VEGETABLE REVOLUTION AND RURAL SUSTAINABLE DEVELOPMENT: A CASE STUDY

Nizamuddin Khan
M.A., Ph.D., Associate Professor
Department of Geography
Aligarh Muslim University
Aligarh. 2020202, India
e-mail: nizamuddin_khan@rediffmail.com

Mohd. Sadiq Salman
M.Sc., M. Phil., Research Assistant
Department of Geography
Aligarh Muslim University
Aligarh. 2020202, India
e-mail: msadiqsalman@gmail.com

Anisur Rehman
M.A. Ph.D., Project Fellow
Department of Geography
Aligarh Muslim University
Aligarh. 2020202, India.
e-mail: anisgeography@gmail.com

UDK: 502.131.1:631.1.017.3(540)
COBISS: 1.01 – Original scientific article

Abstract
Vegetable Revolution and Rural Sustainable Development: A Case Study
Indian agriculture is now at a critical juncture. The liberalization of agricultural trade, increasing trends of urbanization and fragmentation of the land have resulted in commercialization of Indian agriculture. In the present scenario, farmers are bound to turn towards more remunerative crops, like vegetables, for their sustenance. India has a large population and diverse agro–climatic conditions that favor the growth of various vegetables in the country. Vegetable revolution, in the last decades, has been a ray of hope for the landless, small and marginal farmers. This has become a new dimension of development in favor of the poor rural masses. Our study was undertaken in the Bulandshahr district, lying in the Indo-gangetic plain. This area not only has fertile land, but also has an efficient infrastructure to support vegetable cultivation. The present study focuses the role of vegetable cultivation upon rural sustainable development**.** The study revealed that the area studied witnessed an alarming growth in expansion of vegetable cultivation during recent decades. An efficient vegetable marketing network with the integration of rural markets at a grassroots level is urgently needed for sustainable, economically viable and socially acceptable planning of diversification of agriculture with value added crops like vegetables both in the study area and in the country at a national level.

Key words
Vegetable revolution, marginal, small, farmers, sustainable, development

The editor received the article on 3.11.2009.

1. Introduction

Indian agriculture is at a crossroad. It is moving towards commercialization and diversification with value added cropping and farming systems owing to the fact that uneconomic traditional food grain-based subsistence cropping systems persisted in the country for such a long period. After independence, emphasis was given to increase area and productionof food crops to meet the requirements of food production for the burgeoning population. Green Revolution, a technocratic and capital-intensive agricultural innovation, was introduced during the late 1960's and 1970's. The revolution brought a tremendous breakthrough in both horizontal and vertical expansion of grain-based foods, especially wheat and rice. The country became not only self-sufficient, but began to export grain-based foods by the turn of the 20th century. This growth, however, occurred at the cost of environmental sustainability, social equality and economic viability.

The economic reform policy, under which subsidies for inputs were reduced, caused frustration among farmers due to the increase in production costs per unit volume of production and a rather slow increase in price per unit volume of output. The economic viability of grain-based crops and the survival of farmers have been challenged in recent decades. Diversification of cropping systems with value added crops like vegetables, flowers, medicinal plants and fruits are seen as new options for Indian farmers to improve their incomes and the economic viability of agriculture in the country.

Vegetable cultivation is a very important component of Indian agriculture. Its cultivation is a caste oriented activity and mainly cultivated at a small scale. But now commercial, large-scale production has begun in the country, particularly after liberalization of agricultural trade under the auspices of WTO. MNC's have also invested in this sector, and contract vegetable farming began recently. Increasing urbanization, rising income and purchasing power among middle class people, along with increasing awareness of the importance of fresh vegetables among developed countries' consumers, have augmented the production of vegetables in developing countries like India. (Timmer et.al. 1983) Improved infrastructure and institutional arrangement such as private storage facilities, consciousness of food quality and food standards among small income groups, even in village areas, also led to enhancement in vegetable cultivation (Timmer et. al 1983; Jaffe 2003).

