

Constraints Analysis in Adoption of Homestead Farming: A Case Study among Lepcha Community of Indo-Himalayan Region

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KEYWORDS Adoption. Home Garden. Traditional Farming. Indigenous Knowledge

ABSTRACT The present study was conducted at Dzongu area, North Sikkim to ascertain the constraints faced by the farmers in adoption of improved techniques related to homestead farming. Number of households with homestead garden for the survey were decided by proportionate sampling method. The data was collected from 150 respondents of five villages through personal interview method with the help of structured questionnaire and data was analyzed using appropriate tools/methodologies. Results indicated that the input quality and availability, Scientific Farming Practice and post harvest/value addition were the most serious constraints as they ranked 1st, 2nd and 3rd respectively with almost similar response from the respondents. Socio-cultural constraints ranked 4th and general constraints ranked 5th as per the farmer's response.

INTRODUCTION

Homestead farms, are generally found in high rainfall areas comprising of Kerala, NEH region of India, parts of Karnataka and West Bengal (Panwar and Chakravarty 2010; Kumar 2011; Subba et al. 2015, 2016, 2017). In today's context of population explosion coupled with pollution, environmental and land degradation and climate change necessitates, maintenance of multispecies and multistrata agroforests are need of the days. These land-use systems supplement not only production ecosystems, but also the objectives of biodiversity and environmental conservation (Smith et al. 2006; Subba et al. 2015).

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Homestead farms, the multistrata agroforests, are the oldest land use activity after shifting cultivation. Home garden are the basic production units which act as centers of social and cultural well-being of farm families (Rugalema et al. 1994) and maintained by the locally available resources and family members (Agbogidi and Adolor 2013). These gardens are not only important sources of food, fodder, fuel, medicine, spices, fruits, flowers besides supporting livestock (Galluzzi et al. 2010).

Dzongu area of North Sikkim is the part of Kanchandzonga Biosphere Reserve and reserved for indigenous Lepcha community since time immemorial (Kumar et al. 2012). Lepchas of Dzongu reserve slowly deserted hunting, gathering and slash and burnt cultivation of dry rice and started farming in nineteenth century (Jha et al. 2004). From the initial stage of cultivation, Lepchas developed agriculture, replacing shifting cultivation by more well-organized method (Bhasin 2007). The diet of Lepcha's is supplemented with plants and mushrooms, tubers and

rhizomes gathered from wild and produce grown in homestead garden such as ginger, chilies, beans, cucumber, garlic, sweet potatoes, yams and sugarcane (Pradhan and Badola 2008). Yet homestead farming is not a very successful venture in most areas. The basic and predominant reasons for the failure may be due to lack of technical or scientific know-how, unavailability of improved seeds or planting materials, ineffective soil conservation measures, value addition, processing, water harvesting and storage etc. Considering the importance of the constraints it was necessary to identify the major issues which hinder the adoption of recommended homestead farming in the study area. Therefore, the present study was undertaken with the objective of studying the constraints in adoption of homestead farming faced by the villagers in Dzongu area, North Sikkim.

METHODOLOGY

The study was conducted in five village viz. Gor, Hee-Gyathang, Lingdong, Passindong and Tingvong of Dzongu area of North Sikkim under National Agriculture Innovative Programme (NAIP-III) project. The district of North is situated 27° 31.8' N latitude and 88° 35.9' E longitude at an elevation of 3950 ft and is located at a distance of 65 km from Gangtok. The number of households with homestead garden in the villages was decided by proportionate sampling method. The respondents of each village were selected by simple random technique. Thirty (30) families from each village were selected comprising a total sample of 150 respondents from all the five villages of Dzongu Area, North Sikkim. The Lepchas are considered the original inhabitants of the state and Dzongu area of North Sikkim is the original place of the indigenous community. The area is divided into Upper and Lower Dzongu comprising of 11 villages. The 'Lepchas' were hunters, gatherers (Arora 2006; Mukhopadhyay et al. 1996; Kumar et al. 2012) and used to live completely nomadic lives. Since mid-19 century, the Lepechas started practicing settled agriculture (Jha et al. 2004). In addition to that, 'Lepchas' also grow rice, maize, millet, wheat, buckwheat, pulses, and vegetables, some parts sugarcane and fruits, with animal husbandry as another important economic activity. The communities are also maintaining a small home garden/kitchen garden for livelihood security (Kumar et al. 2012).

