

2 Diversification Under Different Agro-Ecosystem

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INTRODUCTION

Diversification pertains with changes in the prevalent traditional farming system, which can ensure better land use, afford sustained productivity, ensure better income, employment generation per unit area per unit time.

After ensuring food security for almost a billion people in India through successful cultivation of Rice-Wheat cropping, country needs to ensure nutritional, economic and environmental security in this subcontinent. India's "Green Revolution", which started in 1968, brought self-sufficiency in food and ensured food security to the country.

Predomination of rice and wheat cropping system, coupled with imbalance and indiscriminate use of chemicals (fertilizers, pesticides, weedicides) and non-judicious use of water in 3-4 decades have created number of problems such as:

- Compaction in soil structure
- Low organic matter content
- Poor water holding capacity
- Outbreak of pest, disease and weed infestation
- Increase in salinity, sodicity or land submergence
- Adverse effect on flora and fauna
- Deterioration in factor productivity and
- Varying degree of displacement of human settlement

Increasing pressure of population and diversion of arable land for non agricultural purpose are the major challenges of today. Per capita availability of land for producing commodities declined from 0.48 in 1951 to 0.15 ha and it may further decline to 0.08 ha by 2050 when population stabilization may occur in this subcontinent. This projection does not consider soil degradation and conversion of land to non-agricultural usage. Meeting all the basic necessities of life from available land resource is one of the major challenges in years to come. There is little scope of horizontal expansion of area for crop cultivation, hence the only alternative left is

to the same commodity from other sources in national and international markets, since the current situation of markets globally is highly unstable with regard to agricultural commodities and value added agricultural products, so as to keep a cushion for market fluctuations and expansion of trade and profits as well.

For effective land use planning, ICAR recognized eight agro-climatic region in India, while Planning Commission (1985–90) recognized 15 broad agro-climatic zones in India based on the criteria or physiography and climate for effective planning. In order to be more precise and giving due importance to soil conditions, National Bureau of Soil Survey and Land Use Planning (NBSSLUP) delineated the country into 21 agro-ecological regions using physiography, soils bioclimatic types and growing periods. This approach is comprehensive and can be used for the delineation of horticulture and plantation crops growing in zones as depicted in Table 2.1.

Table 2.1: Major agroclimatic regions of India (NBSSLUP)

Name of the ecological region	Areas and choice of crop for the region	
	Areas covered	Crops grown
1. Western Himalaya's Cold arid	The region comprise of cold and agro-ecoregion of Western Himalayas covering Ladakh and Gilgit districts of J&K	Potential crops include almond, walnut and pecan nut, Chinese ber, deciduous pomegranate (Russian type) and temperate grapes (with ensured irrigation)
2. Western plains and Kutch Peninsula hot arid	This ecoregion consists of western parts of Rajasthan, Southern parts of Haryana and Punjab, the Kutch peninsula and Northern parts of Kathiwar peninsula	Date palm, citrus, grapes, ber, aonla have potential in the area with supplemental irrigation
3. Deccan plateau, hot arid	The region comprises of the Deccan plateau which includes Raichur and Bellary of Karnataka and Anatapur in Andhra Pradesh	Citrus (Sweet orange and Acid lime), mango, grape, ber, pomegranate, sapota, Annonas are grown with supplemental irrigation
4. Northern plain and central highlands	The region consists of Northern plains, central highlands and Gujrat plains which are characterized by hot and dry summers and cool winter	Citrus fruits, guava, mango, low chilling stone fruits are grown. Banana and sapota are preferred in plains of Gujrat
5. Central (Malwa) highlands and Kathiawar Peninsula, hot semi-arid	The region includes the Western part of Madhya Pradesh, Eastern part of Rajasthan and Gujrat state. This is characterized by hot and dry summer and mild winter	Ber, Pomegranate, aonla, tamrind, guava, citrus fruits, mango and sapota are grown in the region. Banana is also grown with supplemental irrigation. Among the plantation crops, coconut, oil palm, cashew and black pepper are potential.
6. Deccan plateau and Eastern Ghats, hot semi-arid	Deccan, plateau and Eastern Ghat cover major part of Andhra Pradesh	Sapots, custard apple, mango, banana, citrus, guava, and pomegranate grapes are major fruits growing in this region. Cashewnut, oil palm and coconut are potential.
7. Eastern Ghats (TN uplands) and Deccan Plateau, hot semi-arid	The region comprises Deccan plateau, Tamil Nadu uplands, and Western part of Karnataka. This is characterized by hot dry summer and mild winter	Mango, sapota, guava, ber, aonla, grape, banana, tamarind and citrus fruits are major fruit crops. On hills, low chilling pear, plum and peaches are potential, coconut arecanut and cashew are potential plantation crops.