Technological and scientific knowledge multiplied vegetable production many times over in the last few decades. In global vegetable production, developing countries have contributed a larger share. These countries enjoy a higher level of benefits by horticultural revolution e.i. vegetables cultivation rather than developed countries (Ali 2000, pp.1-29). Vegetable cultivation also has many socio-economic implications. Various forms of employment are available through involvement in various jobs required for vegetable farming and distribution from the producer's gate to the end consumers in any region.

Health improvement through nutrition intake from fresh vegetables also has a positive impact. It is helpful in removing micro nutrient deficiencies and works as antioxidants in maintaining the health of vegetable consumers (Rao et.al. 2001, pp.1217-1224). India has a high potential for expansion of vegetable cultivation in both time and space owing to the diversity in agro-climatic conditions. The production level in India has been improving over the years. Supply of vegetables at

the appropriate time, place and price is the main challenge before the nation. An optimum equilibrium between supply and demand at the local, regional, national and international levels at a consumer-accessible price is urgently needed for sustainable development of vegetable cultivation in the country.

Marketing facilities could also encourage the vegetable revolution. Rural markets, however, at the grassroots level, can play a very significant role in the buying and selling of agricultural commodities, especially perishable items, such as vegetables. These market centers stand at the bottom of national and international marketing networks. The majority of rural population fulfill their demands of fresh vegetables from these market points. Small and marginal farmers with small amounts of marketable surplus prefer rural markets for the disposal of surplus, as they can save travel and transport costs and achieve higher prices or income contrary to what they would attain if they sold the same small size of surplus in distant, specialized regulated markets. Vegetable buying and selling through rural markets also generates employment and incomes through involvement of local people in various market functions and operations. This process of marketing vegetables through these various channels helps small and marginal farmers to generate money, employment and other socio-cultural benefits that lead to rural sustainable development.

2. Aims and objectives

Taking into consideration the role of rural markets in the buying and selling of vegetables and expansion of area under vegetables, the researchers aim to understand the following objectives:

- The proportion of vegetable marketed surplus to pass through rural markets.
- The socio-economic standing of the vegetable cultivators in the villages that the markets service.
- The impact of the vegetable revolution on sustainable development of small and marginal farmers in the Bulandshahr district.

3. Database and methodology

The study is based on both primary data and secondary data. Primary data were generated through field survey of the sampled villages. The secondary data were obtained from the Directorate of Economics and Statistics, Lucknow and Vikas Bhawan, Bulandshahr. District Statistical Magazine was also used for basic information regarding vegetable cultivation. Fifteen villages, one from each administrative development block, were selected for the detailed field survey. Village selection was made on the basis of the following criteria:

- Presence of vegetable cultivation.
- Accessibility.
- Size of the population.
- Social Structure of the village.
- Distance from rural and regulated market centres

The field survey was conducted in all 15 sampled villages. For detailed study, fifty percent of households of vegetable cultivators were surveyed in the sampled villages. Thus, the total number of households surveyed from the sampled villages

was 903. A questionnaire was used for collecting data regarding age, sex, caste, buying and selling of vegetables, area used for vegetable cultivation, change in area, employment generation and social change. Data were analyzed and processed using simple statistical techniques. Indicators of sustainable development were selected for measuring the impact of the vegetable revolution. The selected indicators were income generation, employment generation, social change and self-sufficiency.

4. Study area

The district of Bulandshahr in Uttar Pradesh is situated between 28.40^0 and 28.0^0 North latitude and between 77.0^0 and 78.0^0 East longitudes. Bulandshahr District lies in the Meerut Division of Uttar Pradesh, located in Upper Ganga - Yamuna plain, having an area of 3480.18km^2. The district is about 84km in length and 62km in breadth. The District is divided into 7 tehsils and 15 blocks for administrative convenience (Fig.1). There are 1197 villages, 55 rural markets and 16 urban centers in the study area. The climate of the district is liable to extremes, being very cold in winter and very hot in summer; similar to the climate experienced by a large part of the Indo-Gangetic plains of northern India. The total population of the district is 2,923,290 according to a 2001 census. 60% of the population lives in rural areas.

