

Modernization of Agriculture:

The modernization process of Agriculture in different states of North eastern region has started at very late hours. When the green revolution could spread its impact on the entire north east region but at that moment the same green revolution could not be initiated in the North-eastern region. As a result agricultural productivity in north east state remained very low. In recent years some steps have been taken in the north east and particularly Assam in order to modernize the agricultural sector. The steps undertaken include irrigation facilities, utilization of high yielding variety of seeds (HYV), utilization of fertilizer etc.

- 1. Irrigation Facilities:** The net irrigated area in Assam was 572 thousand hectares in 1985-86. In 1995-96, total irrigation potential developed in Assam remained at 4.80 lakh hectares. Out of the gross cropped area of 41.60 lakh hectares, the Irrigation Department alone created potential of approximately 8.32 lakh hectares up to March, 2013 by operating completed and ongoing irrigation schemes. The State Agriculture Department has created irrigation potential of 9.18 lakh hectares till the end of March.
- 2. Utilization of HYV Seeds and Fertilizers:** Utilization of High Yielding Variety of seeds and fertilizer are the other areas under the process of modernization of agriculture. Utilization of HYV seeds in Assam is being made to a certain extent and in 1991-92, HYV seeds were applied in 1226 thousand hectares of agricultural land in Assam. The utilization of same HYV seeds in the other North East states were, 214 thousand hectares in Tripura, 92 thousand hectares in Manipur, 56 thousand hectares in Meghalaya, 41 thousand hectares in Nagaland. The consumption of fertilizer in the state in terms of nutrient (NPK) per hectare is much lower than the national average. Consumption of fertilizer in Assam was 122.3 kg/ hectare during 2012-13 as compared to 74.58 kg/ hectare in the previous year. This increase is 164 per cent from 49.50 kg/ hectare in 2003-04.
- 3. Use of Pesticides:** Integrated Pest Management (IPM) is important for sustainable agriculture. The state Agriculture Department has made efforts to popularize the use of bio-pesticides and other methods of IPM. However, consumption of chemical fertilizers has shown a decreasing trend. The following table shows the trend of consumption of fertilizers:

Table: 2.9
Use of Pesticide

	2007-08	2008-09	2009-10	2010-11	2011-12
Pesticide consumption					
Chemical Pesticide	158MT	150MT	143 MT	140 MT	136 MT
Bio-pesticide	6.7 MT	10.60 MT	19.00 MT	24.00 MT	90.0 MT

Source: Directorate of Agriculture, Assam.

- Crop Insurance:** In view of the recurring natural calamities crop insurance is an important area to help farmers at times of crop failure. National Agricultural Insurance Scheme (NAIS) has been launched by the Government of India; but this scheme has not been so successful in the state. Various factors responsible for this include lack of awareness, low subsidy premium for small and marginal farmers, delayed claim settlement, slow response of banks in issuance of Kissan Credit Cards etc.
- Farm Mechanization:** Fragmented and small land holding is the major factor responsible for slow mechanization in the state. Initiatives have been taken by the State Agriculture Department to procure Tractors, Power Tillers and other farm equipments for the benefit of farmers in general and small and marginal farmers in particular. The following table gives a picture of farm machineries and equipments procured and distributed by the State Agriculture Department during the period from 2007-08 to 2012-13.

Table: 2.10
Use of Tools and Machineries

Year	Tractor	Power Tiller	Small Equipment	Retovator	Farm Power Available (HP per hectare)
2007-08	855	4549	850	-	0.60
2008-09	1718	1326	1527	20	0.60
2009-10	506	3968	92492	26	0.69
2010-11	962	3138	0	65	0.90
2011-12	824	3903	-	335	1.02
2012-13	548	3110	NA	NA	1.02

Source: Directorate of Agriculture, Assam.

Sustainable Agriculture:

Sustainable agriculture is the act of farming using principles of ecology, the study of relationships between organisms and their environment. The phrase was reportedly coined by Australian agricultural scientist Gordon

McClymont. It has been defined as "an integrated system of plant and animal production practices having a site-specific application that will last over the long term". In details-

1. Satisfy human food and fibre needs.
2. Enhance environmental quality and the natural resource base upon which the agricultural economy depends.
3. Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
4. Sustain the economic viability of farm operations.
5. Enhance the quality of life for farmers and society as a whole.

In simplest terms, sustainable agriculture is the production of food, fiber, or other plant or animal products using farming techniques that protect the environment, public health, human communities, and animal welfare. This form of agriculture enables us to produce healthful food without compromising future generations' ability to do the same. The primary benefits of sustainable agriculture are:

1. **Environmental Preservation:** Sustainable farms produce crops and raise animals without relying on toxic chemical pesticides, synthetic fertilizers, genetically modified seeds, or practices that degrade soil, water, or other natural resources. By growing a variety of plants and using techniques such as crop rotation, conservation tillage, and pasture-based livestock husbandry sustainable farms protect biodiversity and foster the development and maintenance of healthy ecosystems.
2. **Protection of Public Health:** Food production should never come at the expense of human health. Since sustainable crop farms avoid hazardous pesticides, they're able to grow fruits and vegetables that are safer for consumers, workers, and surrounding communities. Likewise, sustainable livestock farmers and ranchers raise animals without dangerous practices like use of non therapeutic antibiotics or arsenic-based growth promoters. Through careful, responsible management of livestock waste, sustainable farmers also protect humans from exposure to pathogens, toxins, and other hazardous pollutants.
3. **Sustaining Vibrant Communities:** A critical component of sustainable agriculture is its ability to remain economically viable, providing farmers, farm workers, food processors, and others employed in the food system with a livable wage and safe, fair

working conditions. Sustainable farms also bolster local and regional economies, creating good jobs and building strong communities.

Sustainable farmers and ranchers treat animals with care and respect, implementing livestock husbandry practices that protect animals' health and wellbeing. By raising livestock on pasture, these farmers enable their animals to move freely, engage in instinctive behaviors, consume a natural diet, and avoid the stress and illness associated with confinement.

PROBABLE QUESTIONS

Short Questions:

- 1) What do you mean by land use pattern?
- 2) What is the average land holding size of Assam?
- 3) Define sustainable agriculture.
- 4) Which is the dominant crop of the state?
- 5) Define food security.
- 6) Write the name of two equipment of modernized agriculture.

Short Notes:

- 1) Horticulture
- 2) Sericulture of Assam
- 3) Food security
- 4) Cropping pattern
- 5) Sustainable agriculture

Long Questions:

- 1) Discuss elaborately the main features of agricultural economy of Assam. Suggest some measures for agriculture sector development of the state.
- 2) What do you mean by cropping pattern? What main changes you notice in the cropping pattern of Assam since independence?
- 3) Explain the causes of slow progress of agricultural sector of Assam. Does Assam need another green revolution?
- 4) Give a brief account of food production vis-à-vis food security of Assam.
- 5) Discuss the trends and pattern of agricultural production of Assam.
- 6) Give a policy outline for agricultural development of Assam

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