

Appropriate Technology Application for Diversification towards Vegetable Production in India

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Introduction:

Sustained economic growth and decline in the incidence along with greater urbanization has resulted in growing demand in India for high value food commodities i.e. fruits, vegetables and livestock products. By 2025, the demand for these high value commodities is expected to double. (Kummar et al 2003, Pingal and Khumaja 2004) It is both an opportunity and a challenge to the Indian smallholders who till an area of less than 2 ha. in size. The vegetable economy of India has the potential to augment the income of the smallholders and landless labours as vegetable farming is relatively more labour intensive. The smallholders in India are poor and practice subsistence agriculture with very limited marketable surplus. Small farms is a typical feature of Indian agriculture predominance of small farms is continuously increasing. According to Agriculture Census of India 2005-06, the average size of an operational holding in India is only 1.23 hectare, with farms less than 2 hectares comprising 83 percent of all holdings and 41 per cent of area.

Whether such tiny farmers will survive in a world of intense competition in the ongoing process of globalization becomes a serious concern. The increase in demand and paucity of supply of vegetables has created opportunities for the Indian

smallholders. India is a country in Asia with 15 diverse agro – climatic zones and four distinct crop seasons which makes it possible to grow more than 100 varieties of food and non-food crops.

Demand and Supply of Food Commodities:

The Twelfth Five-year plan working group on Group Husbandry, Demand and Supply Projection, Agriculture Imputes and Agricultural Statistics has made projections for food grains and other items by 2016-17. The study group has suggested that the present levels of cereals production already exceed likely demand expected by 2016-17. These projections are based on actual patterns of observed demand and trends in per capita cereals consumption in India (which has declined since the mid – 1990s). Even the poor in India are reducing the share of income spent on all foods to meet their non-food needs.

This means that agricultural production must diversify with use of suitable appropriate technology. The following table shows that in case of Rice, Wheat, Maize, Food grains and Sugarcane, projected supply almost matches the projected demand while in case of cereal crops, the domestic supplies are likely to exceed demand by 2016-17. The main crops for which demand is slated to exceed domestic supply by 2016-17 are pulses and oilseeds, fruits and vegetables. (NCAER, 2013)

Table No. 1
Demand and Supply of Food Commodities during the Twelfth Plan

Crop/Group of Crops	Projected Demand (million tonnes)		Projected Supply (Million tonnes)		Actual Projection(million tonnes)
	2016-17	2020-21	2016-17	2006-07	
Rice	110	117	98-106	93	104*
Wheat	89	98	93-104	76	94*
Maize	19	22		15	22*
Coarse Cereals	36	38	42-48	34	42*
Cereals	235	253	240-251	203	240*
Pulses	22	25	18-21	14	17*
Foodgrains	257	277	258-272	217	257*
Oilseeds/Edible oils	59	71	33-41	24	30*
Sugarcane/Sugar	279	312	365-411	355	358*
Vegetables	161	189		116	147**
Fruits	97	124		59	75**

Source: Twelfth Plan Working Group on Crop Husbandry, Demand and Supply Projections, Agricultural Inputs and Agricultural Statistics;

Vegetable Production in India:

India is a sub-continent size country in Asia with 15 diverse agro – climatic zones and four distinct crop seasons which makes it possible to grow more than 100 food and non-food crops. India is the second largest producer of vegetables in the world (after China). Out of 58-97 million hectares of total area under vegetable production in the world, 15.6% i.e. 9.2 million hectare of land is under vegetables in India with a yield of 17.6 tons per hectare according to the FAO website Horticulture Division, of the Department of Agriculture &Cooperation’s Government of India. Database available for the year 2013 of the 159 million tons of vegetables produced in the world, India produces as much as 162 million tons and so India’s share in the worlds vegetable market is close to 14 per cent. The vegetable cultivation in

India today is spread over 9.2 million hectares which accounts for above 6.08 percent of the net area are in the country. The area under vegetables was 2.78 million hectares in 1961 which has increased to 9.2 million hectare while vegetable production has increased from 18.47 million tons to 162 million tons. The yield per hectare also has increased from 6.64 tons in 1961 to 17.6 tons in 2013.

Diversification towards vegetable production in India:

After independence, the main focus of India was on the production of cereals. Planning for the development of horticulture started in the year 1980 with consolidation of institutional support. It was after 1993 that the government started encouraging farmers for production of horticulture crops including vegetables.

Table No. 2

Area and Production of Vegetables for 2010-11, 2011-12 and 2012-13

Year	Area (in ' 000Ha)	Production (in ' 000MT)	Production (MT per Hectare)
2010-11	8495	146554	17.25
2011-12	8989	156325	17.39
2012-13	9205	162187	17.62

Source: Horticulture Division, Dept of Agriculture & Co-operation, Ministry of Agriculture.