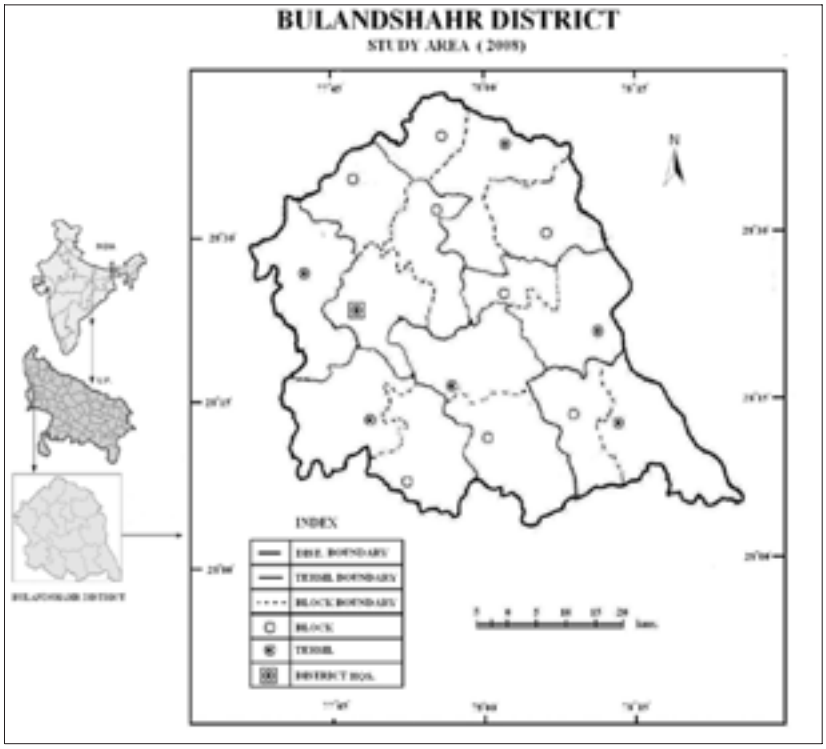

Fig. 1: Location Map

5. Discussion

5.1 Vegetable buying and selling through rural markets

The vegetable marketable surplus is bought and sold through various agencies/traders and changes many hands from the producer's farm gate to the ultimate consumption point. The producer's house, village shop, village traders, rural market, urban and regulated markets are the important agencies/places of vegetable buying and selling in the study area. Various market channels have been explored or identified for the buying and selling of marketable surplus of vegetables through field survey. These channels are producer-consumer, producer-village trader-consumer, (rural) market-regulated producer-assembler, markets-retailers-consumers and producer-regulated market (whole seller)-retailer-consumer. The data on the proportion of marketed surpluses bought and sold through various sources indicates that the regulated markets contribute the largest share, followed by the rural market. The share of marketed surplus of vegetables bought and sold through the regulated market is largest (44.86 percent) followed by rural markets (37.40 percent), village traders (13.68 percent) and village shops (4.06 percent) as shown in Tab. 2. Though the share of vegetable buying and selling through the regulated market is large, the role of rural markets is still very important in vegetable marketing because the regulated markets are only visited by large farmers who have a large amount of marketable surplus. Their share among the total vegetable cultivators is quite small in comparison to landless, small and marginal farmers. Regulated markets are not economical for small farmers with a small amount of surplus, as the farmers would have to pay rather high transport and travel costs per unit weight of marketed surplus. The perishable nature of the commodities is another factor that encourages the smaller vegetable growers to prefer the nearby rural market centers for buying and selling immediately following harvest. Market accessibility to rural markets for both producer-sellers as well as purchasers is easier than to regulated and urban markets, as in the latter case, various extra costs such as license fees, entry fees, and other taxes, etc. have to be paid by producer-sellers at urban markets. The rural markets, however, are the most convenient centers for buying and selling of marketed surplus by marginal and small vegetable growers in the study area.

