Agricultural Diversification and its Impact on Livelihood Security of Farmers

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Introduction

The term agriculture is derived from the latin words ager or agri meaning soils and culture means cultivation. Agriculture is the art, science and business of crop production. It encompasses all aspects of crop production, livestock farming, fishery and forestry. Agriculture is the conversion of solar energy into the chemical energy. Crop production is the conversion of environmental inputs like solar energy, carbon dioxide, water and nutrients in soil to economic products in the form of human or animal food or industrial raw materials.

Diversification

Term ‘Diversification’ has been derived from the Latin word ‘Diverge’ which means to move or extend in the direction different from a common point (Jha, Kumar and Mohanty, 2006). Diversification in its totality is a dynamic, continuous process to adjust to changing circumstances.

Diversification is the process to take advantage of emerging opportunities created by technology, new markets, change in policy etc., to meet certain goals, challenges and threats to reduce risk (Chand and Chauhan, 2002).
According to Penrose (1959), diversification is:

1. It is a response to specific opportunities,
2. It is a response to specific threats,
3. It is a general strategy for growth.

**Definition of Agricultural Diversification**

Agricultural diversification can be described in terms of the shift from the regional dominance of one crop towards the production of a large number of crops to meet the increasing demand of those crops. (Start, 2001).

Diversification involves the use of farm resources for non-agricultural activities (Shucksmith & Winter, 1999). In the context of the present study, agricultural diversification encompasses change in production portfolio from low-value to more remunerative and high-value commodities like fruits, vegetables, milk, meat, eggs and fish that expand farm and non-farm sources of income. It not only involves production processes but also new marketing and agri-business-based industrial activities that expand the income sources of rural households and stimulate the overall rural economy. Changes in the share of different commodities in the value of agriculture are used as a proxy of agricultural diversification.

**Nature and Pattern of Agricultural Diversification**

Sustained economic growth, urbanization and globalization is changing the consumption pattern of Indian consumers from food grains to high-value commodities. This is occurring both in urban and rural areas as well as among rich and poor households. To meet the changing demand, production systems are gradually shifting towards HVCs, though the nature and pattern of such shifts vary markedly across regions. In this chapter, an attempt is made to map the nature and pattern of diversification in the country, with focus on Punjab and Andhra Pradesh.

**Drivers of Diversification**

Diversification can be a response to both opportunities and threats.

**Opportunities**

- **Changing consumer demand.** As consumers in developing countries become richer, food consumption patterns change noticeably. People move away from a diet based on staples to one with a greater content of animal products (meat, eggs, and dairy) and fruits and vegetables. In turn, more dynamic farmers are able to diversify to meet these needs.
• **Changing demographics.** Rapid urbanization in developing countries has an impact on consumption patterns. Moreover, a smaller number of farmers, in percentage terms at least, has to supply a larger number of consumers. While this may not imply diversification it does require adaptation to new farming techniques to meet higher demand.

• **Export potential.** Developing country farmers have had considerable success by diversifying into crops that can meet export market demand. While concern about food miles, as well as the cost of complying with supermarket certification requirements such as for Global GAP may jeopardize this success in the long run, there remains much potential to diversify to meet export markets.

• **Adding value.** The pattern witnessed in the West, and now becoming widespread in developing countries, is for consumers to devote less and less time to food preparation. They increasingly require ready-prepared meals and labour-saving packaging, such as pre-cut salads. This provides the opportunity for farmers to diversify into value addition, particularly in countries where supermarkets play a major role in retailing.

• **Changing marketing opportunities.** The changing of government policies that control the way in which farmers can link to markets can open up new diversification possibilities. For example, in India, policy changes to remove the monopoly of state “regulated markets” to handle all transactions made it possible for farmers to establish direct contracts with buyers for new products.

• **Improving nutrition.** Diversifying from the monoculture of traditional staples can have important nutritional benefits for farmers in developing countries.

**Threats**

• **Urbanization.** This is both an opportunity and a threat, in that the expansion of cities places pressure on land resources and puts up the value of the land. If farmers are to remain on the land they need to generate greater income from that land than they could by growing basic staples. This fact, and the proximity of markets, explains why farmers close to urban areas tend to diversify into high-value crops.

• **Risk.** Farmers face risk from bad weather and from fluctuating prices. Diversification is a logical response to both. For example, some crops are more drought-resistant than others, but may offer poorer economic returns. A diversified portfolio of products should ensure that farmers do not suffer complete ruin when the weather is bad. Similarly, diversification can manage price risk, on the assumption that not all products will suffer low prices at the same time. In fact, farmers often do the opposite of diversification by planting products that have a high price in one year, only to see the price collapse in the next, as explained by the cobweb theory.

• **External threats.** Farmers who are dependent on exports run the risk that conditions will change in their markets, not because of a change in consumer demand but because of policy changes. A classic example is the Caribbean banana
industry, which collapsed as a result of the removal of quota protection on EU markets, necessitating diversification by the region’s farmers.

