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Crop Diversification: A Way for Achieving Household Food Security

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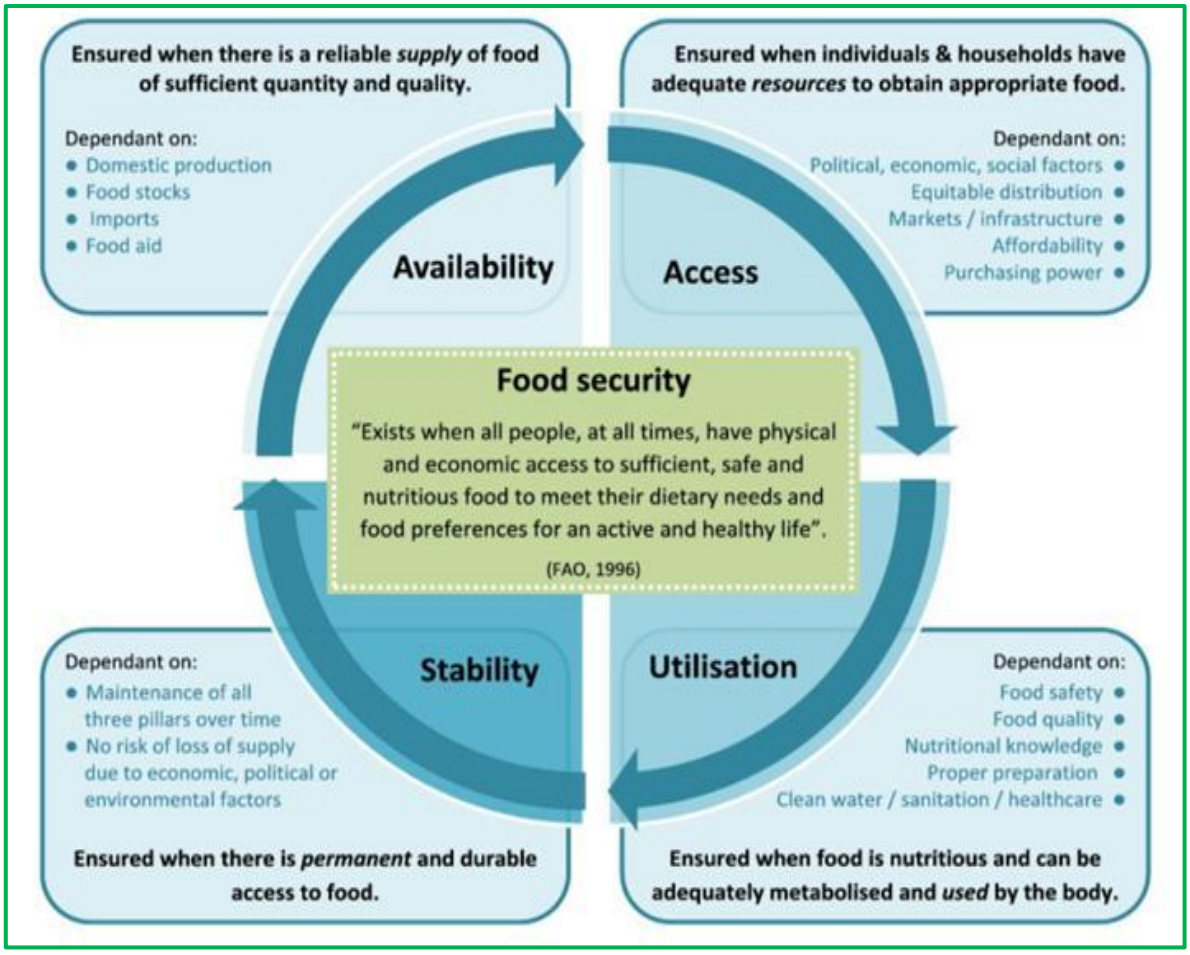
Widespread uptake of sustainable practices in agriculture and food supply chains is essential to meet current and future threats to food security and environmental resilience. The global food system does not yet provide adequate calories or nutrition to everyone on the planet, yet it enables some populations to over-consume. In the coming decades, global agriculture must produce more food to feed a growing population while adapting to climate change, an increasing threat to agricultural yields. Food needs are projected to double by 2050. It is a global imperative to meet this growing demand for food in a manner that is socially equitable and ecologically sustainable over the long term. Current practices are undermining the ecological foundation of the global food system through overuse and the effects of agricultural pollution, thereby enhancing degradation, reducing ecosystem capacity to generate sustainable yields and threatening food security. While modern, industrialized agricultural systems in theory produce sufficient food to feed the world's current population, they have accomplished this feat with significant ecological and social externalities (Nasiro, 2024). Crop diversification is generally viewed as shift from a traditionally grown less remunerative crops to more remunerative crops. Crop diversification is recognized as one of the most environmentally feasible, cost-effective, and reasonable approaches to reduce uncertainty in agriculture, particularly in the face of climate change. Crop diversification helps in minimizing the alleviating second generations problem such as soil degradation, soil salinity, insect-pest and disease insurgence, environmental pollution, decline in farm profit, nutrient imbalance, climate change etc. Crop diversification promotes farm resilience, or the ability of an agroecosystem to return to its former productive state after being perturbed, by increasing geographical and temporal biodiversity. Although crop diversification is not a new concept to many rural people in developing and emerging economies, there has been little research on the subject to date. However, there is increasing global interest in the area, owing to current worries about biodiversity loss, as well as human and environmental health.(Barman, *et al.*, 2022)