Fig. 2: Vegetable Buying and selling Through Rural Markets.

Fig. 3: Modes of Vegetable Buying and selling.

Tab. 1: Share of Marketed Surplus Bought and sold Through Various Channels in Sampled Villages (2009).

Sampled villages	Village shop (%)	Village Traders (%)	Rural market (%)	Regulated markets (%)
Pindrawal	02	19	31	48
Alampur	04	11	41	44
Ahmadgarh	02	13	38	47
Himmatgarhi	06	17	35	42
Jadol	04	13	42	41
Taiyyabpur	05	16	29	50
Tomri	03	12	40	45
Kulsena	02	14	37	47
Ekkataj	06	17	35	42
Deorala	04	13	42	41
Khanwaya	07	08	41	44
Samkola	04	13	42	41
Kisola	05	16	29	50
Dhakoli	04	11	41	44
Narsena	03	12	38	47
Total	4.06	13.68	37.40	44.86

Source: Field Survey, 2009.

Tab. 2: Share of Vegetable Cultivators in Sampled Villages According to Caste (2009).

Sampled villages	Saini (In %)	Lodha (In %)	Muslim (In %)	Yadav (In %)	Other (In %)
Pindrawal	36	24	32	--	08
Alampur	22	17	34	18	09
Ahmadgarh	28	20	17	---	35
Himmatgarhi	36	23	10	17	14
Jadol	27	21	---	36	16
Taiyyabpur	49	---	34	11	6
Tomri	25	22	---	---	53
Kulsena	27	35	32	--	06
Ekkataj	19	25	38	9	09
Deorala	22	13	17	22	26
Khanwaya	34	17	11	19	19
Samkola	36	---	34	---	30
Kisola	23	32	22	20	3
Dhakoli	18	17	17	27	21
Narsena	45	26	17	11	01
Total	29.8	19.46	21.00	12.66	17.06

Source: Field Survey, 2009.

5.2 Social Profile of Vegetable Cultivators

The study of social stratification of vegetable growers is an important feature for analysis of any economic activity in India, as the caste system is historically rooted in every aspect of Indians' lives. The vegetable cultivators belong to different castes and/religions in different sampled villages. In general, it was found that some castes are dominant in vegetable cultivation and marketing. The people involved in the vegetable cultivation generally belong to other backward classes or low castes, as shown in Tab. 3. Saini accounted for, on average, 29.8% of vegetable cultivators in sampled villages, followed by Lodha (19.46%), Muslim (21.00%) and Yadav (12.66%). The remaining communities, together, contributed to 17.06% of vegetable growers.

Scheduled castes and high castes showed very negligible shares in vegetable growing in the study area because the former are deprived of land holdings and work as landless laborers, while the latter do not have the household labours which are greatly demanded in various operations of horticulture, especially vegetable cultivation. Generally high caste household members are primarily involved in white-collar jobs either in secondary and tertiary economic activities.

5.3 Participation in vegetable cultivation in terms of land holdings

The field survey of 903 households of vegetable cultivators from fifteen villages shows the same pattern of economic stratification as in the case of the analysis of

vegetable cultivators according to caste. The economically poor and deprived communities are engaged in a high proportion of vegetable cultivation because of land stress and excess household labor available to be absorbed in this farming system. They follow intensive farming methods with more value added crops for increasing economic viability of their limited land and to absorb their excess available labor. Data reveal that marginal farmers make up the largest share (38.87 percent) among total vegetable cultivators. They are small farmers (25.14 percent), landless (22.26 percent), medium farmers (9.96 percent) and large farmers (3.77 percent). Thus, farmers who have small and marginal landholdings for their sustenance dominate vegetable cultivation. Large holders usually belong to high castes and show little interest in vegetable cultivation, as it involves more labor, care and marketing stress, being a perishable commodity.

