Indian Journal of Extension Education
Vol. 51, No. 1 & 2, 2015 (56-59)

Impact of Improved Vegetable Technologies in Disadvantaged Districts of Uttar Pradesh

Neeraj Singh[1], Shubhadeep Roy[2], B. Singh[3] & A.B. Rai[4]

ABSTRACT

Mirzapur and Sonbhadra, two disadvantaged districts in Uttar Pradesh, were the target area under the NAIP sub project component-3 during 2008-14. Both these districts are situated far south-east region of U.P. in the Vindhyan mountain range. The baseline survey made during 2008-09 in the selected districts clearly indicated the lack of efficient agricultural technology in the region and economic gap among the farmers. Intervention of various high yielding varieties along with improved production and protection technologies in different vegetable crops not only increased the average productivity of the crops from 2.48 to 27.54 per cent but also enhanced the average annual income of the households. The increased productivity of vegetables has resulted in enhanced net return of ₹ 10298 to ₹ 34703 per hectare and the average annual income of commercial vegetable growers was recorded as ₹ 59,695/- per household per year which is an improvement of 50.7 per cent per household per year.

Key words: Disadvantaged district, improved vegetable varieties, productivity, farm income, impact

INTRODUCTION

Mirzapur and Sonbhadra districts in *Vindhyan* region are among 150 disadvantaged districts of the country identified by Planning Commission, Govt. of India. These two districts are on the extreme South East corner of Uttar Pradesh. Large area is rainfed with undulating topography. Sizeable population of these two districts, more particularly the Sonbhadra comprise of tribal people living mostly below the poverty line. The major area is rainfed, with little assured irrigation. Annual rainfall in the area is slightly above 1100 mm but about 87% of the precipitation is received only during monsoon season (June to October). A large number of rivulets flow in the area; however, most of the rain water remains untapped as surface run off is very high, soil moisture retention capacity is low and proper soil and water conservation practices are not followed.

The majority of farm households are marginal and small; they are resource poor and the literacy rate is low. Owing to use of low yielding varieties, poor seed replacement rate, imbalanced nutrient application and inefficient production technology, the crop yields are low. The average family size is large with 6 to 8 members and the level of crop production is not sufficient for the subsistence of most of the farm households. The situation in some of the tribal areas of Sonbhadra is so pity that the people survive on mahua *(Madhuca longifolia)*, obtained from forest, for at least two to three months in a year. The food available to the majority of landless, marginal and small farm households is not balanced and nutritive as it mostly comprised of cereals, millets and minor millets with little vegetables & pulses.

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability and ability to generate on-farm and off-farm employment. Ample research evidence is available suggesting that improved technologies in vegetables, wherever adopted, have lead to increased yield, increased marketable surpluses, increased income and employment and over all welfare of the farm families (Reddy, 2002; Kalloo and Singh, 2000; Attawar,2000). Mirzapur and Sonbhadra districts are also blessed with diverse agro-climates with distinct seasons, making it possible to grow wide array of vegetables with the adoption of improved production technologies.

The present study is a result of NAIP Sub-Project (2008-14) "Ensuring livelihood security through watershed based farming system modules in disadvantaged districts of Mirzapur and Sonbhadra in Vindhyan region" to see how adoption of improved technologies not only enhance crop production per unit area but also opens a new window for nutritional security with better returns from vegetables particularly to small and marginal farmers in the regions.

[1]Principal Scientist (AE), [2]Scientist (AE), [3]Director and [4]Head (Crop Protection) ICAR-Indian Institute of Vegetable Research, Varanasi

METHODOLOGY

Desired data were collected with the help of structured questionnaire developed for the purpose and first hand information from massive demonstrations given during the NAIP Sub-Project "Ensuring livelihood security through watershed based farming system modules in disadvantaged districts of Mirzapur and Sonbhadra in Vindhyan region" and further analysis were done by using appropriate statistical tools. The data were collected from randomly selected 200 project beneficiaries across 20 villages of Madhihan & Pahari blocks of Mirzapur and Myorepur block of Sonbhadra districts of Uttar Pradesh.

RESULTS AND DISCUSSION

Initially a baseline survey was done during 2008-09 and the results obtained revealed that Myorepur block of Sonbhadra district was dominated by SC/ST population of 87.3 per cent whereas Pahari and Madhihan block of Mirzapur had 39.9 per cent and 44.8 per cent SC/ST respectively. In all the clusters, the male population was higher than female. The average land holdings were small (1.27 ha) and majority of farmers in all the clusters were marginal and small. The literacy rate in the area is low; however, Pahari block of Mirzapur with 39 per cent male and 21.5 per cent female it was better than Madhihan block of Mirzapur (male 33.2 %, female 14.9%) and Myorepur block of Sonbhadra (male 13.9%, female 3.9).