Table contd...

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Table 2.1: Contd.

Name of the ecological region	Areas and choice of crop for the region	
	Areas covered	Crops grown
8. Northern plains, hot sub-humid	The North plain, hot humid eco-region with alluvium soil comprises of the Northern Indo-gangetic plains	Mango, guava, citrus fruit (limes and lemon), papaya and low chilling stone fruits
9. Central highlands (Malwa bundelkhand) hot sub-humid	This region is characterized with medium and deep black soils covers a part of central highland, including the districts of Raisen, Sagar, Bhopal, Sehore, Shahjahanpur and Hoshangabad (M.P.)	Ber, pomegranate, aonla, bael, and mango under protective irrigation are potential. Coconut, arecanut and cashew are potential plantation crops
10. Deccan plateau and central highlands	The eco-region with red and black soils is characterized by hot summers and mild winter	The region is known to grow high quality mandarin and is potential for growing guava, sapota, amngo, ber and pomegranatic. Among plantation crops cashew has great potential.
11. Eastern plateau (Chhattisgarh), hot sub-humid	This eco-region with red and yellow soils is characterized by hot summer and cool winter	Mango, citrus, cashew nut, guava, papaya, pineapple are potential fruit crops of the region. On high hills pear can also be grown successfully. Banana has also proved successful in the region.
12. Eastern (Chhota Nagpur) Plateau and Eastern Ghats hot sub-humid	This eco-region with red loamy soil is characterized by hot summer and cool winter	Mango, guava, banana, papaya, jackfruit, aonla, pineapple, cashew nut and several minor fruits are grown in this region. Aonla, ber and pomegranate have potential for commercial exploitation. Banana and litchi can also be grown especially in plateau of Bihar. Cashew nut is also potential.
13. Eastern plain, hot sub-humid	This eco-region has alluvial soils and is characterized by cool winter and hot summer. Best litchi is grown in this region	Mango, litchi, jackfruit, guava, bael, aonla, acid lime and banana are predominant fruit crops. Coconut and arecanut is potential.
14. Western Himalayas warm sub humid (inclusion humid)	This eco-region has brown forest and podzolic soils and is characterized by warm sub-humid to cool humid climate	The region is suitable for growing apple, plum, apricot, almond and nuts. Apple cultivation has been successfully exploited in the region.
15. Assam and Bangal plains, hot humid	This eco-region has alluvium derived soil	Banana, pineapple, mango, and sapota are predominant fruit crops. Citrus fruits are also grown especially in Assam valley, Guava, aonla, bael are also potential in the region. Cahsew nut, coconut and arecanut are potential plantation crops.
16. Eastern Himalayas, warm per humid	This eco-region has brown hill soils. It passes Northern tip of the West Bangal, Northern most part of Arunanchal Pradesh and Sikkim	Apple, pear, plum are potential in the region. Mandrain is successfully grown in valleys.

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CONCLUSION

Diversification of agriculture should be preceded by a thorough study of natural and economic resources of the concerned eco-region, the level of infra-structural development, and social status of the communities, level of economic activities and the prevailing farming situations. Creation of a farmer and agribusiness friendly policy environment will also be necessary. Depending upon these factors, farmers groups and their organizations need to be mobilized to find a right mix of mutually complementing agricultural components like cropping systems, fruits and vegetables production, animal production, poultry, fisheries, etc. depending upon the regional preferences and specialties. Managerial skills shall play an important role in turning this combine into a thriving competitive venture. Collectively this mega shift in agriculture from a conventional cereal dominated farming to a diversified system is expected to take the country to sustainable new heights of economic and social development including poverty alleviation since the programme has a substantial human face with economic strength.