

Contribution of Rural Women in Vegetable Cultivation in Homegardens of Nainital District, Kumaun Himalaya, India

KIRAN BARGALI*, VIBHUTI and CHARU SHAHI

Department of Botany, DSB Campus, Kumaun University,
Nainital-263002 Uttarakhand, India.

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ABSTRACT

Homegardens are usually the small piece of land surrounding the house. They are important agroecosystems and are a source of subsistence and cash resources. The aim of present study was to analyse contribution of rural women in homegarden vegetable cultivation in Nainital district of Kumaun Himalaya, India. Data were collected from 100 respondents by using random sampling method. Participatory interview technique was used to collect data. Observation of homegardens revealed that women play a key role in homegarden vegetable cultivation. Majority of rural women were independently participating (60%) in homegarden vegetable cultivation while 40% women participated jointly with men. Characteristics of rural women such as age, level of education, family size, homegarden size, knowledge about homegarden etc vary from place to place and affect contribution of rural women insignificantly. In order to enable women to actively participate in the various activities related to homegarden vegetable cultivation there is a great need to promote change in policies, laws and development programmes.

Key words: Homegarden, Rural women, Vegetable Cultivation, Kumaun Himalaya.

INTRODUCTION

The vegetables play a very important role in human nutrition as source of fibre, trace minerals, vitamins, carbohydrates and proteins and help to prevent various diseases resulting from malnutrition and unbalanced diet. Homegardens are intensively cultivated agroforestry systems managed within the compounds of individual homes¹. They supply a variety of nutritious food through provision of fresh and often pesticide free vegetables and fruits for healthy lives of the family members. Along with the nutritional benefits, homegardens provide potential food security to the house holder. Since the diverse mixture of crops is harvested at different times a constant supply of food in some form or the other is available from these homegardens throughout the year². In Kumaun Himalaya, vegetable production for commercial purpose has increased during last few years. In rural areas, there are some relatively

small-scale producers who grow vegetables for the sale or exchange.

Women have made important contribution in almost every aspect of our society from the time immemorial^{3, 4}. In rural area; women are major but largely unrecognized contributors to agricultural and economic productivity. They grow most of the family's fruits and vegetables and participate in post harvest activities. However, the role of rural women in vegetable production has not widely been explored. Inadequate information on the level of women participation in agriculture and women's substantial contribution in agriculture are neglected in policy issues^{5, 6}. Therefore, in the present study, an attempt has been made to assess the contribution of rural women in cultivation of vegetables in homegarden agroforestry systems of Nainital district of Kumaun Himalaya, India. The main objectives were: i). to determine the extent of rural women participation;

ii). to describe characteristics of rural women involved in vegetable cultivation and iii). To explore the relationship between the selected characteristics of rural women and their participation in vegetable cultivation in home garden of Nainital district, Kumaun Himalaya, India.

MATERIALS AND METHODS

Study Area

The study area selected for the present study was located in Kumaun Himalayan region of Uttarakhand state, India. The Kumaun Himalaya forms the northwestern part of the central Himalayan region spread over a geographical area of 51125 km² and lies between 77°34' to 81°02' E longitude and 28°43' to 31°27' N latitude. It comprises six districts viz., Almora, Bageshwar, Champawat, Nainital,

Pithoragarh and Udham Singh Nagar (Figure 1). The study was conducted in the district Nainital. The district is spread over hilly area as well as the plains and divided into 8 Tehsils, 8 development blocks and 1082 villages. The population of the district is 7, 62,909 (2011 census) out of which rural population is 4,93,859.

Climate

The study area falls in sub-tropical to temperate climate. The maximum temperature was 40.2° C and minimum temperature was – 5.4° C. The average rainfall in the district was 1407 mm.

River system

There are a number of river and rivulets in the Nainital district. Among them the main rivers flowing through the Nainital are the Gola and Kosi.



Fig. 1: Location map of the study area

Many rivulets such as Bhakra, Dabka and Baur also flow in the district.

Land use patterns

Mostly subsistence and crop based farming is prevailed in the area. Cultivation is done on varying degree of slopes. Wheat, maize and Rice is the principle crop covering about 75% of the total cropland. Cultivated soil grows crops like rice, wheat, corn, mustard, potato, ginger, garlic, onion and varieties of pulses and vegetables. Main fruits are mango, jackfruit, banana, litchi, papaya, citrus, peach, plum, etc. In homegarden area, different

types of perennial fruits, timber, fuel wood, fodder and annual vegetable plants prevailed.