Availability of irrigation water is the major constraint of crop production in the area particularly in Myorepur block in Sonbhadra that had only 12.4 per cent area under irrigation compare to Pahari and Madhihan blocks of Mirzapur where 36.6 per cent and 28 per cent irrigated area were recorded. In the selected clusters with cropping intensity of 151.7 per cent, the average area under vegetables was 0.07 ha with a productivity of merely 17.46 t/ha which was even lower than the state productivity.

Large variations were noticed in income of household in different clusters. The annual household income of even the 'medium & big' farmers of Myorepur in Sonbhadra was far below the income of landless and marginal farm households of other clusters of Mirzapur. Nevertheless, the average annual income of Cluster Myorepur, Pahari and Mad hihan blocks were found to be ₹ 26,859, ₹ 54,241 and ₹ 38,160, respectively. In spite of low household income, farmers of Myorepur keep them engaged for more number of days (225) as compared to other two clusters/blocks.

Technology Intervention & Impact

The promotion of improved production and protection technologies including high yielding vegetable varieties developed by ICAR-Indian Institute of Vegetable Research (ICAR-IIVR), Varanasi improved the growth rates in vegetable supplies and per capita availability, checked the increase in vegetable prices, and reduced seasonality in selected clusters of Mirzapur and Sonbhadra districts of Uttar Pradesh. Caswell (2001) also suggested that the availability and use of technical assistance have helped the farmers in determining the choices made to use specific practices. Extension and education efforts are considered to be important tools for promoting the adoption of new production practices.

The farmers were motivated for commercial vegetable growing in the project area and by the performance of improved varieties and production technology demonstrated under field demonstrations, the average area under commercial vegetable has enhanced considerably from 0.07 ha to 0.56 ha. The increased productivity of vegetables was recorded from 16.7% (sponge gourd) to 42 per cent (vegetable pea) and this resulted in enhanced net return of ₹ 10298/- to 34703/- per hectare from commercial vegetable growing as compared to the traditional practice (Table 1). At household level, the average income of commercial vegetable growers using improved varieties and technology was ₹ 59,695/- per year/household which was ₹ 20,090/- higher than control that was equivalent to 50.7 per cent . The additional income helped to boost savings, to increase expenditures on purchased food, and to improve farm implements and children's education (Ali and Hau, 2001)

Table 1: Effect of improved vegetable technology on productivity, net return and household income

Parameters	Crop	Traditional practice	Improved practice	Increase over traditional practice	% Increase over traditional practice
Productivity (q/ha)	Brinjal	345	408	63	18.3
	Bottle gourd	265	368	103	38.9
	Sponge gourd	90	105	15	16.7
	Bitter gourd	87.5	115	27.5	31.4
	Okra	98	136	38	38.8
	Cowpea	110	144	34	30.9
	Pumpkin	285	352	67	23.5
	Cucumber	222	273	51	23.0
	Pea	69	98	29	42.0
Net return (₹/ha)	-	35312.00 - 75165.00	45610.00 - 109868.00	10298.00 - 34703.00	29.2 - 46.2
Annual Household income (₹/HH)	-	39605	59695	20090	50.7

Efforts made in this direction significantly improved the yield performance of various vegetable crops like okra, cowpea, chilli, brinjal, pea, pumpkin etc. and opens a path of seed replacement by the improved vegetable varieties developed by various organizations. The adoption of improved technologies varied from crop to crop. While in crops like pea, cowpea and okra, the shift from local variety to improved variety was more while in others the adoption percentage was less. It has been observed that by and large, farmers do not adopt complete package of practices and do not cover the whole area, under the new practice being introduced to them for the first time (Subrahmanyam and Sudha, 1996). The data were further analyzed to evaluate the performance of some vegetable varieties developed by ICAR-IIVR and the results obtained herewith revealed that varieties of garden pea (Kashi Udai) and cowpea (Kashi Kanchan) were most successful which fetched higher yield of more than 20 per cent when compared to other cultivars. However, sponge gourd (Kashi Divya), chilli (Kashi Anmol) and okra (Kashi Pragati) were also successful in which an increase of more than 15 per cent productivity were recorded (Table-2). Here, comparatives were made with other crop varieties performing successfully in the area.

