



Impacts of Home Gardening in Agrobiodiversity Hotspots among Small and Marginal Farm Households

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Dietary diversity and consequent nutritional security are vital for a healthy life. Changes in socio-economic conditions and commercialisation of agriculture have led long lasting changes in the land use pattern and gradual decline of home gardens in Kerala. Present paper illustrates the strategies adopted to revive home gardening in Wayanad district of Kerala. With the support of quantitative and qualitative data, this paper analyses the impacts of home gardening on small and marginal farm households in terms of ensuring dietary diversity, quality vegetables and fruits, and exercising choice of people. Study shows that home gardening increased women's status in terms of increased consumption of vegetables, exchanging seeds and vegetables with neighbours and relatives, and increased their capacity in household decision making pertained to food and diet of the family members.

Key words: Dietary diversity, Gender, social network, Nutritional security, Marginal farmers, Agrobiodiversity.

Dietary diversity is an important pre-requisite for nutritional security. One third of the global population suffer from micro-nutrient deficiency (Mason *et al.*, 2001). Micro-nutrient poor starchy staples and monotonous diet are the key factors that aggravate malnourishment in developing countries. Ironically, areas rich in agrobiodiversity are also not free from malnutrition. Ignorance about the importance of dietary diversity, economic backwardness, lack of agricultural land, access to agrobiodiversity, knowledge of locally available wild edibles or inhibition to access them, cash crop based mono-cropping system, higher market price for vegetables and other diverse food groups, increased dependence on very few food groups, etc are the main reasons for the monotonous and often unbalanced diet among the poor people even in agrobiodiversity rich areas. The rural poor of India, particularly women and adolescents, suffer from three types of malnutrition resulting: calories deprivation, protein malnutrition and micronutrient deficiency (Swaminathan, 2014).

Dietary diversity at household level depends on many interlinking factors including socio-economic status of the household, education and awareness level about dietary diversity, landholding, tenure system, biodiversity, agriculture and market. Present paper illustrates the impacts of home gardening among marginal and small farm households in Meenangadi Grama Panchayath in Wayanad district of Kerala, India, an agrobiodiversity hotspots in the Western Ghats. The home garden, as indicated in this paper, means homestead production of vegetables, tubers, fruits and other edible plant species mainly intended for household consumption.

Wayanad located in the Western Ghats, a biodiversity hotspot in India, exemplifies the 'South Asian Enigma' (Gillespie *et al.*, 2012; Ramalingaswami *et al.*, 1996) of co-existence of wealth of the nature and poverty of the people. With 17.4% of ethnic population, the highest concentration in the State, Wayanad is inhabited by diverse groups of people. Agriculture is the main source of livelihoods. Cash crops like coffee, pepper, tea and cardamom are cultivated on the hill slopes, while rice and short duration crops occupy valleys. People have accessed wild and semi domesticated species from both natural and human altered ecosystem for food and medicine. Wayanad has a rich heritage of agriculture with diverse varieties of rice, pepper, ginger, plantains and vegetable crops. However, the agrobiodiversity in this region is undergoing tremendous pressure due to extensive cultivation of cash crops, increased application of chemical fertilizers and promotion of high yielding varieties of crops (Kumar *et al.*, 2010). Erosion in agrobiodiversity and changes in cropping pattern have had long lasting changes in the dietary diversity of local communities, especially among the poor and landless households.

In 2012, M.S. Swaminathan Research Foundation has implemented a research project in Wayanad district among 1000 selected households. One of the objectives of the research project was to enhance dietary diversity to address malnutrition among the poor through effective agricultural interventions and other related means. Both food based and knowledge based approaches were adopted to ensure nutrition security of local communities. Food based approach included promotion of home gardens, backyard poultry, home based fish farming,

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and crop diversification. Knowledge based approach included awareness generation about the importance of dietary diversity, anaemia, nutritionally rich foods, best practices and behavioural changes to address malnutrition, and demonstration of cooking practices.

The article illustrates the strategies adopted for ensuring home gardens and the resultant outcome and initial impacts of vegetable gardening amongst the small and marginal farming communities in Wayanad district of Kerala State.

Materials and Methods

Data collection

The study relied on both quantitative and qualitative data. Two sets of quantitative data were collected and analysed. The first set of data was collected in the year 2012 from 1000 households in the project area. The selected households spread across to 31 hamlets. The survey covered all basic information, including socio-economic and demographic profile, agriculture, food and livelihoods details of the selected households. Socio-economic details of the sample households are given in table 1. A prior informed consent was obtained for collecting information.