- **Domestic policy threats.** Agricultural production is sometimes undertaken as a consequence of government subsidies, rather than because it is inherently profitable. The reduction or removal of those subsidies, whether direct or indirect, can have a major impact on farmers and provide a significant incentive for diversification or, in some cases, for returning to production of crops grown prior to the introduction of subsidies.

- **Climate change.** The type of crop that can be grown is affected by changes in temperatures and the length of the growing season. Climate change could also modify the availability of water for production. Farmers in several countries, including Canada, India, Kenya, Mozambique, and Sri Lanka have already initiated diversification as a response to climate change. Government policy in Kenya to promote crop diversification has included the removal of subsidies for some crops, encouraging land-use zoning and introducing differential land tax systems.

**Facets of Agricultural Diversification**

**At macro level**

Diversification in agriculture is moving away from agriculture to industry or service sector. (Muujumdar and Kapila, 2006)

**At micro level (within agriculture)**

- Shift to high value commodities/ enterprises

- Use of resources in diverse and complementary activities

**Agricultural diversification towards High Value Commodities**

Indian agriculture has slowed. Growth has decelerated sharply from 3.2 per cent annually between 1980/81 and 1995/96 to a trend average of 1.96 per cent subsequently. Emphasis on cereals production (especially rice and wheat) to achieve food security, which resulted in higher profitability for producers and lower output prices for consumers, is dampening agricultural growth. The food security objective has been achieved. The country has accumulated large foreign exchange reserves, if needed, to import food. Alternative options need to be explored to accelerate agricultural growth.

Agricultural diversification towards high-value commodities (such as fruits, vegetables, milk, meat, poultry, eggs and fish) is one of the most promising strategies to reverse the declining growth in agricultural sector. Demand for these commodities is growing with rising income, urbanization and globalization.
Why high-value agriculture?

The growth in agricultural sector has sharply decelerated from 3.2% per annum during 1980/81 to 1.1% in 2014-15. (Economic survey of India 2014-15). It is a matter of great concern, as nearly 70 percent of the population lives in rural areas, and over 60 percent of the rural population seeks its livelihood in agriculture and allied activities. (census 2011). The poor performance of agriculture is causing distress to the farming community. Declining trend of Poverty may reverse in rural areas.

There are two main reasons for such a dismal performance of the agricultural sector. First, the traditional crop sector has reached a plateau; the yields of a majority of traditional crops have slowed or stopped increasing and the cost of production has risen, resulting in declining profitability. Second, the production environment has deteriorated:

(i)   Ground water has fallen;

(ii)  Water logging and soil salinity have increased in surface-irrigated areas;

(iii) Imbalanced use of nutrients and excessive mining of micro-nutrients have led to deterioration in soil quality.

On the demand side, sustained economic growth (nearly 8 percent per annum in recent years), rising per capita income, growing urbanization, and unfolding globalization are causing a shift in the consumption patterns in India (Kumar et al 2003). Per capita cereal consumption has declined from 192.6 kg per person per annum in 1977-78 to 152.6 kg in 1999-2000 in rural households, representing a 20.77 per cent decrease. For urban households it declined by 14.97 per cent. In contrast, the share of HVCs in total food expenditure increased from 23.8 percent in 1977-78 to 35.75 percent in 2003 for rural consumers and from 32.2 per cent to 41.55 per cent for urban consumers (NSSO 2005). The growing demand for HVCs is not only confined to rich consumers but can also be observed among poor households (Dev, Mahendra S. and Chandrashekar Rao 2004; Kumar 2003).

Alternative options need to be explored to revitalize agriculture, make it more profitable and to improve its growth performance. Agricultural diversification towards high value commodities (HVCs) is viewed as one of the most promising strategies to reverse the declining growth trend in agriculture. (WorldBank, 2002; DFID, 2002; Rosegrantand Hazell, 2000, Government of India 2005).

Agricultural diversification in selected sectors

We have observed a noticeable shift in production portfolio towards HVCs in India as well as in both the food grain surplus states. But it is important to note that the shift in production portfolio is broad-based in the marginal and fragile environment (i.e., Andhra Pradesh), while the move is more towards dairy sector in well-endowed region (i.e., Punjab). In the following sections, we discuss the pattern of diversification for selected agricultural sectors.
Fruits and Vegetables

India is a major producer of fruits next to China with an estimated production of 82.631 million tons in 2013-14. (NHB report 2014). Mango and citrus are the major fruit crops, accounting for about 57 percent in the total fruit production. In vegetables, India is second to China with an estimated production of 162.89 million tons in 2013-14. At the all-India level, the share of fruits and vegetables in the total value of agricultural output increased from 14.37 per cent in 1982-83 to 32.33 per cent 2015-16. This has happened due to area expansion and productivity increase of both fruits and vegetables.