Table 2: Yield Performance of Demonstrated ICAR-IIVR Vegetable Varieties

Vegetable	Varieties	Yield (q/ha) FLD	Yield (q/ha) Control	% Increase in Productivity
Cowpea	Kashi Kanchan	135.44	106.19	**27.54**
Okra	Kashi Pragati	138.43	116.01	**19.33**
Sponge gourd	Kashi Divya	108.82	92.07	**18.20**
Pumpkin	Kashi Harit	347.29	318.99	**8.87**
Tomato	Kashi Vishesh	490.23	478.35	**2.48**
Brinjal	Kashi Uttam	394.42	358.17	**10.12**
Chilli	Kashi Anmol	213.04	184.80	**15.28**
Garden pea	Kashi Udai	93.05	76.93	**20.95**

Further, data reported in Table-3 revealed that the ICAR-IIVR developed improved varieties in certain vegetable crops like okra, cowpea, chilli and pea gave higher benefit cost ratio than the other farmers practicing cultivars. Technology index of below 10 per cent in Kashi Pragati in okra, Kashi Kanchan in cowpea, Kashi Anmol in chilli and Kashi Harit in pumpkin indicates a greater adoption perspective by the growers in this region. Singh *et al,* 2007 reported the perception of farmers towards the new technology as an important factor for its adoption. In cowpea, Kashi Unnati and Kashi Kanchan varieties were widely adopted by the growers because the perception index was as high as 73.05. However, in case of tomato, brinjal and sponge gourd farmers preferred to grow hybrids for higher productivity but, more technology gap *i.e,* 59.77 per cent in tomato, 55.98 per cent in brinjal and 41.18 per cent in sponge gourd indicates the possibility of more yield enhancement and adoption. In case of Kashi Udai in pea though the technology index is 22.46 per cent but still the demand of this variety is increasing as potential of this variety is still to increase the productivity by 26.95 per cent.

Table 3: Technology impact of ICAR-IIVR vegetable varieties in selected districts of Uttar Pradesh

Crop	ICAR-IIVR Variety	Potential Yield (q/ha)	Technology Gap	Technology Index	BC Ratio at farmers' field	
					ICAR-IIVR Variety	Practicing Cultivar
Okra	Kashi Pragati	150.00	11.57	7.71	3.01	1.89
Cowpea	Kashi Kanchan	140.00	04.56	3.26	2.38	1.64
Tomato	Kashi Vishesh	550.00	59.77	10.87	1.70	1.65
Chilli	Kashi Anmol	220.00	06.96	3.16	2.03	1.66
Brinjal	Kashi Uttam	450.00	55.98	12.44	4.00	3.66
Sponge Gourd	Kashi Divya	150.00	41.18	27.45	1.68	1.40
Pumpkin	Kashi Harit	350.00	02.71	0.77	3.24	3.03
Pea	Kashi Udai	120.00	26.95	22.46	3.46	2.82

CONCLUSION

It is being concluded that even in disadvantaged districts like Mirzapur & Sonbhadra crop diversification through vegetables is certainly a remunerative agricultural practices especially for marginal and small farmers as they had reaped maximum profit upto 46.2 per cent increase in net return by following improved production techniques in vegetable over traditional practices despite of various physical and natural constraints. The productivity of demonstrated crops increased from 2.4827.54 per cent mainly because of introduction of high yielding new varieties along with improved production and protection technologies. Therefore, target oriented training programme on improved vegetable production technology along with multiple demonstrations is required to enhance level of knowledge and skills of growers which ultimately led to adoption of technologies. Farmers (especially large ones) were also suggested to throw away the traditional methods of marketing in local places and move for distant marketing, super-markets in nearby cities, value addition with standard packaging *etc*. by forming cooperatives and farmers' interest group.

Paper received on : February 09,2015
Accepted on : February 16,2015

REFERENCES

Ali, Mubarik, and Hau, Vu Thi Bich. 2001. Vegetables in Bangladesh: Economic and Nutritional Impact of New

Varieties and Technologies. Asian Vegetable Research and Development Center, Technical Bulletin No. 25, 55 p.
Attawar Manmohan, 2000, Hybrid Vegetables, Tool for productivity gains, The Hindu Survey of Agriculture, 2000. 145-149.

Byerlee, D., and Polanco, H.E. 1986. Farmers' stepwise adoption of technological packages: Evidence from the Mexican Altiplano. *American Journal of Agricultural Economics*, 68(3), 519-527

Caswell, M. (2001). The change to conservation : moving farmers towards new production practices. *Agricultural Outlook*, No. 281, pp. 32-34.

Jagdish Singh and G. Kalloo, 2000, Vegetable crops: Nutritional Security, In Emerging Scenario in Vegetable research and development. [Ed: G. Kalloo and Kirthi Singh] RPB publishing house. Pp: 181-196

Reddy, P.P, 2002, Impact of vegetable research, constraints and strategies An IIHR perspective, Paper presented at the Workshop on Impact of vegetable Research in India, held at IIVR, Varanasi, 1-2 March, 2002;

Singh Neeraj, Suvedi Murari and Rai Mathura, 2007, Varietal evaluation of cowpea in eastern Uttar Pradesh, *Indian Journal of Extension Education*, 43(1 &2):12-15

Subrahmanyam, K.V.and M. Sudha, 1997, Impact of Time and technology on cultivation of Horticultural crops. Final project report submitted to IIHR, Bangalore-89.