Variables of the study

The dependent variable in this study was the contribution of rural women in vegetable cultivation in homegardens. There were several characteristics of rural women that influence their extent of participation in vegetable cultivation. In the present study, characteristics of rural women selected as independent variables were age, level of education, family size, homegarden size, knowledge about vegetable cultivation etc.

Table 1: List of vegetables grown by rural women in homegarden.

Vegetable	Local Name	Botanical Name	Family
Lady's finger	Bhindi	<i>Abelmoschus esculentus</i>	Malvaceae
Onion	Piyaz	<i>Allium cepa</i>	Alliaceae
Garlic	Lahsun	<i>Allium sativum</i>	Alliaceae
Amaranthus	Chua	<i>Amaranthus cruentus</i>	Amaranthaceae
Head cabbage	Band gobhi	<i>Brassica oleracea var. capitata</i>	Brassicaceae
Brassica	Rai	<i>Brassica juncea</i>	Brassicaceae
Loose cabbage/ Cauli flower	Phool gobhi	<i>Brassica oleracea var. botrytis</i>	Brassicaceae
Chilly	Mirch	<i>Capsicum annum</i>	Solanaceae
Chenopodium	Bathua	<i>Chenopodium album</i>	Chenopodiaceae
Arbi	Gaderi/ Pinalu	<i>Colocasia esculenta</i>	Araceae
Coriander	Dhania	<i>Coriandrum sativum</i>	Apiaceae
Pumpkin	Kaddu	<i>Curcubita pepo</i>	Cucurbitaceae
Sweet gourd	Ramkerala/ Meetha kerala	<i>Cyclanthera pedata</i>	Cucurbitaceae
Potato yam	Gethi	<i>Dioscorea bulbifera</i>	Dioscoraceae
Buckwheat	Ugal	<i>Fagopyrum esculentum</i>	Polygonaceae
Bottle gourd	Lauki	<i>Lagenaria siceraria</i>	Cucurbitaceae
Luffa	Torai	<i>Luffa acutangula</i>	Cucurbitaceae
Tomato	Tamater	<i>Lycopersicon lycopersicum</i>	Solanaceae
Bitter gourd	Karela	<i>Momordica charantia</i>	Cucurbitaceae
Bean	Bean	<i>Phaseolus vulgaris</i>	Fabaceae
Pea	Matar	<i>Pisum sativum</i>	Fabaceae
Redish	Mulli	<i>Raphanus sativus</i>	Brassicaceae
Chayote	Ascus	<i>Sechium edule</i>	Cucurbitaceae
Egg plant	Baigan	<i>Solanum melongena</i>	Solanaceae
Potato	Aalu	<i>Solanum tuberosum</i>	Solanaceae
Spinch	Palak	<i>Spinacea oleracea</i>	Amaranthaceae
Snake gourd	Chichinda	<i>Trichosanthes anguina</i>	Cucurbitaceae
Fenugreek	Methi	<i>Trigonella foenum-graecum</i>	Fabaceae
Faba bean	Bakula	<i>Vicia faba</i>	Fabaceae

Data collection

Frequent surveys were conducted in some villages of Nainital district for selection of study sites. After primary survey ten villages involved in homegarden vegetable cultivation were randomly selected and in each village ten households were randomly selected for the collection of data. Thus, through random sampling method 100 rural women were selected for the study. Data for this study were collected through personal interview during May 2014 to April 2015 using questionnaire and field observation. The interviews were conducted with the respondents in their houses. After completion of data collection, responses were analyzed according to the objectives of the study. Statistical measures such as number, percentage, frequency distribution, range, rank order, mean and standard deviation were used in describing the variables of the study. The data was analysed using Statistical Package for Social Science (SPSS version 16) and tables and graphs were used for presenting the data using Excel programme.

For better understanding of comparative participation of rural women on homegarden vegetable cultivation activities a participation index (PI) was computed using the formula ⁷.

$$PI = (P_{np} \times 0) + (P_{rap} \times 1) + (P_{op} \times 2) + (P_{fp} \times 3) + (P_{rp} \times 4)$$

Where, PI= Participation index

P_{np} = Percentage of rural women with no participation

P_{rap} = Percentage of rural women with rare participation

P_{op} = Percentage of rural women with occasional participation

P_{fp} = Percentage of rural women with frequent participation

P_{rp} = Percentage of rural women with regular participation

RESULTS AND DISCUSSION

Diversity in vegetable crops

Homegarden is the dwelling place and it is the centre where all the vegetables and quick growing fruits are cultivated ^{8,9}. A variety of vegetable crops are being grown in homegardens of Nainital