Tab. 3: Participation in Vegetable Cultivation in Sampled Villages in Terms of Landholdings (2009).

Sampled Villages	Landless	Marginal (1-2)	Small (2-4)	Medium (4-10)	Large (>10)	Total Households
Pindrawal	12 (21.8)	19 (34.5)	16 (29.09)	5 (9.09)	2 (3.63)	54 (100.00)
Alampur	18 (24)	33 (44)	19 (25.33)	5 (6.66)	0 (0.00)	75 (100.00)
Ahmadgarh	21 (25.33)	29 (32.22)	22 (24.44)	10 (11.11)	8 (8.88)	90 (100.00)
Himmatgarhi	9 (20.00)	19 (42.22)	14 (31.11)	3 (6.66)	0 (0.00)	45 (100.00)
Jadol	12 (20.00)	21 (35.00)	17 (28.33)	6 (10.00)	4 (6.66)	60 (100.00)
Taiyyabpur	7 (16.66)	22 (52.38)	10 (3.80)	3 (7.14)	0 (0.00)	42 (100.00)
Tomri	22 (27.16)	34 (41.97)	17 (20.98)	6 (7.40)	2 (2.46)	81 (100.00)
Kulsena	14 (23.72)	19 (32.20)	18 (30.50)	5 (8.47)	3 (5.08)	59 (100.00)
Ekkataj	11 (22.91)	22 (45.83)	11 (22.91)	4 (8.33)	0 (0.00)	48 (100.00)
Deorala	10 (19.60)	17 (33.33)	17 (33.33)	4 (7.84)	3 (5.88)	51 (100.00)
Khanwaya	13 (19.69)	23 (34.84)	17 (25.75)	9 (13.63)	4 (6.06)	66 (100.00)
Samkola	11 (16.41)	25 (37.31)	16 (23.88)	11 (16.41)	4 (5.97)	67 (100.00)
Kisola	9 (19.56)	22 (47.82)	9 (19.56)	4 (8.69)	2 (4.35)	46 (100.00)
Dhakoli	23 (32.85)	31 (44.28)	10 (14.28)	6 (8.57)	0 (0.00)	70 (100.00)
Narsena	9 (18.36)	15 (30.61)	14 (28.57)	9 (18.36)	2 (4.08)	49 (100.00)
Total	201 (22.26)	351 (38.87)	227 (25.14)	90 (9.96)	34 (3.77)	903 (100.00)

Source: Field Survey, 2009.

6. Dynamism in areas under vegetable cultivation

The vegetable cultivators in the sampled villages were also questioned about the expansion of vegetable cultivation in the recent period. They were asked about their opinion regarding the change in area under vegetable cultivation over the past decade. The survey revealed a significant expansion of vegetable cultivation in the

study area, and most of the respondents (38.53 percent) were in favor of the opinion that the area has doubled in the last decade. The share of respondents who favored the opinion that there has been a significant increase in the area was 28.01 percent, followed by those who said there has been no change (17.27 percent), the area has decreased (8.19 percent) and the area has become half as large (7.97 percent). Thus, the study has shown that during the last decade, the area under various kinds of vegetable cultivation increased at a rate of 4.12% per year. The increase showed variation from village to village (Table 5). The highest change was recorded by Pindrawal (15%); followed by Alampur (11.60%), Jadol (10.00%), Ahmadgarh (8.00%) and Samkola (8.00%), respectively.

Some of the sampled villages also reported negative growth. This is mainly due to the unavailability of a rural market in the vicinity, an increase in transportation costs, irregular supply of water for irrigation, social stratification and composition of the villages under discussion. The area increased tremendously in small and marginal sized holdings unlike larger sized holdings, which recorded either stagnation or decline during the same period.

Tab. 4: Assessed Level of Change in Vegetable Cultivated Area in Sampled Villages From 1997-08 to 2007-08.

