

## Vegetables for Livelihood Security: A Study in Disadvantageous Area of Vindhyan Region

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### ABSTRACT

*The vegetable crops have been well advocated as protective food. They are rich source of minerals, vitamins, vegetable fibre and contain fair amount of carbohydrate and protein. In addition to meet the local demand, vegetables have the potential for distant and export market. Vindhyan region in Eastern Uttar Pradesh is considered as potential area for vegetable cultivation but due to the lack of technical guidance and unawareness of improved technologies, farmers in this region were practicing traditional cultivars and other agronomic practices. Therefore, efforts has been made to educate the growers of two clusters in Mirzapur and one cluster in Sonbhadra districts of Vindhyan region regarding the improved cultivation of vegetables along with giving massive frontline demonstrations, farmers-scientists interaction and organizing field days for quicker dissemination and adoption of technologies. The productivity of demonstrated crops increased from 6.25–40.34 % mainly because of introduction of high yielding new varieties. Further, Kashi Pragati in okra and Kashi Kanchan in cowpea fetched maximum yield differences between demonstrated and farmers' practiced varieties. Considering the importance of nutritional security, during 2008-09 a total of 1100 households were given kitchen garden demonstration kit where as in 2009-10 and 2010-11 it increases upto 3767 and 5621 households respectively.*

**Key words** – Improved vegetable varieties, vegetables productivity, kitchen garden

Among the food-based approaches, cereals may not provide a solution for micronutrient deficiency as it narrows down the biodiversity in production as well as in diets. Asian Vegetable Research and Development Center (AVRDC) believe that integration of micronutrient-rich food, particularly vegetables into the diet is the only viable solution for micronutrient deficiency. Among the micronutrient-rich foods, vegetables are relatively inexpensive, and produce micronutrients at a lower unit cost than other such as livestock products (Ali and Tsou 1997). Vegetables are rich source of minerals, vitamins, vegetable fiber and contain fair amount of carbohydrate and protein. Post meeting the local demand, vegetables have the potential for export market (APEDA 2010-11). Thus, considering the nutritional and livelihood security vegetables play pivotal role in Indian agriculture and have been well advocated as protective food. During the last 62 years after independence vegetable production has increased in multiples. Although, India ranks second to China in vegetable production, the

availability of vegetable in the country is only 230-240 g/caput/day which is far below the requirement in the paradigm of health.

Due to advent of improved varieties, better market price and general awareness of nutritional security among the people, vegetable cultivation in the country is getting momentum continuously among the growers, preferably small and marginal farmers for their livelihood security. Vindhyan region in Eastern Uttar Pradesh is considered as potential area for vegetable cultivation but lack of technical guidance and unawareness of improved technologies have compelled the farmers in this region to grow traditional cultivars and adopt outdated agronomic practices. These constraints are more restrictive on vegetable production in vindhyan region than in other parts of the country, as reflected by low yield and high seasonality in availability. Overcoming constraints in vegetable cultivation also require more labor, thereby creating productive employment opportunities and generating higher incomes which can therefore break the cycle of poverty.

Indian Institute of Vegetable Research, Varanasi has developed 53 high yielding and resistant/tolerant varieties/hybrids in 17 different vegetable crops which are performing significantly well at farmers' field (Pandey et.al. 2011). The tolerant/resistant varieties are considered to be the best choice in integrated disease and insect management modules. Adoptions of improved vegetable varieties/hybrids not only enhance the production but also reduce the cost of cultivation due to quality seeds and avoidance of indiscriminate use of pesticides. Therefore, efforts have been made with an objective to educate the growers of disadvantaged districts of Vindhyan region regarding the improved cultivation of vegetables for their livelihood security.

## METHODOLOGY

The study was conducted in two disadvantaged districts of Vindhyan region *ie.*, Mirzapur and Sonbhadra. A total of 33 villages were selected in three clusters *viz.*, 12 villages from Pahari and 13 villages from Madhihan block of Mirzapur district while 8 villages from Myorepur block of Sonbhadra district. Further, 875 farmers were randomly selected from these villages regarding the improved cultivation of vegetables by conducting frontline demonstrations and farmers-scientists interaction for quicker dissemination and adoption of technologies. Considering the nutritional security of the people, kitchen gardens were also promoted in all the selected villages by providing kitchen garden kits consisting improved varieties of vegetable seeds in mass.

## RESULTS AND DISCUSSION

*Livelihood Status of the Region* : At the outset a baseline survey was conducted in the three selected clusters *viz.*, Myorepur block of Sonbhadra and Pahari and Madihan blocks of Mirzapur district to study the livelihood status of the growers. Desired data were collected from 30 households selected randomly from each of 33 villages of the three clusters, for the household information. The results of the baseline survey revealed that Myorepur block was dominated by tribal people with SC/ST population of 87.3% whereas Pahari block has 39.9% SC/ST population and that of Madihan block has 44.8%. In all the clusters, the male population was higher than female. The average land holdings were small and majority of farmers in all the clusters were marginal and small. Living conditions of the farm households in all the clusters were

unhygienic and unhealthy and it was particularly severe in Myorepur block of Sonbhadra. In general, the illiterate people were more in all the clusters. However, the literacy rate of Pahari block with male 39% and female 21.5% was better than Madihan block (male 33.2%, female 14.9%) and Myorepur block (male 13.9%, female 3.9%).