The second survey was conducted in the year 2015 among randomly selected 250 families from 1000 households. The survey was focussed on eliciting information pertained to the impacts of various developmental interventions undertaken by the implementing agency. Prior informed consent was also obtained for collecting information from the selected households (Table 1).

Apart from the survey methods, the present study also relied on focus group discussions (FGDs) and key informant discussions with the stakeholders of vegetable gardening. In order to ensure fair participation of all social strata and gender, FGDs were conducted both separately, with each stratum and together with different strata. Nine FGDs were conducted in the intervention village. The number

of participants varies from seven to eleven for each FGD. The participants are not strictly from the selected 250 households, but there were fair representation from these households. Key informant interviews were conducted among men and women belonging to different socio-economic categories. 12 such interviews conducted as part of this study.

Study area

The study was conducted in *Meenangadi* Grama Panchayath in Wayanad district. The Panchayath is spread over 53.51 sq.km. As per the latest survey conducted by volunteers of ICDS, there are 8786 households in *Meenangadi* (*Meenangadi Grama Panchayath*, 2012). The total population is 34601 (men 17356 and women 17245). There are 1886 tribal households and 267 Scheduled caste households in *Meenangadi*. Major tribal communities include the *Kurumas*, *Paniyas*, *Kattunaikkas* and *Urali* tribes. The *Kurumas* hold land and agriculture is their major livelihood options. The *Paniyas* are the landless tribal communities depending on wage labours. The *Kattunaikkas* and *Uralis* are marginal landholders and depending more on wage labour (Fig. 1).

Agriculture is the main source of income for the people. Major crops include coffee, areca nut, rice, banana, ginger, coconut and pepper. Pepper was the major crop in terms of area under cultivation until recently. Pepper cultivation has been facing lots of setbacks due to pest and disease attack. Perennial cash crops like coffee, areca nuts *etc.*, stand ahead in terms of area under crop. Major food crops are paddy, vegetables, banana and yam (Table 2).

Results and Discussion

Strategies and process followed to promote home gardens

Understanding the issues and challenges in maintaining vegetable gardens

The first step was to identify and understand issues and challenges in nurturing home gardens through a household survey. Space constraints, lack

Table 1. Socio-economic details of sample households

Land size (in Acre)	General	Backward caste	Scheduled caste	Scheduled Tribes	Total
Landless (0-0.05)	6	31	8	51	96
Marginal (0.05-2.5)	29	47	1	53	130
Small (2.5-5)	12	5	0	4	21
Medium (5-25)	2	1	0	0	3
Total	49	84	9	108	250

Source: Baseline Survey, 2011 (APM/MSSRF)

of quality seeds, competition from profitable alternate crops, attack from pest like crabs and chicken, lack of knowledge in home gardening, especially pest and disease management *etc.*, were some of the major issues raised by households during the initial stages of the implementation of the project.

As a strategy to address their doubts and concerns, series of awareness programmes were conducted in different parts of the study areas focussing mainly on women to emphasise the importance of vegetable gardens in the dietary diversity and nutritional security of households.

This was followed by house visits by project staff members to discuss individual household constraints. To households interested in raising a home garden, quality seeds, protection net, training and capacity building in vegetable gardening, and timely agro-clinic support for protection from pest and diseases was ensured to encourage in the initial stages.

Table 2. Land use in Meenangadi panchayath

Category	Area (ha)	% area
Total geographical area	5351	100
Total cropped area	4104.5	76.7
Wetland area	615	11.4
Miscellaneous	411	7.6
Wasteland area	0.5	0.01
Forest area	145	2.7
Rocky area	75	1.4

Source: Meenangadi Grama Panchayath, 2004

Sustained capacity building, inclusion of landless and appropriate and timely support for nurturing home gardens

Even though there was an initial resistance to start home gardens, there was a significant jump in the number of households adopting vegetable gardens through sustained awareness programmes as is illustrated in Table 1, where the number of households nurturing a home garden increased from a mere 4 to 788, an increase within three years. The other notable feature has been the diversification of species wherein the households are nurturing a wider range of tubers and fruit trees (Table 3).

Table 3. Number of households that initiated home gardens

Year	No. of HHs that initiated vegetable gardens	No. of species	
		Tubers	Fruit trees
2011	04	-	-
2012	460	24	457
2013	788	46	598

N=1000

The area for vegetable garden varied from just one cent to three cents depending on the availability of land. Towards inclusion of the socially and economically marginalised sections, Landless and marginal landholding households were also included in the initiative by providing them with polythene bags for growing vegetables.