Sampled Villages	Became Half as Large	Decreased	No Change	Increased	Doubled	Total Households
Pindrawal	05 (9.25)	02 (3.70)	10 (18.51)	14 (25.92)	23 (42.59)	54 (100.00)
Alampur	04 (5.33)	8 (10.66)	12 (16.00)	18 (24.00)	33 (44.00)	75 (100.00)
Ahmadgarh	11 (12.22)	10 (11.11)	8 (8.88)	27 (30.00)	34 (37.77)	90 (100.00)
Himmatgarhi	3 (6.66)	4 (8.88)	7 (15.55)	12 (26.66)	19 (42.22)	45 (100.00)
Jadol	2 (3.33)	3 (5.00)	4 (6.66)	29 (48.33)	22 (36.66)	60 (100.00)
Taiyyabpur	3 (7.14)	2 (4.76)	8 (19.04)	10 (23.80)	19 (45.23)	42 (100.00)
Tomri	4 (4.93)	6 (7.40)	19 (23.45)	21 (25.92)	31 (38.27)	81 (100.00)
Kulsena	7 (11.86)	3 (5.08)	11 (18.64)	13 (22.03)	25 (42.37)	59 (100.00)
Ekkataj	1 (2.08)	3 (6.25)	10 (20.83)	14 (29.16)	20 (41.66)	48 (100.00)
Deorala	5 (9.80)	3 (5.88)	09 (17.64)	13 (25.49)	21 (41.17)	51 (100.00)
Khanwaya	7 (10.60)	3 (4.54)	11 (16.66)	13 (19.69)	32 (48.48)	66 (100.00)
Samkola	5 (7.46)	5 (7.46)	09 (13.43)	18 (26.86)	30 (44.77)	67 (100.00)
Kisola	7 (15.21)	4 (8.69)	7 (15.21)	17 (36.95)	11 (23.91)	46 (100.00)
Dhakoli	6 (8.57)	16 (22.85)	14 (20.00)	23 (32.85)	11 (15.71)	70 (100.00)
Narsena	2 (4.08)	2 (4.08)	17 (34.69)	11 (22.44)	17 (34.69)	49 (100.00)
Total	72 (7.97)	74 (8.19)	156 (17.27)	253 (28.01)	348 (38.53)	903 (100)

Source: Field Survey, 2009.

Tab. 5: Expansion of Area under Vegetable Cultivation in Sampled Villages From 1997-98 to 2007-08.

Sampled Villages	Area Under Vegetable Cultivation (1997-98) (In acres)	Area Under Vegetable Cultivation 2007-08) (In acres)	Decadal Change in Area (In acres)	Average Growth per Year (In %)
Pindrawal	20	50	30	15.00
Alampur	30	65	35	11.66
Ahmadgarh	25	45	20	8.00
Himmatgarhi	23	30	07	3.03
Jadol	25	50	25	10.00
Taiyyabpur	22	24	02	0.90
Tomri	11	17	06	5.45
Kulsena	27	22	- 05	-1.85
Ekkataj	16	18	02	1.25
Deorala	17	21	04	2.35
Khanwaya	22	16	- 06	-2.72
Samkola	05	09	04	8.00
Kisola	22	28	06	2.72
Dhakoli	11	06	- 05	-4.54
Narsena	17	13	- 04	-2.35
Total	293	414	121	4.12

Source: Field Survey, 2009.

Fig. 4: Participation of Women and Children in Vegetable Cultivation.

7. Employment Generation Through Vegetable Cultivation

Vegetable farming absorbs abundant labor, unlike grain-based cultivation. Cultivation, including the preparation of fields, sowing, irrigating, weeding; harvesting, transportation and marketing operations, needs many people to work relentlessly during various steps of the process. The study revealed that in the study area, 2,704 (53.52 percent) of the total 5,052 people from among the 903 households surveyed were involved in picking and plucking the vegetables. This task employs the largest number of people both as part time and full time workers. Vegetable cultivation demands a huge number of workers, as vegetables must be harvested as soon as possible due to their perishable nature. Transportation and marketing provided employment to 1,714 (33.92 percent) and 1,402 (27.25 percent) people, respectively. The number of employed vegetable workers in various operations varied from village to village (Tab. 6).

