



Strategic Assessments and Development Pathways for Agriculture in the Semi-Arid Tropics

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Sustaining Growth in High-Value Food Commodities: Role of Urbanization and Infrastructure

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Introduction

In India, the demand for high-value food commodities (HVCs) such as fruit, vegetables, milk, meat, fish and eggs is fast increasing as compared to food grains. This is an opportunity as well a challenge for millions of smallholder farmers who are over 81% of the total farm population in India. High-value agriculture has a comparative advantage over staples in production and labor use, and thus is reckoned as an important strategy for income augmentation and employment generation (Barghouti et al. 2004; Joshi et al. 2004). Besides, the integration of global markets is creating export opportunities for HVCs in the developing countries (Diaz-Bonilla and Recca 2000; Akshoy 2005)

However, high-value agriculture has greater production and market risks, and there is clearly a need to provide a cushion to producers against such risks. Mitigating production risks would require improved technologies, quality inputs, formal insurance mechanisms, access to capital, etc. Most HVCs are perishable, and require immediate transportation to consumption centres/markets, and storage or processing into less perishable forms. Lack of access to markets and information (transport system post harvest infrastructure and prices) raise marketing and transaction costs that are an important barrier to small farmers' participation in production and marketing of HVCs (Birthal et al. 2005).

The main objectives of this study are to document current trends in agricultural diversification towards HVCs, and identify and quantify major factors driving or impeding diversification. The study hypothesizes that demand for HVCs is driving their production

while lack of adequate infrastructure and market support impedes their supply.

Demand for HVCs

Urbanization is a key determinant of demand for HVCs because of higher per capita income, change in tastes and preferences, and greater participation of women in labor markets. About 28% of India's population lives in urban areas and by 2020, the urban population is expected to be 35% of the total population. This is expected to fuel rapid growth in demand for high value food commodities. While the food budget allocation for cereals and pulses declined by 5–10%, between 1983 and 1999, there has been a dramatic increase in the allocation towards milk, meat, fruit and vegetables (Figure 1). Eventhough a rural consumer still spends

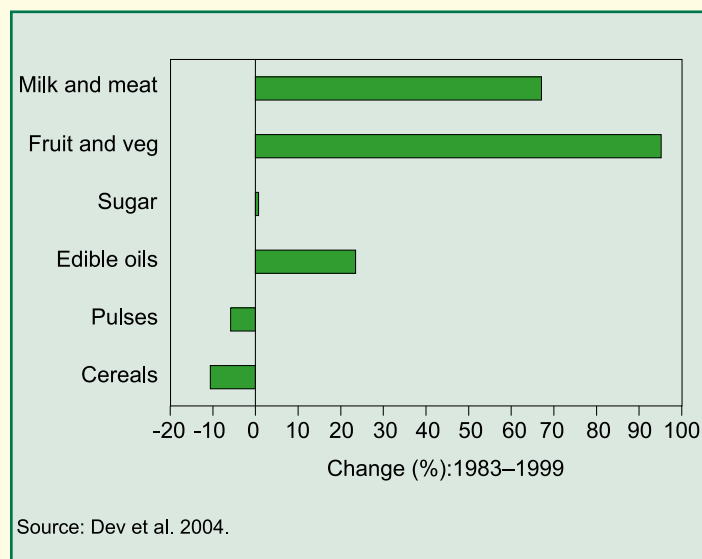


Figure 1. Change in food budget allocation of urban consumers in India.

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38% of the food budget on cereals compared to 26% by his urban counterpart, the demand for HVCs is increasing in the rural areas. Kumar et al. (2003) project that by 2025, demand for fruit, vegetables, milk, meat, eggs and fish in India would be almost double the demand in 2000.

Trends in diversification towards HVCs

In response to changing food basket in favor of HVCs, the agricultural production portfolio too has undergone a significant change. Share of cereals and pulses in the gross value of agricultural production declined from over 33% in 1981–83 to 27% in 2001–03 (Figure 2). On the other hand, the combined share of fruit, vegetables, milk, meat and fish has increased significantly from 32 to 44% during this period.

Using more disaggregated data at the district level (for 309 districts, 1970 district boundaries) covering 16 states in India, on crop and livestock activities, a considerable regional variation in the incidence and growth of high-value agriculture was noted. In more than one-third of the districts, HVCs accounted for over 40% of the gross value of agricultural output in 1998, while in another one-third their share was less than 25%. To capture the level and changes in diversification at district level, the share of HVCs in 1998 is plotted against their share in 1982 (Figure 3). Distance above the diagonal represents increasing share of HVCs and vice versa. There is a widespread growth in high-value agriculture during this period. However, at the lower end of the diagonal, there is a further

reduction in the share presumably because of the supply side constraints.