Ensuring diversity of vegetables and fruits to meet year round demand

With the aim of increasing the diversity in the food choices of the people to ensure intake of adequate nutrition, effort was on growing wide variety of fruit trees, leafy greens, tubers and varied vegetables to ensure the availability of vegetables throughout the year. Both traditional and high yielding varieties were promoted for cultivation on the basis of demand from

the households. Table 4 shows the details of different vegetables cultivated in their home gardens.

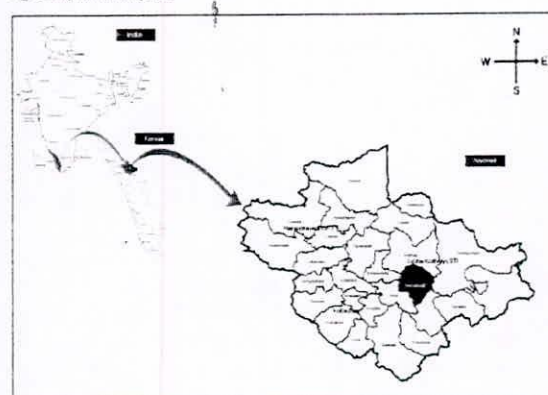
Table 4. Diversity of vegetable crops promoted in the vegetable gardens

Vegetable crops	Fruit trees	Leafy greens	Tubers
ash gourd, bitter gourd, snake gourd, bottle gourd, pumpkin, okra, chili, brinjal, tomato, beans, cowpea, cauliflower	guava, papaya, gooseberry, drumstick, jackfruit, banana	amaranthus, cabbage, drumstick, pumpkin	sweet potato, radish, beetroot, coleus, yams and taros like dioscorea and colocasia

b. Impacts of home gardens

An impact assessment survey was conducted amongst randomly selected 250 households. The survey showed that home gardens have had an impact on the quantity and quality of food consumed. 74.8 per cent of sample households benefited by consuming more green leafy vegetables as a result of establishing home gardens, while 67.2 per cent families were able to benefit from the fruit trees planted and 24 percent families reported increased consumption of roots and tubers (Fig 2).

Fig 1. Map of the study area

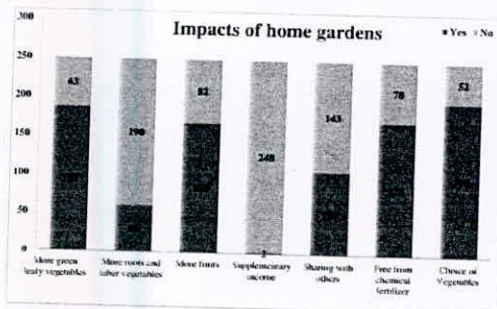


Sharing of food among neighbours is a common practice and as a result of the home gardens, households were able to share their excess harvest of vegetables with their neighbours and relatives thus, leading to an increase of the supplementary income of households. 42.8% families opined that they could share vegetables with their neighbours and relatives and thereby increased their bonding with others (Fig 2).

Another major impact of the home garden has been the sense of freedom from consuming pesticide laden fruits and vegetables purchased from the markets. People are of the opinion that the vegetables available in the market are usually contaminated by chemical pesticides as opposed to those harvested from the home gardens as they are chemical free. Of the 250 households surveyed, 68.8 percent of households opined that they are able to access chemical free vegetables for consumption (Fig 2).

Choice in the fruit and vegetables consumed are most often the result of many limiting factors like high price and sometimes even availability in the local markets. But with the intervention of the home gardens, around 80 percent of the households are of the opinion that establishment of home gardens helped to a greater extent to increase their choice over vegetables. However, establishment of home gardens has an insignificant impact on household income, even though they could save the money earlier spent to purchase vegetables from the market.

Fig. 2. Impacts of Home Gardens on diversified diets, supplementary income, choice of chemical free vegetables



Source: Impact Assessment Survey, June-July, 2014 (APM/MSSRF)

c. Gendered impacts of home gardening

Home gardens are the exclusive domain of women who decide what to plant, where to plant, when and how much quantity to harvest, inputs to be used, make decision on sales or exchange with neighbouring households, exchange seeds and manage the crops on day to day basis (Oakley and Momsen, 2005; Finerman and Sackett, 2003). Though generally vegetable gardens tend to focus more towards women under the impression that they are responsible for the household nutrition security, the research project impacted gender in a much deeper manner, as the capacity building efforts did not just confine to women as mere trainees but strived to build their capacity to make informed choices.