Tab. 6: Employment Generation Through Vegetable Cultivation in Sampled Villages (2009).

Sampled Villages	Cultivation (in %)	Plucking/packaging (in %)	Transportation (in %)	Marketing (in %)	Total Persons Involved
Pindrawal	67 (22.18)	164 (54.30)	74 (24.50)	87 (28.80)	302 (100.00)
Alampur	103 (24.52)	154 (36.66)	136 (32.38)	99 (23.57)	420 (100.00)
Ahmadgarh	124 (24.60)	276 (54.76)	143 (28.37)	158 (31.34)	504 (100.00)
Himmatgarhi	65 (25.79)	153 (60.71)	88 (34.92)	76 (30.15)	252 (100.00)
Jadol	92 (27.38)	204 (60.71)	152 (45.28)	126 (37.50)	336 (100.00)
Taiyyabpur	64 (27.23)	142 (60.42)	97 (41.27)	76 (32.34)	235 (100.00)
Tomri	118 (26.04)	210 (46.35)	144 (31.78)	132 (29.13)	453 (100.00)
Kulsena	68 (20.60)	159 (48.18)	92 (27.87)	83 (25.15)	330 (100.00)
Ekkataj	86 (32.08)	146 (54.47)	79 (29.47)	67 (25.00)	268 (100.00)
Deorala	82 (28.77)	144 (50.52)	86 (30.17)	72 (25.26)	285 (100.00)
Khanwaya	98 (26.55)	163 (44.17)	104 (28.18)	89 (24.11)	369 (100.00)
Samkola	102 (27.20)	169 (45.06)	112 (29.86)	79 (21.06)	375 (100.00)
Kisola	74 (28.79)	182 (70.81)	117 (45.52)	69 (26.84)	257 (100.00)
Dhakoli	94 (23.97)	239 (60.96)	145 (36.98)	110 (28.06)	392 (100.00)
Narsena	88 (32.11)	199 (72.62)	145 (52.91)	79 (28.83)	274 (100.00)
Total	1325 (26.22)	2704 (53.52)	1714 (33.92)	1402 (27.75)	5052 (100.00)

Source: Field Survey, 2009.

8. Role of Vegetable Cultivation in Sustainable Development

Vegetable cultivation has emerged as an efficient means of income generation for poor farmers who possess small pieces of land. The livelihoods of these poor

farmers depend on this activity. The study revealed that a large proportion of people involved in the cultivation of vegetables in general are dependent upon this activity for their livelihood. The field survey shows that it not only increases the income of farmers, but also acts as a means for social transformation, economic development and becoming self-sufficient. The households under study were asked for their response regarding the role of vegetable cultivation in social change, employment, income generation and self-sufficiency. A major portion of the households under study were of the opinion that vegetable cultivation has emerged as a means of social change (89.36 percent) and provides income to poor, landless and marginal farmers (82.72 percent). 70.76 percent of respondents thought that vegetable cultivation helps farmers become self-sufficient. Table 7 shows the role of vegetable cultivation in sustainable development.

Fig. 5: Employment Generation Through Vegetable Cultivation.

Tab. 7: Role of Vegetable Cultivation in Sustainable Development.

Role of vegetable cultivation	Number of Households	Percentage of Total Households
Employment	617	68.32
Income generation	747	82.72
Social Change	807	89.36
Self-sufficiency	639	70.76
Total	903	100.00

Source: Field Survey, 2009.

