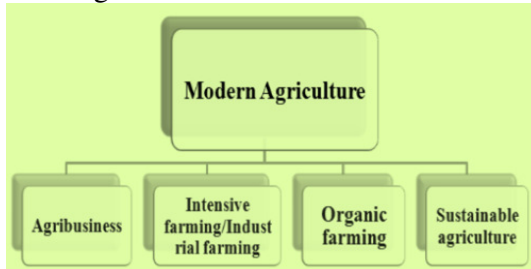


20. MODERN AGRICULTURE

- Modern agriculture is an **evolving approach to agricultural innovations and farming practices** that help farmers increase efficiency and reduce the number of natural resources like water, land, and energy necessary to meet the world's food, fuel, and fiber needs.
- Modern agriculture includes:

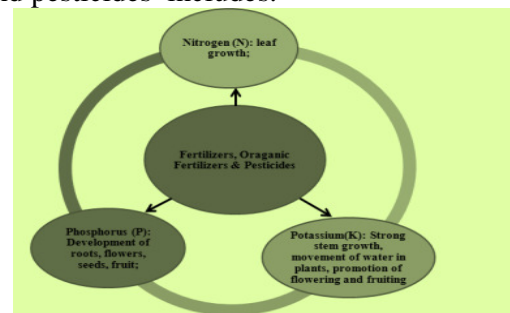


- Green evolution



- M.S.Swaminathan (Indian Father of Green Revolution) is renowned for his leading role in India's Green Revolution program under which high-yield varieties of wheat and rice seedlings were planted in the fields of poor farmers and success in introducing and further developing high-yielding varieties of wheat in India.
- Norman Ernest Borlaug was an American biologist, humanitarian and Nobel laureate, who has been called "the father of the Green Revolution" agriculture's greatest spokesperson and "The Man Who Saved A Billion Lives".
- Results of the Green Revolution involved the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernization of management techniques, distribution of hybridized seeds, synthetic fertilizers, and pesticides to farmers. This leads to produce much larger quantities of food with cheaper price in the market.

- **High Yielding Varieties Seeds** are undoubtedly land substituting, water economizing, more labour using, and employment generating innovation; nevertheless, they are very delicate and sensitive and therefore require a great deal of care if a successful harvest is to be obtained.
- HYVs varieties of wheat, rice, maize, pulses and ground nut etc.
- Farmers use both organic fertilizers produced from plant and animal wastes as well as commercial chemical fertilizers produced from various inorganic compound.
- Fertilizer is any material of natural or synthetic origin that is applied to soil or to plant tissues (usually leaves) to supply one or more plant nutrients essential to the growth of plants.
- Organic Fertilizers or Manure are fertilizers derived from animal matter, human excreta or vegetable matter. (e.g. compost, manure).
- Naturally occurring organic fertilizers include animal wastes from meat processing, peat, manure, slurry, and guano
- As figures shows Fertilizers, organic fertilizers and pesticides includes:



- Organic fertilizers are carbon-based compounds that increase the productivity and growth quality of plants. They have various benefits over chemical fertilizers.
- Pesticides are substances meant for attracting, seducing, and then destroying any pest. The most common use of pesticides is as plant protection products, which in general protect plants from damaging influences such as weeds, fungi, or insects.

- The benefits of pesticides include increased food production, increased profit for farmers and the prevention of diseases.
- Pesticides also increase farm profits by helping the farmer save money on labour costs. Using pesticides reduces the amount of time required to manually remove weeds and pests from fields.
- Pesticides, when used in the approved regulatory manner, pose no risk to either farm workers or consumers.
- It describes the potential performance of a seed lot. Trueness to variety; the presence of inert matter, seed of other crops, or weed seed; germination percentage; vigor; appearance; and freedom from disease are important aspects of seed quality.
- Agricultural mechanization helps in increasing productivity on large areas of land by using various machines:



• **Newer Agriculture Practices**

<p>Poultry farming is the raising of domesticated birds as chickens, ducks, turkeys and geese for the purpose of farming meat or eggs for food.</p> <p>Exotic birds: Leg horn, Rhode Island, Cornish</p> <p>Indian Breeds: Aseel, Busra, Chittagong</p>	<p>Mushroom culture is the process of producing food, medicine, and other products by the cultivation of mushrooms and other fungi.</p> <p>Mushroom species in India are: Button mushroom, Paddy straw mushroom and Oyster mushroom</p>	<p>Fish Farming or Pisciculture involves raising fish commercially in tanks or enclosures, usually for food. Worldwide, the most important fish species used in fish farming are carp, tilapia, salmon, and catfish. There is an increasing demand for fish and fish protein.</p>
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- The branch of agriculture that deals with breeding, feeding and care of domestic animals is called **Animal husbandry**. It is an integral

part of modern agriculture as animal sources provide us important food materials like milk.