A questionnaire was prepared for data collection as per the objectives of the study. With the permission of the local 'Gram Panchayats' (village-level administration) extensive questionnaire survey was undertaken for collection of data. Primary data was collected through personal interviews with the villagers. Majority of respondents were aged people and head of the families. Data collected on each parameter was expressed as percent of respondents. Farmers' perceptions on constraints in homestead gardening and most valuable recommendation was recorded and converted into mean percent score and constraints were ranked subsequently as suggested by Warde et al. (1991). The constraints listed by respondents were scored on the basis of enormity of the problem as per Meena and Sisodia (2004).

RESULTS AND DISCUSSION

The major constraints (input, technical, socio-cultural, post-harvest/value addition and general) regarding management of homesteads faced by the farmers of Dzongu area of North Sikkim are summarized in Table 1. The data reveals that the majority of the respondents/households faced water scarcity during winter season (90.19%) due to lack of water harvesting facilities, poor strategies and infrastructure for water management during rainy season and ranked first among the five listed constraints (Table 1). Unavailability of quality planting material of multi-purpose trees (MPTs), fruits, improved varieties of vegetables (87.09%) was recognized as second most important constraint followed by the lack of bio pesticides, herbicides (85.36%). Non-availability of suitable plain land for homesteads nearby households (80.12%) ranked as fourth constraint. Unavailability of organic manures (56.98%) for homesteads ranked fifth amongst the constraints. Govt. of Sikkim declared the state as organic state, therefore State Department of Agriculture, Horticulture, ICAR Sikkim Center and other Non-government organizations are carrying out various trials for identification of suitable organic products for farmers. This may be the reason for unavailability of organic products in the areas.

Perusal of Table 1 revealed that the farmers were unaware about the recent technological developments and improved technologies on

Table 1: Constraints in adoption of improved/scientific techniques

S. No.	Particulars	MPS	Rank
<i>A Inputs Constraints</i>			
1.	Unavailability of quality planting materials of MPTS, fruits and Improved seed of vegetables	87.09	2
2.	Unavailability of suitable flat land for homesteads nearby households	80.12	4
3.	Lack of irrigations due to scarcity of water during winter	90.19	1
4.	Unavailability of organic manures	56.98	5
5.	Lack of bio pesticide and herbicide on being declared as organic state	85.36	3
	<i>Overall</i>	79.00	
<i>B Technical Constraints</i>			
1.	Lack of knowledge about selection of MPTS, nutritious vegetables and fruits	83.54	1
2.	Lack of knowledge about spacing between MPTS, improved varieties, seed rate and sowing time of vegetables	83.21	2
3.	Lack of knowledge about the management of major insect pest and disease	76.02	3
4.	Lack of knowledge about seed production and collection time	73.43	4
5.	Lack of knowledge about pre-sowing treatment of MPTS seed, recommended dose organic fertilizer and timely application of irrigation	70.21	5
	<i>Overall</i>	77.28	
<i>C Socio-cultural Constraints</i>			
1.	Continuous adoption of traditional system	76.03	2
2.	Fear about theft of farm produce	32.12	4
3.	Farmers tendency of non-practice until other farmers in the areas to follow the same	82.19	1
4.	Emigration of rural youth to urban areas for employment	56.98	3
5.	Lack of involvement of household women in the system	21.06	5
	<i>Overall</i>	53.68	
<i>D Post-Harvest/Value Addition Constraints</i>			
1.	Lack of knowledge and facility about preservation and processing technique of surplus produce	98.56	1
2.	Lack of transportation facility for marketable surplus	89.06	3
3.	Lack of proper storage facility for surplus produce	67.89	4
4.	Difficulty in selling of small amount of surplus produce is very difficult	32.98	5
5.	Lack of knowledge about value addition in surplus produce	90.00	2
	<i>Overall</i>	75.70	
<i>E Other Constraints</i>			
1.	Low priority for homesteads gets less priority than other activities	34.54	2
2.	Improper protection measures against chicken and goat	41.08	1
	<i>Overall</i>	37.81	

management of homesteads. Five types of constraints were faced by the farmers regarding technological constraints. Of these constraints, lack of knowledge about selection of MPTS, nutritious vegetables and fruits (83.54%) ranked first position due to inadequate knowledge about the crops as the majority of the farmers grow local trees species, fruits and vegetables in the home garden. The study showed that most of the farmers were unaware about the seed rate, sowing time and right spacing between row to row and plant to plant and was recognized as second serious technical constraint in the home garden farming. Other technical constraints identified as lack of knowledge about the management of major insect pest and disease (76.02%), lack of knowledge about seed production and collection time (73.43%) and lack of knowledge about pre-sowing treatment of MPTS seed, recommend-

ed dose of organic fertilizer and timely application of irrigation (70.21%) were ranked third, fourth and fifth, respectively. This may be due to the lack of communication and inaccessibility of area to other people as this area is reserved for Lepchas.