9. Conclusion

The vegetable revolution has had a significant role in rural development. Vegetable cultivation has drastically increased over the last decade in the area studied. Most of the vegetables are bought and sold either in rural markets or the nearest regulated markets. Socio-economic stratification of vegetable growers and workers showed domination of some specific castes in vegetable cultivation and buying and selling, whereas the people of high castes are little involved in vegetable cultivation. More than 80% of vegetable cultivators are landless, small or marginal farmers and market or dispose of their surplus in nearby rural markets. The vegetable revolution has not only increased the income of vegetable growers, but it has also contributed to employment generation, social change and self-sufficiency among landless, small and marginal farmers. The expansion of vegetable cultivation in the sampled villages has been significant to reducing the vulnerability of small and marginal farmers to poverty and misery. Thus, the vegetable revolution is significant in rural transformation and is a new dimension of rural sustainable development. An efficient vegetable marketing network with integrated markets at the grassroots level is urgently needed for sustainable, economically viable and socially acceptable planning of diversification of agriculture with value added crops like vegetables, both in the study area as well as on a national level.

References

Timmer C.P., W.P. Falcon, and S.R. Pearson, 1983: Food Policy Analysis. Baltimore: Johns Hopkins University Press for the World Bank.

Ali, 2000: Dynamics of vegetables in Asia: a synthesis. In: M. Ali (ed.). Dynamics of vegetable production, distribution and consumption in Asia. Asian Vegetable Research and Development Center. AVRDC publication no. 00-498, pp 1-29

Rao, S., C.S. Yajnik, A. Kanade, C.H.D. Fall, B.M. Margetts, A.A. Jackson, R. Shier, S. Joshi, S. Rege, H. Lubree, and B. Desai, 2001: Intake of micronutrient-rich foods in rural Indian mothers associated with the size of their babies at birth: pune maternal nutrition study. J. Nit. 131: pp 1217-1224

Jaffee S. 2003: From challenge to opportunity: transforming Kenya's fresh vegetable trade in the context of emerging food safety and other standards. Agriculture & Rural Development Discussion Paper No. 2, World Bank, Washington, DC.

VEGETABLE REVOLUTION AND RURAL SUSTAINABLE DEVELOPMENT: A CASE STUDY

Summary

Indian agriculture is the main asset of Indian rural masses, still, after five and half decades of independence. It achieved high level of satisfaction in term of foodgrain production through the adoption of green revolution. Now the foodgrain based cropping system became uneconomical because of increasing input costs many folds as compared to prices of outputs. Diversification of cropping as well as farming with value added system has taken place in the country. Vegetable cultivation at commercial scale started after globalisation of agricultural trade in the form of a revolution in developing countries like India. The urbanised population ,increasing health consciousness , rise in purchasing power among middle income group of consumers, high demand for fresh vegetables in developed nations are important deriving forces of such revolution. Besides, liberalisation of agri business, development of infrastructural facilities i.e. refrigerated transport net work, rural link roads, cold storage facilities and the establishment of accessible and economical marketing and processing facilities in production areas have accelerated the production and area in response to increasing export of vegetables in recent period. The vegetable cultivation is socio economic oriented phenomena and usually controlled by backward and poor farmers with marginal small size of the holding less than 3 hectares of land.It provides opportunities to rural masses to improve their incomes through employment in various operations from production to consumption points. This will directly or indirectly improve the health conditions, living standard, infrastructural facilities and allied socio econmic conditions in the rural areas and integrated and sustainable rural development could be taken place.

Data regarding various aspects of vegetable revolution at grass roots level are not available in recorded form, so the researchers have selected a micro level area called Aligarh district for detail survey.12 villages are selected for field survey to generate data regarding employments, incomes. Social conditions of growers as well as role played by this revolution on socio economic transformation of rural areas in the study region.

Study revealed that the country as well as study region witnessed an alarming growth in vegetable cultivation during last three decades.90% of vegetable growers belonged to land less, marginal and small farmers. Marketing and processing are done by mainly land less or marginal farmers with shares of 60-70%. Female workforce are involved in preparing, packaging and some other post harvest activities. Almost all commercial vegetable growing villages have witnessed development of infrastructural facilities at satisfactory level in the study area.