- Milk producing animals are called milch animals. Ex: cows and buffaloes.
- Some indigenous (Indian) breeds of dairy cows are Sahiwal, Red Sindhi, Tharparkar, Gir. Some exotic (foreign) breeds of cows are Jersey, Brown Swiss, Holstein Friesian. Some cross breeds of dairy cows are: Frieswal, Karan Fries and Karan Swiss.
- High milk yielding breeds of buffaloes are Murrah, Surti, Mehsana.
- **Management of Livestock**
- **Feeding and nutrition:** What animals eat has a major impact on performance, profitability and quality of the end product.
- For intensive livestock (pigs, poultry and sheep and cattle in feedlots), cereals, legumes and protein meals make up the majority of the diet and are formulated to meet diet specifications.
- Feed of cattle should be rich in carbohydrates, protein, fats, minerals, vitamins and water. It must include large amount of roughage and some concentrates.
- Roughage the low nutrient, fibrous, coarse material rich in cellulose. Concentrates are generally rich in one or more nutrients, provided by cotton seeds, oil cakes, gram, cereals and millets.

• **Genetics and Selection:**

Genetic improvement is a major factor contributing to the profitability of production systems for livestock and poultry. Breeding and selection have resulted in significant economic gains in beef, lamb, wool, milk, pork, egg and chicken production.

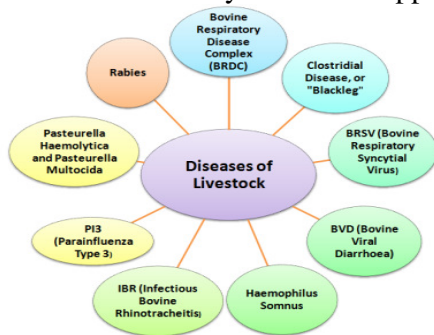
• **Shelter management**



- The provision of shelter allows cattle to better cope with the varying climatic extremes that can occur throughout the year and can increase their productivity.

- **Diseases of Livestock**

Some diseases can have devastating effects on the livelihoods of everyone in the supply chain.



- **Disposal of Dead Livestock**

- Burial must be no less than 6 feet deep with a minimum of 30 inches of soil cover. Burial cannot be in a wetland, floodplain or shoreline area.
- Composting: As an underlying layer, or substrate, use a mixture of hay, manure and bedding with moisture content between 40 to 50 %.
- **Detrimental Effect of Hormones on Livestock and Poultry:**

Indiscriminate use of hormones for increasing milk production causes lot of discomfort and to pain to pain the animals making it difficult for her to even walk.

Hormones and antibiotics can encourage weight gain or counter the effects of other treatments. Dairy cows given rBGH, for example, sometimes develop udder infections.



- **Consequences of Aquaculture**

- Aquaculture is the practice of growing aquatic species in pens or nets. Most aquaculture includes the use of ponds, holding tanks, or nets that float in open water.
- Species are grown in these controlled environments and harvested for sale.
- Aquaculture was established mainly to help reduce the pressure on natural fish populations.
- Purpose of aquaculture includes utilization of natural resources, increase production for per capita consumption and income, upliftment of socio-economic status of people and create employment opportunities.
- **Environmental effects of fish farming**
One large problem with aquaculture is that organisms are grown in large numbers in small areas. This concentrated setting can cause some major problems that influence the environment.
- This setting results in a large amount of uneaten food and bodily waste being released into the environment. This unnatural increase in nutrients results algal blooms, which can negatively impact native species by reducing the amount of oxygen available in the water.
- The concentrated setting of aquaculture also increases the risk of diseases.



Check Yourself

- Green revolution refers to increase in:
 - New fruit varieties
 - yield by developing new crop varieties
 - Protein rich food crop
 - New oil seed varieties
- Who was the father of green revolution in India?
 - Norman E Borloug
 - K V Rakesh
 - K. L Chauhan
 - M.S. Swaminathan
- Out of the following fertilizers, which is belonging to organic fertilizers?
 - Green manure
 - Phosphate
 - Superphosphate
 - Urea
- Combine harvester is used for:
 - A picking cotton from the plants
 - Spraying pesticides on crops
 - Cutting the corn and separate grains from the ear of plants
 - Broke off heavy chunk of soil/rock
- The branch which deals with breeding, feeding and care of domesticated animals is known as:
 - Animal rearing
 - Animal husbandry
 - Pasturage
 - Dairying



Stretch Yourself

- Expand the term USAID, HYVs.
- Give important revolutionary varieties of wheat in India.
- Name different type of chemical fertilizers.
- Mention the main advantages of bee-keeping.
- Give reasons for low yield milk per day in Indian cattle.



Test Yourself

- Discuss the contribution of MS Swaminathan to become self-sufficient in food production of India.
- Mention the benefits of using green manure/organic fertilizers.
- How does poultry farming help to farmer for changing their.
 - Financial conditions?
- Give four characteristics of an ideal shelter for cattle.
- Describe the consequences of an aquaculture.