The annual income of the households, particularly the landless and marginal was low in all the clusters. Nevertheless, the average annual income of Myorepur, Pahari and Madihan block were found to be Rs. 24,450, Rs. 39,874 and Rs. 52,385, respectively. Agriculture (crop production) is the main source of income to marginal, small, medium and big farm households. On the other hand, landless population in all the clusters earn the major part of their livelihood working as 'labour' and their secondary occupation is crop production and working on leased land.

Availability of water was the major constraint in crop production in all the three clusters but in Myorepur block the problem was very serious where only 10.7% area under small and 6.7% area under marginal farmers had irrigation facility. However, in Madihan block 28.0% and 29.1% and in Pahari block 34.0% and 38.0% area of marginal and small farm households, respectively were irrigated. One pond, 7 rivulets and 23 check dams were the only source of irrigation water in Myorepur. Pahari has 1 river tributary, 2 canals, 63 bore wells, 107 open wells, 12 ponds besides 13 rivulets and 17 check dams. Madihan block on the other hand had 71 bore wells, 41 open wells, 20 ponds, 23 rivulets and 16 check dams. Almost all the rivulets and ponds as well as some open wells failed to supply water during zaid season. Regarding use of farm machines, Madihan had maximum number of tractors (101) followed by Pahari block (98) and Myorepur (6). Tractors in all the clusters were mostly owned by 'medium & big' farm households.

In general, the yield of field crops *viz.* cereals, pulses, vegetables, oilseeds and minor millets were low in all the clusters but it was lowest in Myorepur. The cropping intensity of small and marginal farmers in Pahari were 183.7% and 167.1%, respectively whereas in Madihan it was 161.5% and 169.3% and that of Myorepur 141.6% and 154.6%, respectively. However, in all the three clusters, the cropping intensity of small and marginal farmers was much higher than landless as well as 'medium & big' farm households.

In all the clusters, a larger proportion of the produce was consumed by the households and it was

predominantly high in Myorepur. Though the production level was high among the ‘medium & big’ farm households, they consume less percentage of the produce than other categories of farmers. A small portion of the produce was only sold in the local markets immediately after the harvest of produce.

Regarding processing enterprises, Myorepur had only one flour mill, Pahari block had 10 flour mills and 5 oil expellers whereas in Madihan, there were 13 flour mills, 4 oil expellers and one rice mill. However, there was no pulse mill in any of the clusters and no rice mill in Myorepur and Pahari block. Accordingly, whatever produce was sold in the market; it was all without processing or value addition. It was further noticed that majority of the farm households in all the clusters were professionally untrained but they had shown interest in undergoing various agriculture based training.

*Introduction of High Yielding Vegetable Varieties :*  
After analyzing the disadvantageous situation of the

study area, a SWOT analysis was done. Introduction of improved vegetable varieties and cost effective technologies were perceived to be the future strength and opportunity for the area. To explore the potential of improved varieties of vegetables frontline demonstration were conducted in 875 farmers’ field in an area of 196.43 hectare during 2008-2011 in all the three selected clusters. Significant yield differences were observed

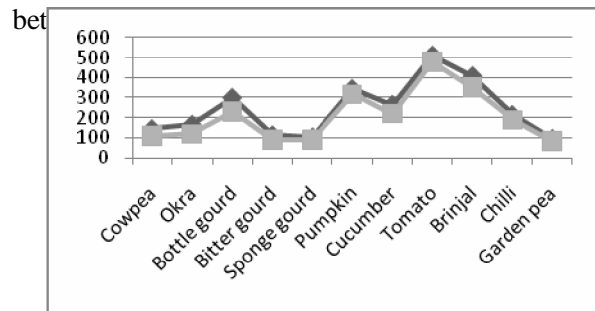


Fig. 1. Comparative yield performance (q/ha) of FLD and Control (data on Y-axis indicates crop yield in q/ha, dark line indicates FLD and light line as control)

Table 1. Yield Performance of Demonstrated Vegetable Varieties

S. N.	Vegetable	Varieties	Yield (q/ha) FLD	Yield (q/ha) Control	% Increase in Productivity
1.	Cowpea	Kashi Kanchan	145	110	31.82
2.	Okra	Kashi Pragati	167	119	40.34
3.	Bottle gourd	Pant Lauki-1, Narendra Rashmi	300	230	30.43
4.	Bitter gourd	Kalyanpur Sona, Kalyanpur Barahmasi	115	90	27.78
5.	Sponge gourd	IVSG-1, K. Hari Chikani	105	90	16.67
6.	Pumpkin	Kashi Harit, Azad Kaddu	344	317	8.52
7.	Cucumber	Swarna Ageti	265	220	20.45
8.	Tomato	Kashi Vishesh, Kashi Amrit, Kashi Anupam	510	480	6.25
9.	Brinjal	BR-14	408	350	16.57
10.	Chilli	Kashi Anmol	215	190	13.16
11.	Garden pea	Kashi Nandini, Kashi Udai, Kashi Mukti	97	83	16.87
12.	French bean	Swarna Priya	77	-	-