Establishment of vegetable gardens helped to increase women's choice on vegetables

Finerman and Sackett (2003) observed that by ensuring adequate supply of vegetables and other food plants, home gardens provide freedom from dependence on vendors and neighbours for food. Women in the intervention villages opined that they enjoy freedom from market and exercise their choices over vegetables after establishing home gardens. Earlier, the women in the households could cook only what was available in the market and what was purchased by their husbands who went to the market, but this has changed due to the establishment of vegetable gardens through which women are making their choices of what to cook and what ingredient to use, making use of their new knowledge of a well balanced nutritious diet. On the impacts of vegetable gardening, Mrs Thankam from Meenangadi Panchayath, one of the women who established vegetable garden says; "Decision on what to prepare, how to prepare and how much

to prepare- is now in my domain after establishing vegetable garden. Earlier it was a restricted choice based on the market price and the preference of my husband who buy food stuffs for the household. Thanks to vegetable garden, whether it is Sambar (a traditional curry made of pulse and vegetables) or Aviyal (a traditional preparation made out of multiple vegetables), today I can satisfy the preferences of my children and also provide the family with healthy food".

Established social network and sharing of produces and seeds by women in the neighbourhoods

Social networks especially in rural areas are helpful in supporting families and though such networks may continue in a traditional manner, home gardens also have helped to establish strong social network among women in the neighbourhood. Women were of the opinion that sharing vegetables amongst themselves firstly increased their confidence and secondly strengthened the mutual bonding, to help each other during emergencies or food shortage. Mutual sharing of vegetables also helped increase their access to diverse food groups from their neighbours and relatives instead of quality vegetables. Revival and strengthening of social network in rural areas has significantly increased the level of confidence among women. The women, who benefited from vegetable gardening, encouraged their relatives and well wishers in the neighbouring villages to go for vegetable cultivation by sharing seeds and the knowledge related to cultivation practices.

Changes in gender roles

Earlier, vegetable cultivation at household level was confined to women with no support from the family, but due to the recognition of the benefit of home gardens, family members including men and children have begun to work on the home gardens lightening the burden of the women. Women feel a prestige by contributing to the diet of the family.

Increased consumption of vegetables by women and children

A well established understanding is that women and children especially the girl child do not consume healthy nutritious food due to cost and availability. As a result of the home gardens, the production of vegetables at household level increased the per capita consumption of vegetables in the family. Annual vegetable consumption per household in the intervention villages increased from 26.4 kg to 96 kg. The benefits of production reached all members, especially women and children who are more susceptible to debilitating disorder like anaemia. Women and children have restricted opportunities to eat away from home while men utilise their chances to eat from workplace or hotels and thereby ensuring at least some dietary diversity when compared to women and children in their family. Establishment of vegetable gardens, however, helped women and children consume diverse diets that included vegetables and fruits in adequate quantity.

Revival of vegetable seed systems

Establishment of vegetable gardens and training in seed selection, seed treatment and storage etc., has helped women revive the vegetable seed system among themselves; a tradition that is gradually disappearing with the decline of home gardens and vigorous establishment of cash crops where women had minimal or no role to play except as labourers. Thus, the revival of this traditional practice as also paved the way for sustainability of home gardening in the project area, as women have greater stakes to preserve and exchange seeds.

Conclusion

Home gardening is not a new concept in Kerala or specifically in Wayanad, where couple of years back a complete meal could be cooked by picking vegetables from their own backyards. But gradually due to a combination of varied factors, establishment and nurturing of home gardens was neglected. As a result, the people faced increasing challenges in meeting their food and nutritional needs that was inexpensive, diverse, locally available and safe.

The project addressed the challenges faced by local community in establishing vegetable gardens, created awareness about the importance of vegetable gardening and invested in building their capacity in vegetable cultivation, pests and disease management, seed selection and storage, and good cooking practices that minimises the loss of vitamins. Apart from ensuring dietary diversity, this intervention established processes and practices to ensure sustainability of vegetable gardening even in the absence of promoting agencies through reviving local seeds system. Dietary diversity is an important factor for achieving nutritional security and household well being. Home gardens are best example of gender equitable access over dietary diversity and household well being with gender equity.

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