Farmers face different types of socio-cultural constraints during the management of homesteads in Dzongu area of North Sikkim (Table 1). More than eighty-two percent of the respondents/farmers wait till the end for the adaptation of advanced package of practices due to lack of faith on the improved techniques and hence tend to persist with traditional package of practices (76.03%). These two factors ranked first and second, respectively. Emigration of rural youth to urban areas for employment (56.98%) was the third most important constraint with lack of employment opportunity in the local area as the

Table 2: Major constraints/problem faced by farmers in adoption of homestead garden

S. No.	Particulars	MPS	Rank
1.	Timely availability of required inputs	79.95	1
2.	Technical constraints	77.28	2
3.	Socio-cultural constraints	53.68	3
4.	Post harvest/value-addition constraints	75.70	4
5.	General constraints	37.81	5

prime factor for not adopting the improved practices. Farm produce theft fear ranked fourth with 32.12 percent of the farmers while lack of involvement of women in the system was viewed positively as only 21.06 percent farmers responded that women were not interested to work and was ranked fifth.

Constraints faced for post harvest/value additions presented in Table 1 reflect that more than ninety percent respondent/farmers were unaware about the techniques or process. During the survey it was recognized that most of the respondent/farmers were keen to improve the quality of product through value addition/post-harvest, but lack of proper facility and knowledge was the major hindrance for the post-harvest/value addition. However, constraints like lack of information, absence of preservation and processing infrastructure, lack of transport facility for marketable surplus, lack of proper storage facility and marketing small amount of surplus are faced by the respondent/farmers during the value addition of the products. Of these lack of information and infrastructure for value addition and processing of surplus produce ranked top with 98.56 percent respondents. Lack of knowledge about value addition possibilities of in surplus produce with ninety percent farmers was ranked second among the post harvest/value addition constraints. Lack of transportation for marketable surplus ranked third as 89.06 percent farmers were unable to send their produce to nearby regulated market. Absence of proper storage facility was the fourth serious problem in the area. Constraint in selling of small amount of surplus produce was ranked fifth as only 32.98 percent of respondent/farmers agreed. Other constraint faced by the respondents was not a major problem as only 41.08 percent responded positive about improper management measures for chicken and goat production and homesteads given low priority than other farm activities ranked second as 34.54 percent respon-

dent/farmers responded positively for the problem. Dzongu area is far away from capital of Sikkim that is, Gangtok and road transport facility are not upto the mark in the area, and this may be the possible cause for lack of the above facility in the area.

Priority Wise Constraints

To find out the most important constraint faced by farmers and relationships amongst them, rank order was calculated and presented in Table 2. Out of all the constraints faced by the respondent in the area, timely availability of required inputs ranked first with 79.95 percent followed by technological constraints with 77.28 percent with respect to most important in homestead farming. Post harvest/value addition constraints ranked third, 53.68 percent respondents showed concern about socio-cultural constraints as this was ranked fourth whereas, general constraints ranked fifth among the major constraints faced by farmers maintaining the homesteads at Dzongu area of North Sikkim.

CONCLUSION

It was concluded from the present study that input, technical and post-harvest/value addition constraints were the most serious constraints faced by the respondent/farmers. Socio-cultural constraints ranked 4th and general constraints did not have strong influence in the area for maintaining the homestead farming. It was seen that absence of knowledge and infrastructure related to resources conservation and processing techniques of marketable surplus, lack of knowledge on value addition and water management, and unavailability of quality planting materials of MPTs, fruits and improved seed of vegetables were the major constraints reported by the farmers of the Dzongu area, North Sikkim.

RECOMMENDATIONS

1. Water harvesting structure need to be developed for regular use.
2. Forest/Horticulture nursery would be established for production of quality planting materials.
3. Marketing/value chain should be establish for improving the value of products.

4. Institutional linkage should be started to improve the availability of quality inputs.

ACKNOWLEDGEMENTS

The researchers are thankful to the sub project on 'Introduction of nursery technology for major horticultural crops' under NAIP-III project on "Livelihood Improvement and Empowerment of Rural Poor through Sustainable Farming Systems in North East India" and financial assistance from Indian Council of Agricultural Research and World Bank for carrying out the research work.

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Paper received for publication on October 2012
 Paper accepted for publication on November 2017