Table 2: Distribution of rural women according to their characteristics

Characteristic	Category	Percentage	Mean	Standard deviation
Age	Young age(< 35)	41.30	41.96	13.32
	Middle age(36-50)	36.96		
	Old age(> 50)	21.74		
Education	Illiterate	26.09	5.75	4.30
	Primary level (I-V)	26.09		
	Higher secondary (VI-XII)	43.47		
	Higher education (under graduate/ Post graduate)	4.35		
Family size	Small (up to 4 member)	32.61	6.6	3.20
	Medium (5 to 7)	50.00		
	Large (more than 7)	17.39		
Homegarden size (ha)	Small (<0.002)	39.13	0.011	0.0012
	Medium (0.003-0.006)	26.17		
	Large (>0.01)	34.78		
Knowledge about homegarden	Poor (upto 10)	45.65	-	-
	Good (10-20)	50.00		
	Excellent (above 21)	4.35		

district (Figure 2). In rural areas of Nainital district, farmers have successfully integrated food crops like potato, leafy vegetables like spinach and fruit vegetables like pumpkin along with fruit and fodder tree in their homegarden area. Some of the cultivated vegetable species are given in Table 1. They have successfully maintained many introduced species in homegardens along with indigenous ones, leading to their integration and acquired cultural significance in the region's diverse and unique food preparation and eating habits. Most of the rural women interviewed revealed that they are aware of the role of vegetable in household nutrition. The results of the present study indicated that 30% of the total households grow vegetables only for household consumption while 70% grow for both home consumption and commercial purposes. With regard to support from governmental and non-governmental organization on vegetable production, 65% answered that they do not get any support from any organization while 35% responded that they get some services or support. The type of support received included training, planting material/ cutting and technical support.

The sources of seeds/planting materials for home gardens are largely through self maintenance, local market, office of agriculture and rural development, neighbors and relatives. The highest percentage of household (60-75%) uses their own stock. This indicates that local people still have indigenous experiences in preserving genetic diversity of traditionally known vegetables.

Contribution of rural women

The homegarden vegetables form an integral part of the family diet and a part of them enters the commercial market. Although every member of the family has some contribution, the major labour input was contributed by women. The role of women in homegarden vegetable production was found to be prominent in all the surveyed homegardens. Most of the vegetable cultivation activities viz. land preparation, nursery preparation, planting, watering and harvesting, post harvesting handling, processing etc were done by women (Figure 3), while men usually help in ploughing, fertilizer and pesticide application and marketing of

Table 3: Comparative participation of rural women in ten major activities in homegarden agroforestry with participation indices (PI) and rank order (RO).

Activity	Participation of rural					PI	RO
	Regular	Occasional	Frequent	Rare	Nil		
Transplantation	70	9	12	7	2	338	1
Decision making on	65	12	17	3	2	333	2
Processing of homegarden products	68	10	9	11	2	331	
Collection of homegarden products	62	12	10	9	7	319	4
Weeding	57	12	26	2	2	318	5
Nursery preparation	58	12	14	10	6	306	6
Land preparation	60	10	12	10	8	304	7
Watering	52	10	30	5	3	303	8
Arrangement of seeds/seedlings	38	20	19	18	5	256	9
Marketing of homegarden products	10	9	10	9	60	100	10

Table 4: Constraints faced by rural women in vegetable production.

Constraints	Respondents (%)
Time	45
Distance from market	52
Irrigation facilities	60
Availability of market	42
Availability of Capital	58
Transportation	32
Lack of knowledge	26
Shortage and lack of planting material	37
Other problems	28

homegarden products. Koopman¹⁰ and Sanyang *et al*¹¹ also reported that most of the vegetables grown in homegardens are tended almost exclusively by women and remarkably proven to be productive and critically important to nutritional and economic well being of their households¹². Based on the data 80% of the respondents reported that women had the greatest share in growing and managing vegetables in the homegardens. The role of men was only 18% and children contributed only 2%. In a rural area where malnutrition and low sufficiency of vegetables has been challenging owing to several factors, contribution of rural women (who are regarded as invisible in agricultural statistics) is appreciable.

It was reported that women play a great role in using and selling homegarden products. 67% of the total respondents from all surveyed homegardens responded that women have the highest share in making decision on the use and sale of the homegarden product while 33% said it was decided by men. This indicated that the product and income obtained from homegarden was mainly utilized for the well being and improvement of the households. Therefore, introducing better homegardening practices can bring changes in the livelihood of rural families in general and female headed households in particular.

Characteristics of rural women

Age

Age of rural women play an important role in adoption or rejection of a practice. In the

present study the age of the respondents ranged from 19 to 68 years. On the basis of age groups, the respondents were classified into three categories: young age (up to 35 years), middle age (36 to 50 years) and old age (>50 years). Data presented in Table 2 indicates that majority (40-41%) of the rural women were young aged compared to middle aged (37%) and old age category (22 %).

