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**SUSTAINABLE AGRICULTURE AND
FOOD SECURITY**

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UNIT – II

SUSTAINABLE AGRICULTURE

1. **Food Availability** refers to the physical existence of food, be it from own production or on the markets.

2. **Food Access** is ensured when all households and all individuals within those households have sufficient resources to obtain appropriate foods for a nutritious diet.
 - Depends on the level of household resources -capital, labour, and knowledge, and also on prices;
 - Function of the physical environment, social environment and policy environment, which determine how effectively households are able to utilize their resources to meet their food security objectives; and
 - Drastic changes in conditions, such as during periods of drought or social conflict, may seriously disrupt food production and threaten the food access of affected households.

3. **Food Utilization** has a socio-economic and a biological aspect. If sufficient and nutritious food is both available and accessible:
 - **socio-economic**
 - households make decisions/choices on what food to consume (demand) and how the food is allocated within the household;
 - Unequal distribution leads to suffering from food deficiency;
 - the same is true if the composition of the consumed food is unbalanced;
 - **biological utilization of food** – Focused at the individual level food security, which refers to the ability of the human body to take food and translate it into either energy that is used to undertake daily activities or is stored.

Utilization requires not only an adequate diet, but also:

 - a healthy physical environment, including safe drinking water and adequate sanitary facilities (so as to avoid disease); and
 - an understanding of proper health care, food preparation, and storage processes.

Food production sustenance:

Food production sustenance refers to the ability of agricultural systems to produce sufficient, nutritious, and accessible food in a manner that preserves environmental health, supports economic stability, and promotes social equity over the long term. It involves practices that conserve vital natural resources, such as water, soil, and biodiversity, while reducing the negative impacts of farming, including greenhouse gas emissions and pollution. Sustainable food production ensures the resilience of food systems to climate change and external shocks, supports local economies by creating jobs and fostering fair trade, and reduces reliance on expensive and depleting inputs like synthetic fertilizers and pesticides. It also focuses on maintaining and improving the quality of food through healthier farming methods, such as organic farming and agroecology, while enhancing food security by making food accessible and affordable to all populations. By reducing

4. Food Stability refers to the temporal dimension of nutrition security - i.e. the time frame over which food security is being considered.

- Distinction of **chronic food insecurity** - the inability to meet food needs on an ongoing basis; and
- **transitory food insecurity** when the inability to meet food needs is of a temporary nature;
 - **cyclical** (where there is a regular pattern to food insecurity, for example, the "lean season" that occurs in the period just before harvest); and
 - **temporary** (which is the result of a short-term, exogenous shock such as droughts or floods). Also civil conflict belongs to the temporary category, although the negative impact on food security often continues over long periods of time.

food waste at every stage of production and consumption, it maximizes resource use, helping to ensure that food is available for future generations. In promoting these practices, food production sustenance not only meets current needs but also supports the achievement of global goals, such

as ending hunger, promoting responsible consumption, and combating climate change, ultimately fostering a resilient, equitable, and thriving food system for the future.

Food production sustenance refers to the ability of food systems to produce enough food over the long term in a way that is environmentally responsible, socially equitable, and economically viable. It is not just about increasing food output but ensuring that food production is carried out in a manner that preserves the resources needed for future generations and supports the well-being of people and ecosystems.

To ensure food production sustenance, a number of key principles and practices are adopted across different sectors of agriculture and food production. Here are the main elements of food production sustenance

Key Indicators of Food Production Sustenance:

- i. **Crop Yield per Hectare:** Measures how efficiently land is being used to produce food.
- ii. **Resource Efficiency:** Includes water use, energy consumption, and fertilizer inputs for food production.
- iii. **Sustainability Metrics:** Tracks soil health, biodiversity, and climate impact (carbon footprint).
- iv. **Access to Food:** Ensures that all populations, regardless of socioeconomic status, have access to sufficient, nutritious, and culturally appropriate food.

In summary, food production sustenance requires a balanced approach that considers environmental, economic, social, and technological factors. It emphasizes practices that support the long-term health of ecosystems, ensure food security for all, and promote the efficient use of resources while addressing the challenges posed by a changing climate and growing global population.

Limitations of food production sustenance:

While food production sustenance offers significant environmental, economic, and social benefits, it also faces several limitations that can hinder its widespread adoption and effectiveness. One of the primary challenges is the high initial costs and knowledge barriers for farmers, especially smallholders in developing regions, who may lack access to the necessary resources, training, or

technology to implement sustainable practices. Additionally, transitioning to sustainable farming methods can reduce short-term yields, which may be a concern in regions struggling with food insecurity or in industries where high productivity is essential to meet growing demand. Climate change itself poses a paradox, as changing weather patterns, more frequent droughts, and extreme weather events make it harder to predict and manage sustainable production systems. There is also a limited infrastructure for distributing sustainably produced food, particularly in rural or remote areas, which can lead to higher costs and logistical challenges. Furthermore, the global food system is deeply entrenched in conventional agricultural practices, including heavy use of chemical fertilizers, pesticides, and monoculture farming, which makes large-scale transition to sustainability difficult. Cultural, political, and economic factors also play a role, with some regions and industries resistant to change due to entrenched interests or the perception that sustainable practices may be less profitable. Finally, while sustainability aims to ensure long-term food security, achieving it on a global scale requires coordinated action, which can be hampered by political instability, economic inequalities, and lack of international collaboration.