What is food security?

Commonly accepted and used definition for food security: "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life" (World Food Summit, 1996).

Four Pillars of Food security



Crop Diversification

- Crop diversification is the practice of growing more than one crop species within a farming area in the form of rotations or mixed cropping (Makate et al. 2016).
- A shift from less profitable and sustainable crop or cropping system to more profitable and sustainable crop/cropping system.

Approaches of Crop Diversification:

(A) Horizontal diversification:

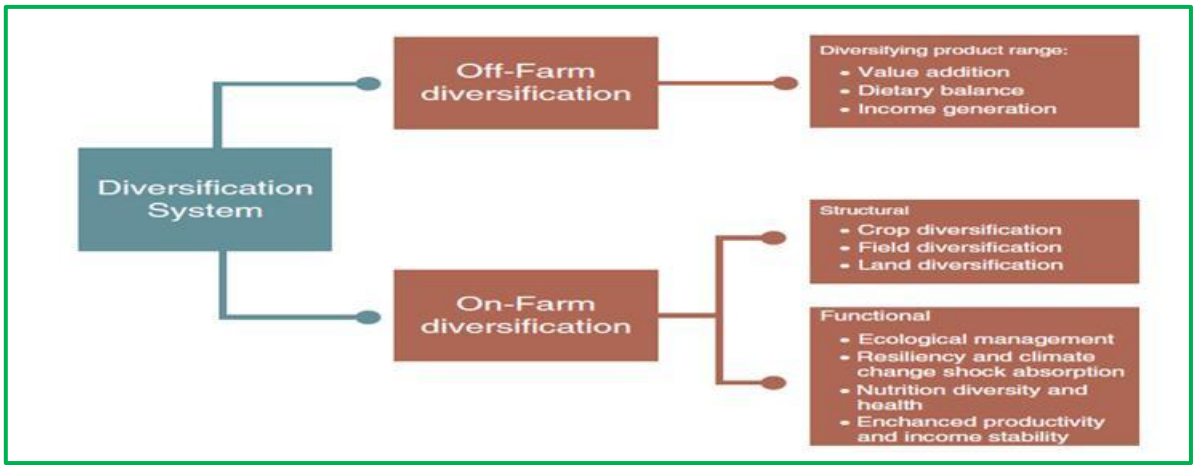
- Crop substitution: Instead of low value adoption of high value crop.
- Crop intensification: Addition of more crops to crop mix.

(B) Vertical diversification: Other than cropping e.g. canning, juicing of the fruits, natural colorants, herbs and essence etc.

Why Crop Diversification?

- For raising farm income.
- Sustainable production and income.
- Food and nutrient security.
- Promotion of export.
- Employment generation.
- Poverty alleviation.
- Judicious use of land and water resources.
- Reduction in environmental pollution.

Structural Levels of Diversification:



Factors influencing crop diversification

- Resource/climate related: irrigation, rainfall & soil erosion
- Tech related: seeds, fertilizer, storage, processing
- Household related: food & fodder self-sufficiency + investment capacity
- Price related: factor affecting price directly/industry,
- Institutional & infrastructure related: farm size, govt. regulation, credit access, and farm extension services, post-harvest and production facilitation, marketing and trade
- Social factors: farmers age, education & experience, peer pressure.