Education level

The range of education level of the respondents ranged from no formal education to higher education levels. The levels of the education were categorized into four groups. These were illiterate (no schooling), primary level (class I-V), secondary level (class VI-X) and higher education level (Undergraduate to post graduate) and presented in Table 2. It revealed that the highest proportion (30-44%) of the respondents had higher secondary level of education while only 4% women had higher education. The average score of educational level of the respondent was 5.75.

Family size

Family size of the rural women ranged from 2 to 12 members with an average of 6.6 having a standard deviation of 3.20 while in Bhabhar belt it ranged from 2 to 18 members with an average of 7.2 and 4.58 deviation (Table 2). The family size was classified into three categories. These were small (up to 4 members), medium (5-7 members) and large (8 and above members). Data presented in Table 1 indicated that 47% -50 % of the rural women belonged to medium size family, 30% -33 % belong to small family while 17 % - 22% belong to large family.

Homegarden size

Homegarden size of the respondents varied from 0.0004 to 0.04 hectares in hills. The average homegarden size was 0.011 hectare with a standard deviation of 0.0012. There were three categories of homegarden size viz. small, medium and large (Table 2). Data indicated that majority (39 percent) of the respondent had small homegarden.

Knowledge about homegarden

The score of knowledge on homestead agroforestry ranged from 8 to 24 against the possible range of 0 to 24 with a mean and standard deviation of 15.49 and 3.59, respectively (Table 2).



Bean (*Phaseolus* sp.)



Lady's finger (*Abelmoschus* sp.)



Colocasia (*Colocasia* sp.)



Pumpkin (*Curcubita* sp.)



Onion (*Allium* sp.)



Chilly (*Capsicum* sp.)

Fig. 2: Some vegetable crops growing in surveyed homegarden.

The respondent were classified into three categories on the basis of their knowledge on homestead agroforestry and poor (up to 10), medium (11-20) and high knowledge (>20). The distribution of the respondents has been presented in Table 2. Data presented in Table 2 show that highest proportion (52 %) of the respondent women had medium

knowledge on homestead agroforestry, belong to have high knowledge and compared to 37 % of the rural women. 11% of the respondent had poor knowledge. In our society, women gained knowledge in agricultural activities mostly from her parents before marriage and her husband after marriage. It was observed that knowledge of the housewives was

**Land preparation****Collection of manure****Plantation****Irrigation****Collection****Processing**

Fig. 3: Rural women involved in different activities of vegetable cultivation in surveyed homegardens.

medium which is quite rational because rural women are always related with some sorts of agricultural activities.

Aspect of rural women participation

Extent of participation of rural women in ten major activities of homegarden agroforestry

in Kumaun Himalayan region is given in Table 3. Computed participation index against ten activities ranged from 100 to 338. The participation of rural women in the plantation activity had highest participation index (PI= 338) and ranked 1st while participation in marketing of homegarden products had lowest participation index (PI=100) and ranked

10th. All the activities mentioned in the Table 3 are very much associated with women and they perform these activities naturally and thus participation was high.

Constraints faced by rural women

During cultivation of vegetables rural women face many problems such as lack of capital, lack of irrigation water etc (Table 4). As the rural women has to perform household activities and in hills of Kumaun Himalaya women has to spent time in collection of fodder and fuel wood from the forests, they have scarcity of time for homegarden management. In rural area, poverty is a major problem due to lack of capital. In most of the cases, farmers have no regular source of income; they face difficulty in arrangement of money. There were no proper market and farmers have to sent their homegarden vegetables to nearby market, so they are unable to sell their products in time. Most of the villages in hills are situated far away from roads, lack of transportation facility also become a major constraint. Availability of input supply, seeds, seedlings, pesticides and fertilizer etc was also affected due to distance from market and lack of transportation facility. Lack of irrigation water and dependency on irrigation water (particularly during summer) was a big constraint in vegetable production.

CONCLUSIONS

Cultivation is an important activity for providing supplementary diets as well as for income

generation. Present study recorded that rural women contributed actively in vegetable production in homegarden area. As homegardens were situated nearer to their houses as compared to agricultural field, involvement of rural women in vegetable cultivation was quite common in addition to their daily household activities. Women in farming households that are not earning salaried income can be trapped as potential growers of off-season vegetables. They will not only be converted into income earning members of the households but also as providers of the vegetables required by their households. Providing technology to rural women through training and demonstration can have significant socio-economic impacts and can help in eliminating food insecurity and alleviating poverty in their households. To help them with their genuine problems, irrigation, transportation, credit and marketing facilities should be extended to village level.

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