Dairy

Dairy sector in India has witnessed a steady growth in the last two decades. Its share in agricultural GDP has risen from 13.17 percent in TE 1982-83 to 33.22 percent in 2013-14, primarily because of the implementation of operation flood program through the National Dairy Development Board (NDDB) under which milk collection centers and processing units have been set up countrywide by the milk cooperatives. More recently private players have also entered the dairy sector and are expected to give a big boost to it. Dairying has assumed greater significance for smallholders since it is land-saving, labour-intensive and regular-yielding activity. Milk production in the country has increased at an annual rate of 3.91 percent between 1992-93 and 2013-14. This increase was much faster than the population growth; the per capita availability of milk in India went-up to 230 gm per day in 2003-04 from 180 gm per day in 1991. However, it is still much below the level recommended by the Indian Council of Medical Research of 250 gm per day per person. Milk production is growing at a modest growth rate of 3.9 per cent per annum (for the period 1992-93 to 2013-14). The per capita availability of milk in Punjab increased from 201.96 gm/day in 1981-82 to 321.49 gm/day in 2003-04, which is much above than the national average as well as the recommended level. In Punjab, dairy production contributed 54.6 percent of farm business income to marginal farms and 37.4 per cent to small farms during 2002-03 (Sidhu and Bhullar, 2004).

Impact of agriculture diversification on farmers

Malik (2003) has shown that the incidence of poverty is significant less in those areas of Pakistan and Punjab where agricultural activities are more diversified. And the diversification is positively correlated with the

- Employment security.
- Profitability (economic security)
- Nutritional security
- Empowering women( social security)
- Sustainable use of water (environmental security)
Employment security

Agricultural diversification towards HVCs, in most instances, augments employment at the farm level as these commodities are labor-intensive. The advantage of higher employment opportunities are expected to benefit smallholders more as they possess more family labor (Ali and Abedullah, 2002; Joshi et al., 2003) The data on labor days employed in the production of various crops collected from Punjab and Andhra Pradesh tend to confirm these observations.

![Graph showing labor employment in various crops](image)

Fig. 1 Employment generation in important HVCs and other crops in Punjab and Andhra Pradesh

In addition to the employment generated in production at the farm level, substantial demand for employment is expected in non-farm agricultural sector, agribusiness and agro-based industry since the HVCs require scientific pre- and post-harvest handling (Barghouti et al 2004). The employment involved in the entire supply chain of HVCs is high since many value-addition activities such as grading, packing, processing, cold chain management and logistics management are necessary.

Empowering Women

HVCs have the potential of creating increased employment opportunities and are more gender sensitive than the traditional crops. Women have better chances of being engaged in picking, sorting and grading of fruits and vegetables. About half of the total workforce in production of vegetables in Andhra Pradesh are women. In Punjab, as high as 93 percent of women are engaged in livestock. At the all-India level, more than 70 percent of the total workforce engaged in livestock production was women. Women also participate in large numbers in commercial crops, like cotton, sugarcane, groundnut, etc. Promoting high-value commodities in Andhra Pradesh and Punjab will open new avenues for women workers. Higher participation of women workforce in high-value commodities means empowering them in rural areas.
Sustainable use of water

Water is a critical input in agriculture and the demand for it is rapidly growing. Both Punjab and Andhra Pradesh are encountering problems related with water in agricultural sector. The water table in these states is falling in certain areas consistently due to excessive use of ground water. Similarly in canal irrigated areas in both the states, low water rates are encouraging mismanagement and injudicious use of surface irrigation, leading to soil salinity and water logging. Approximately 1,50,000 ha in Andhra Pradesh and 6,03,300 ha in Punjab are affected by these problems. Groundwater level in Punjab has been falling due to early sowing of paddy, particularly in the Central Zone at the rate of almost one-quarter meter per year. HVCs play important role in managing water-related problems as their water requirement is lower than rice and other crops. In Andhra Pradesh, it was found that water requirement (hrs/ha) was highest for blue-water crops like paddy and sugarcane (Shiferaw et al. 2003). In contrast, for other crops like flowers, vegetables, cotton and chickpea, water requirement was less. The water productivity of HVCs was highest with low-water demand crops, while it was lowest for high-water demand crops like rice and sugarcane. However, rice, which occupies less than a quarter of the irrigated area, uses over sixty percent of the water. Agricultural diversification can result in improved management of water (Barghouti et al 2004).

Constraints of Agricultural Diversification

- High transaction costs, price volatility, lack of access to credit and information on food safety and standards.
- Most of the products are perishable and are more susceptible to production risks.
- Lack of organized supply chain result in poor mobilization of small marketable surplus that the farmers generate, resulting in low returns.
- HVCs are labour-intensive, higher wages constrained their production.
Conclusion

HVCs were a major source of agricultural growth during the decade of 1990s at all-India level. Compared to cereals, the HVCs yield higher income and generate more employment, particularly for women. The HVCs also use less water and therefore conserve that precious resource. Important factors that have contributed to promoting agricultural diversification include urbanization and per capita income on demand side and watershed programs on supply side. Growing agro-processing has impacted production of fruits. Since HVCs are labour-intensive, higher wages could constrain production. The HVCs are perishable and mostly produced by smallholders. The real challenge is to reduce their transactions costs and link them with the markets. Existing marketing channels are inefficient and fragmented. But some successful innovative institutional arrangements through farmer’s markets, cooperatives, and contract farming are emerging which connect producers with agro-processors, exporters and domestic retail chains.
References


