.

**Livestock Breeding Strategy**

A national livestock breeding strategy needs to be evolved to meet the requirements of milk, meat, egg and other livestock products. Major thrust will be given to genetic upgradation of indigenous/native cattle and buffaloes using proven semen and high quality pedigreed bulls and by expanding the artificial insemination and natural service network to provide quality semen and other services at the farmer’s level. Improved bulls for natural breeding will be made available to private breeders, Gaushalas, NGOs and panchayats in remote and hilly areas.
The programme of providing exotic males for improvement of sheep in the northern temperate region and pigs in the north eastern region will continue in the Tenth Plan. Financial and technological support would be needed to promote breeding programmes.

**Conservation of Breeds**

Conservation of threatened breeds of livestock and improvement of breeds used for draught animals and packs would be one of the major goals of the Tenth Plan. It will be the national priority to maintain diversity of breeds and preserve those showing decline in numbers or facing extinction. The improvement programme of indigenous breeds possessing desirable characteristics like disease resistance, heat tolerance, efficient utilization of low quality feed etc. will be taken up. This is essential even for a sustainable crossbreeding programme. Steps will be taken to coordinate all the activities related to the efficient utilization of draught animal power and animal by-products. Similarly efforts will be made to conserve indigenous birds and propagation of other birds like quail, guinea fowl and duck in those parts of the country where they are popular.

**RECENT INITIATIVES**

- Withdrawal of Milk & Milk Products Order MMPO)
- Introduction of National Project on Cattle & Buffalo improvement Programme
- Database & Information Network
- Creation of disease free zone (proposed)
- Conservation of threatened livestock breeds (Proposed)
- Feed & Fodder production enhancement (Proposed)
- Dairy/Poultry venture capital fund (proposed)
- Clean Milk Production (proposed)

**Quality and Safety of Livestock Products**

Quality and safety of livestock products depend upon a quality and safety assurance system for which legislation for setting up standards, corresponding to Codex standards, is obligatory. These do not exist nor is there any method for reviewing and rationalising the quality and
safety guidelines. Efforts will also be made for harmonization of infrastructure facilities for testing food quality and safety with international standards.

**Database**

Currently, there is absence of a lot of data like those relating to breed-wise milk production of cattle and buffalo, egg production from commercial farms and households, cost of production of milk, egg and wool, availability of livestock resources etc. A National Animal Health and Production Information System will be established with the active involvement of research Institutions, Government departments, panchayati raj institutions (PRIs), urban local bodies (ULBs), private industries, cooperatives and NGOs. This will work as the national database.

**Animal Welfare**

Animal welfare is also related directly with the productivity of animals. The well-being of animals is affected during management under the intensive production system, in the animal market, during handling and transportation, rearing of buffalo male calves in urban areas etc. There is a great deal of wastage, as well as animal suffering due to ill-designed agro-implements, carts and implements attached to animals. Efforts will be made to strengthen the institutions working on a livestock care system so that they can ensure and promote animal care and well-being. Research and technology development will be taken up for enhancing efficiency and reducing drudgery of animals by improving the design of carts, yokes, implements and toolbars used in agriculture. A good example is the buffalodrawn bogey fitted with rubber tyre and bearings.

**Development of Location Specific Animals**

Camel will continue to be important in desert areas for quite some time. Effective support for providing nutrition and health cover is needed for its improvement. The Department of Animal Husbandry will continue its programme for improvement of better studs both for horses and donkeys used for transport in hilly areas. Horse riding is now becoming an integral part of amusement parks and this will be encouraged as a niche industry. To encourage the breeding of horses, mules and asses, technological and financial support will be extended to entrepreneurs. Animals indigenous to specific agro-climate regions like Yak and Mithun will be developed.

**IMPORTANT FACTS**

- Total livestock population in India (2009-10): 529.7 Million
- Share of world live-stock population in India: 15 0/6
- Cattle population in India: > 205 millions
• Buffalo population: 84 Millions
• Cattle disease that is communicated to man is: Anthrax
• Cow's milk is light yellow in color due to: Carotene
• The milk is white in color due to presence of: Casein
• The carbohydrate or sugar constituent of the milk: Lactose
• Milk is deficient in element: Iron (BIIU Exam-2015)
• Milk production is maximum in: Uttar Pradesh
• The state which is second in milk production is: Rajasthan
• Fat globule in the milk are in the form of: Emulsion
• Protein present in the milk in the form of: Colloidal
• Lactose and Minerals are present in milk in the form of: Solution
• Milk is the poor source of: Iron and Vitamin C
• India ranks first in production of : Carpet wool v/ Best crop for silage making is: Maize
• Temperature of artificial vagina: 42 °c
• First clone of adult (sheep) animal: Dolly
• In India wool production is maximum in: Rajasthan (35%)
• Disbudding in calf of newborn is done at the age of: 4-10 days
• Swelling due to the collection of gases in rumen of the animal is: Bloat
• Protein content in colostrum of cow is 17.8% & in buffalo colostrum is: 21.4%
• Generally ruminant have four chambers stomach e.g. Cattle, sheep, goat, deer except camel that has three chambered rumen.
• Milk is rich source of Calcium, Phosphorus and excellent source of vitamin A.
• India's position first in world milk production, total buffaloes, wool production and total cattle production.
• The world's first in vitro fertilized buffalo calf is: Pratham
• The most commonly used cry protectant for freezing of semen: Glycerol
• Collagen is the main proteins of skin/connective tissues
• Light receptor pigment in animals is: Melanin
• Cannibalism is seen in poultry due to: Sodium chloride deficiency
• Cracked feet in poultry is caused by: **Deficiency of biotin**
• Degnala and Alkali diseases are caused due to toxicity of: **Selenium**
• Animal protein factor is known as: **Cobalamin**
• Fat content in double toned milk is: 1.5%
• Hay can be stored if moisture per cent below: 16%
• Milk lipid is: **lecithin**
• Crazy chick disease is caused by deficiency of – **Vitamin E**
• Only essential fatty acid of poultry is: **Linolic acid**
• Glucose + Glucose = **Maltose**
• Glucose + Fructose = **Sucrose**
• Glucose + Glactose — **Lactose (Milk sugar)**
• Sulphur containing vitamins are: **Thiamine and Biotin**
• The best way to prevent fatal septicemia in young calves is to make sure that they get: **Colostrum**
• The biggest compartment of ruminant stomach is: **Ruman**
• The boiling point of milk is: 100.17 °C
• The most variable constituent of milk is: Fat
• The process of dehorning is accomplished by applying: Castic potash
• The poultry specially raised for meat production is known as: **Broiler**
• The protein which can’t be digested: **Elastin**
• Freshly drawn milk has a pH value of: 6.5-6.7
• The disease in which animals aborts or gives birth to a dead or weak calf is known as: Brucellosis
• The deficiency of manganese in poultry causes: **Perosis**
• Parakeratosis is caused by the deficiency of: **Zinc**
• Oxidation of fat is called: Beta oxidation
• Protein which is soluble in water and heat coaguable is: **Albumin**