Ways to measure crops diversification: There are several ways to measure crops diversification, and the most important include:

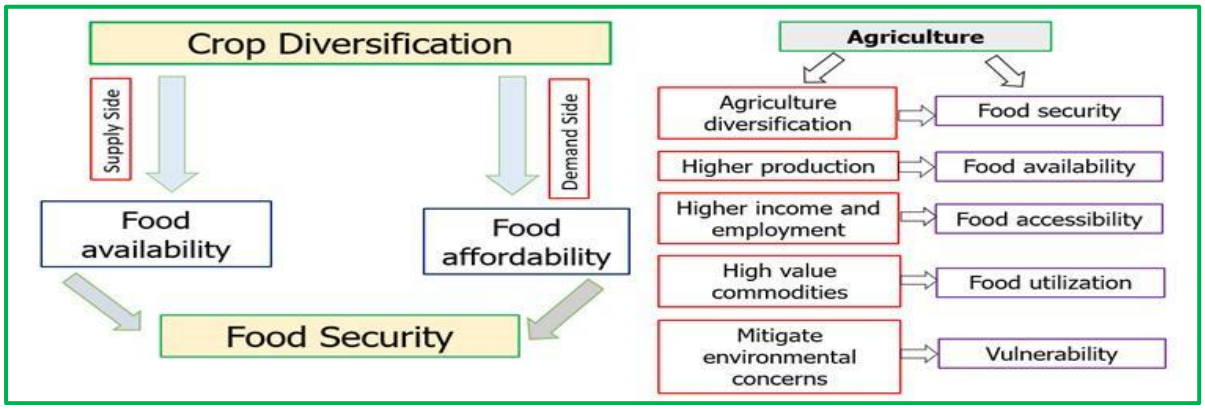
- Herfindahl Index
- Simpson Diversity Index
- Ogive Index
- Margalef Index
- Shannon Index
- Berger-Parker Index
- Entropy Index.

Crop Diversification and Food Security: Crop diversity can influence the food security in two ways:

1.Production for food security: Increased Farm production by crop diversification increases food availability (Khan and Gill 2009).

2. Income for improved food security: Crop diversity by increasing the household income ensures food security (Sultana and Kiani 2011).

Linkages between Crop Diversification and Food Security:



Benefits of Crop Diversification:

- Improvement in Soil Properties
- Improvement in System Productivity and Profitability
- Pests and Diseases
- Environmental Benefits

Constraints in Crop Diversification:

- Lack of suitable land.
- Lack of water and technologies.
- Low adoption rate of new varieties.
- Imports discourage diversification.
- Existing marketing system discourages diversification.
- Very weak agro-based industry.
- Inadequate supply of improved and quality seeds and planting material of improved cultivars.

Conclusion

- Inclusion of pulses/oilseeds and vegetables in cropping system is more beneficial compared to monocropping for achieving the sustainable food and nutritional security
- Crop diversification is not only a shift from traditional and less remunerative crop to more remunerative crop but it is a demand driven, need based situation specific and national goal seeking continuous and dynamic concept.
- Achieving food security is a major challenge of developing nations and is crucial to alleviating poverty.

Future Aspects

- Establishing food grain banks and promoting household gardening.
- Inclusion of high value crops through horizontal and vertical diversification approach.
- Availability of farm insurance and credit.
- Production and availability of quality seed.

References

1. Barman, A., Saha, P., Patel, S. and Bera, A. (2022). Crop Diversification an Effective Strategy for Sustainable Agriculture Development, https://www.intechopen.com/chapters/81179.
2. Khan, R.E.A. and Gill, A.R. (2009). Crowding Out Effect of Public Borrowing: A Case of Pakistan. The Islamia University of Bahawalpur, Bahawalpur, MPRA Paper, 16292.
3. Makate, C., Wang, R., Marshall M. and Mango, N.(2016). Crop diversification and livelihoods of smallholder farmers in Zimbabwe: adaptive management for environmental change, *SpringerPlus*, 5:1135.
4. Nasiro, K. (2024). Cropping Systems Diversification as an Approach to Enhancing Crop Productivity: A Review, *Plant*, 12(3): 48-65.
5. Sultana A. and Kiani A.(2011). Determinants of food security at household level in Pakistan. *Afr J Bus Manage*, 5(34):12972–9.
6. World Food Summit 1996, https://www.fao.org/4/w3548e/w3548e00.htm