The productivity of demonstrated crops increased from 6.25–40.34% mainly because of introduction of high yielding new varieties. The details of the improved crop varieties introduced in three clusters are given in Table I. The data shown in Table-1 clearly reveals that Kashi Pragati in okra and Kashi Kanchan in cowpea fetched maximum yield differences between demonstrated and farmers’ practiced varieties. However, in case of tomato yield difference was less which might be due to unknown varieties/hybrid procured by the growers from local markets. In pumpkin, maximum yield recorded for Kashi Harit was 430 q/ha but, average demonstrated yield was 344 q/ha against the local cultivars of 317 q/ha. In case of pumpkin farmers were usually growing big size fruit varieties

which shared less market price whereas, Kashi Harit being small sized varieties fetched higher market price because of its dimensions and keeping quality. In garden pea, demonstrated varieties proven as a boon in the vindhyan region because the other varieties sown by the farmers were not only giving low yield but the pods were of poor quality as well. During 2010-11, about 50 quintals of demonstrated varieties of pea seed were produced by the growers. French bean was a new crop introduced in the region. The average yield recorded in case of French bean was 77 q/ha and the growers send their produce in city markets where they received better price as its demand in local market was not appreciable.

Further, assessing the demonstrated vegetable varieties according to their performance in farmers’ field

(Table-2), it was revealed that varieties of okra, cowpea, bottle gourd, bitter gourd and cucumber were most successful and fetched higher yield of more than 20 per cent when compared to local cultivars. Sponge gourd, brinjal, chilli and garden pea were also successful in which an increase of more than 10 per cent productivity were recorded.

Table 2. Demonstrated Crop Performance in Vindhyan Region

Category	% Increase in Productivity	Crop & Varieties
Most Successful	$\geq 20$	Okra (Kashi Pragati), Cowpea (Kashi Kanchan), Bottle gourd (Pant Lauki-1, Narendra Rashmi), Bitter gourd (Kalyanpur Sona, Kalyanpur Barahmasi), Cucumber (Swarna Ageti)
Successful	10-20	Sponge gourd (IVSG-1, K. Hari Chikani), Brinjal (BR-14), Chilli (Kashi Anmol), Garden pea (Kashi Nandini, Kashi Udai, Kashi Mukti)
Average	$\leq 10$	Tomato (Kashi Vishesh, Kashi Amrit, Kashi Anupam), Pumpkin (Kashi Harit, Azad Kaddu),

#### *Moving towards Nutritional Security :*

In different components of balanced diet, vegetable occupies the prime place in a predominantly vegetarian country like India. Vegetable crops have a diverse group, like tuber, legumes, leafy vegetables, cucurbits and fruit vegetables which contributes different dietary factors such as vitamins, minerals, carbohydrate, essential amino acids, fibres and proteins. In addition to these, vegetables add variety, taste, colour and texture in diet.

From the survey it was found that the study area was undergoing nutritional imbalance. Therefore, an initiative was taken to enhance the nutritional security of the study area. Increasing trend of vegetable

availability will contribute to improve the diet of resource poor farmers of vindhyan region. Due to adoption of improved varieties and efficient method of vegetable production, farmers of that region are not only getting balanced nutritive diet but also enhanced their livelihood by selling excess kitchen garden produce in the local market of their respective village. In every cropping season thousands of kitchen garden kits were distributed among the households of the selected locale. During 2008-09 a total of 1100 households were given kitchen garden demonstration kit where as in 2009-10 and 2010-11 it increases upto 3767 and 5621 households respectively. Beside that, 20 model fruit-vegetable based nutritional gardens have also been established in 12 different villages in a merely small area of 0.0375 ha (2-3 biswa) each to make the villagers aware about the nutritional benefits of having such a garden.

#### **CONCLUSION**

Vegetable cultivation and adoption of new technologies enhanced vegetable consumption, nutritional security and overall livelihood security of the study area. Efforts made under this study to improve the compatibility of vegetable production with other crops by enhancing yield and reducing production cost certainly helped in improving the livelihood status of the growers of disadvantageous districts in vindhyan region. The rate of return on the investment made by farmers to achieve the gains of technologies is reasonable. The promotion of new technologies improved the growth rates in vegetable supplies and per capita availability, halted the increase in vegetable prices, and reduced seasonality. It significantly improved the yield performance of various vegetable crops like okra, cowpea, bottle gourd, bitter gourd, cucumber, pea etc. and opens a path of seed replacement by the new demonstrated vegetable varieties.

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