The above table shows that the area under vegetables, the production of vegetables and productivity in India has increased consistently during the three-year period from 2010-11 to 2012-13.

Table No. 3

Area under Vegetables as % of Net Sown Area

Year	Net South area	Area Under Vegetables
1961	133200	2780 (2.09%)
1971	140860	3580 (2.54%)
1981	140860	4400 (3.14%)
1991	140290	4860 (3.40%)
2001	143000	6020 (4.26%)
2011	140020	6750 (4.82%)
2015	151340	9205 (6.08%)

Source: Vegetable Statistics, IIVR, Fertilizer Statistics, The Fertilizer Association of India, New Delhi.

The above table shows that the area under vegetables as % of net sown area has consistently increased from 2.09% in 1961 to 6.08% in 2015 indicating a clear trend of diversification towards vegetable production.

Share of Smallholders in Production of Vegetables in India:

The smallholders contributed 61% to vegetable production in the year 1999 according to GOI report on cultivation practices in India.

Table No. 4

Share of Smallholders in the Production of Fruits and Vegetables in India

Year	Share
1971	63%
1991	51%
2001	55%

Source: Singh et al (2002) Smallholder Farmers in India.

Table No. 5

Participation of Categories of Farm Households in Cultivation of Vegetables

Category	% Households	% of gross cropped area
Small	15.8	2.97
Medium	14.8	1.80
Large	10.4	1.20
All	15.3	2.12

Source: GOI (1999) Cultivation Practices in India.

The above table shows that large farmers allocate a relatively small proportion of their land to vegetables. Percentage of area under vegetables tends to decline with farm size.

Information Technology as one of the Determinants of Diversification towards Fruits & Vegetables:

It is observed that smallholders in India have a greater participation in vegetables relative to large farmers. A study (NSSO, 1999) observed that vegetable growers have large families compared to fruit growers. Vegetable production, being more labour intensive, is undertaken often by households with greater labour endowment.

Vegetable cultivation requires less capital and more labour. As the production of vegetables is information sensitive, farmers who have access to sources of information such as radio, television, newspapers and mobile phones with which they can communicate with call centers for farmers have better prospects in India in pursuing vegetable cultivation.

How can vegetable cultivation in India grow:

Improved road connectivity, rising demand for vegetables, higher profitability, low capital requirement are the main reasons why diversification towards vegetable cultivation can work towards raising the per capita income of smallholders.

Vegetables give quick, regular and higher returns and work to ideal hands in the smallholder households. Smallholders also cultivate a variety of vegetables to spread risk and use the available land intrusively. Availability of family labour is the biggest advantage to smallholders.

A Study by Prof. P. K. Joshi (Joshi et al 2006) has brought out evidence that diversification towards vegetables provides more employment opportunities to women.

Constraints to Smallholders:

In diversification towards vegetable production, there are a number of problems that smallholders face which are common to farmers in many developing countries. The major problem is non-availability of goods quality seeds which is due to lack of information or lack of resources or both. The NSSO report on cultivation practices in India (NSSO, 1999) has registered that smallholders are laggards in opting for improved variety of seeds compared to large farmers. Exorbitant prices of these improved seeds is another reasons why smallholders prefer home-produced seeds in India.

Poor access to markets is another problem in diversification towards vegetable cultivation. Also

there are high post harvest losses in vegetable production which leads to low volume of marketable surplus. When marketable surplus is very less, it drains away the bargaining power from smallholders and hence large farmers dominate in bargaining. Though smallholders are more efficient in production, their comparative advantage is negated due to high transaction cost.

Crop failure due to unexpected changes and insect infestation results in loss of produce for the smallholders. Though varieties of seeds resistant to insect infestation resistant are available, their adoption is negligible in India. Volatile prices affect profitability. Prices of vegetables are ultra-sensitive to supply causing immiserizing growth. There is no institutional arrangement in India to protect vegetable farmers from risk.

Conclusions:

Raising levels of per capita income brings opportunities of education and access to healthcare leading to improvement in the levels of human development. As we find that vegetable production improves the standard of living of the rural poor and in particular the poor women farmers.

The smallholders need an assured market for their produce and also a well-developed seed sector. They also need quick transport with cold storage facility considering the perishable nature of their produce.

The answer to these problems can be found in contract farming which would insulate the farmers from high volatility of vegetable prices and make vegetable production an all time profitable venture. An environment favourable to vegetable farming can be made available through capital expenditure in cold storages and public private partnership in supply chain management will go a long way in increasing production and income of smallholders.

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