Role of urbanization and infrastructure

To better understand the relationship between high-value agricultural production and urbanization, districts with more than 1.5 million urban population were identified as major urban districts. The districts surrounding the major urban districts were classified as near-urban, and others as far-urban. Accordingly, about 10% of the districts (30) in the country are classified as urban, 30% as near-urban (91) and the rest as far-urban.

Table 1 shows the shares of HVCs in urban, near-urban and far-urban districts. Share of HVCs in gross value of agricultural production is highest in major urban districts. These districts apart from being main consumers of HVCs, also have a higher concentration of agricultural markets, better road connectivity and

Table 1. Share of HVCs in gross value of output by location, 1998.

Commodity	Urban	Near-urban	Far-urban
Fruit	9.0	10.0	7.0
Vegetables	10.0	7.0	6.0
Milk	17.0	14.0	15.0
Meat and eggs	6.2	4.2	3.0
Total	43.0	35.0	31.0

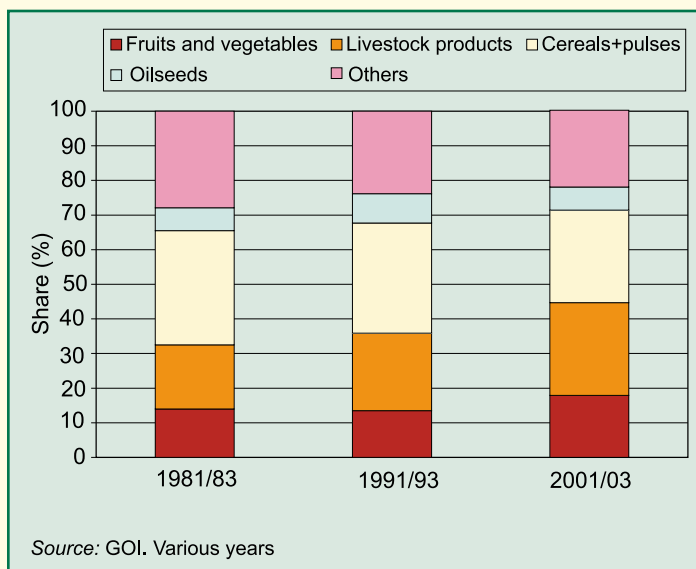


Figure 2. Share of selected agricultural commodities in the gross value of agricultural out put in India.

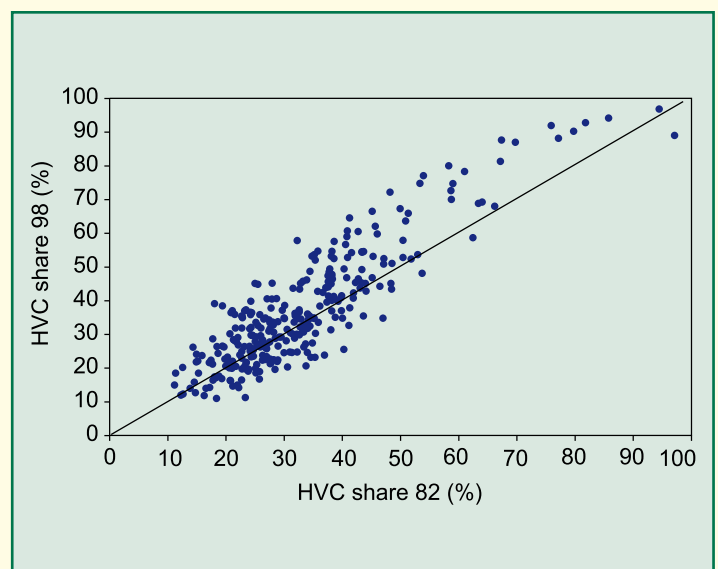


Figure 3. District-wise share of high value crops to total value in 1982 and 1998

processing infrastructure. In other words, producers nearer to the urban centers have better access to markets and face less transaction costs. This is one of the important reasons for higher incidence of high-value agriculture in urban districts. In general, incidence of high-value agriculture declines as one moves away from the major urban districts, except fruit, which appear to be more prominent in near-urban districts. This is because fruit are grown in their niche production regions due to agro-climatic factors besides being close to demand centers. The association of dairying with urbanization is somewhat weak, presumably because of a strong network of dairy cooperatives linking rural milk production with urban consumption centres. In 2003–04, India had about 109 thousand village level dairy cooperatives with 12 million dairy producers as members (NDDDB 2005).

The magnitude of high-value agriculture in near-urban districts is variable and could be explained by the existence or lack of transportation connectivity. The 91 near-urban districts identified in this study were grouped into three categories based on the number of national highways passing through them from the main urban centers, ie, Zero highway, one highway, and 2 or more highways. It is found that 25 near-urban districts are not connected with any highway, 45 with one highway and 21 with 2 or more highways (Table 2). Interestingly, incidence of high-value agriculture is more in the near-urban districts connected with one or more highways (37%) compared to districts with Zero highways (28%).

To test whether the influence of urbanization and roads is statistically significant, the incidence of high-value agriculture in the 309 districts was regressed on both demand and supply side variables. The share of HVCs is defined as the sum of the value shares of fruit, vegetables and livestock products in the gross

Table 3. Factors determining diversification: All HVCs, 1997–98 (Tobit model).

Variable	Coefficient	Level of significance
Urban population (%)	0.281	***
Smallholders (%)	0.354	***
Road density (km/100 sq km)	0.065	***
Veterinary institutions (No./10000 livestock units)	0.267	***
Mechanization (No. of tractors/1000 ha)	-0.172	***
Annual normal rainfall (mm)	0.662	**
Adjusted R ²	0.54	-
*** and ** significant at 1 and 5% probability levels.		

value of agricultural output at 1980–82 constant prices. Urbanization was used as a proxy for demand side variables. On the supply side, mechanization was used as a proxy for irrigation/intensive agriculture; rainfall as a proxy for agro-climatic conditions; roads as a proxy for markets and infrastructure; veterinary institutions as a proxy for livestock related infrastructure; and small farmers as a proxy for landholding size. The results of the Tobit model are presented in Table 3.

As expected, incidence of high-value agriculture is positively and significantly associated with urbanization on the demand side and road network on the supply side thus vindicating our hypothesis that urbanization and infrastructure are important in the spread and growth of HVCs. Mechanization has a negative effect on the share of HVCs because mechanization is higher in the irrigated areas where farmers are more inclined towards specialization in a few crops only (for example, rice and wheat production in the Green Revolution belt). Finally, high-value agriculture is more prominent among small holders (for whom family labor is an important component) and in rainfed areas where agriculture is already diversified as a risk mitigating strategy and now diversification towards HVCs is an important income augmenting strategy.

Conclusions and policy implications

Urbanization is an important determinant of intensification and the growth of high value agriculture and infrastructure facilitates it. On an average in 2000, high value agriculture accounted for about 40% of the total value of agricultural output in India with considerable variation across the country. This has

Table 2. Impact of national highways on diversification within urban-surrounded districts group: 1998.

	Number of National Highways		
	Zero ¹	One	Two or more
No. of near-urban districts	25	45	21
Share of HVCs (%)			
Fruit	4.9	11.2	10.9
Vegetables	6.1	7.4	6.7
Milk	14.8	14.1	15.5
Ruminant meat	1.2	2.0	1.7
Non-ruminant meat	1.5	2.9	3.2
All HVCs	28.4	37.6	37.8

1. Number of national highways passing between urban and urban surrounded districts

implications on regional planning and development. Rained areas, lagging far behind from the irrigated areas, are emerging important domains for HVCs to augment employment and income. Promoting rainfed areas through appropriate infrastructure development for agricultural diversification would have far reaching implications on the developmental and poverty alleviation programs. However, infrastructure required for high value agriculture is different from that of staples and non-food commodities. Being perishable, HVCs require refrigerated transport, cold storage and immediate processing. Considerable public/private investment is required, which will have to be matched with the demand drivers and supply side factors.

Options to mitigate market risks and reduce transaction costs include the establishment of special markets for HVCs in rural areas and linking farmers to industry/retail chains, etc, through institutions such as producers associations, cooperatives and contract farming (Birthal et al. 2005). The modification of the existing Agricultural Produce Marketing Act, 1966, by the Government of India to promote competitive trading, direct marketing, smooth raw material supplies to agro-industries through contract farming, etc, is a step in the right direction. However, its speedy implementation at the ground level is critical.

Once the enabling environment is created and restrictions on the role of the private sector in agriculture is streamlined, we can expect farmers to get access to latest technology, production geared to meet quality standards and strengthened supply chain leading to lower transactions cost. This would enable small-scale producers particularly in rainfed areas to participate in the HVC boom to augment and diversify their income.

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