



# Assessment of the contribution of home garden and its component on household income and home garden income of disadvantaged groups (DAGs) in Jhapa district of Nepal

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**Abstract**— Nepalese agriculture is subsistence based and furthermore, farms are getting smaller and subsistence farm families are on the rise. Home garden, traditional land use system around a homestead, where several species of plants are grown along with livestock. Home garden provides fruits and vegetables to the household with direct access to important nutrients that may not be readily available or within their economic reach. A study was conducted in three VDCs of Jhapa namely; Dharampur, Dangibari and Dhajjan to assess the contribution of home garden to total household income. The study revealed that among the three VDCs total own land, total plant species, were found significant and others were not significant. Mean of total plant species was found 42 and significant ( $P=0.5$ ) among the VDCs. The home garden contribution on annual household income was 19.23% and livestock component was identified as most profitable component as it contributes 50.92% of home garden incomes followed by vegetable component (25.02%). The total household income was found higher in home garden practitioner compared to the non-practitioner household but it was not statistically significant. It was found that the mean annual income from home garden was NRs 37697.24 in practitioner household and significant ( $P=0.05$ ). Among the home garden components the annual income was found highest in livestock component (NRs. 19197.77) followed by vegetable component (NRs. 9434.44). The annual income from home garden components such as vegetables, fruits and livestock components were found significant and higher in practitioner household whereas annual income from poultry and other component was not significant and higher in non-practitioner household. The research suggested to promote home garden in order to increase the food security situation and income of the farmers.

**Keywords**— Agriculture, Home Garden, Income, Practitioner, Food security.

## I. INTRODUCTION

Agriculture is the largest economic sector employing 65.7 percent of economically active population and sharing 35.1 percent in the GDP (MoAD, 2013). Nepalese agriculture is subsistence based and furthermore, farms are getting smaller and subsistence farm families are on the rise. Three types of interventions are commonly employed to improve micronutrient status, namely: capsule and tablet supplementation, fortification of commonly consumed foods, and diet diversification. Diet diversification is

arguably the most sustainable and affordable strategy to improve nutrition for the majority of the population particularly the poor. For poor households, vegetables and fruits are often the only source of micronutrients in the family diet. Home garden, traditional land use system around a homestead, where several species of plants are grown along with livestock and maintained by household members and their products are primarily intended for the family consumption (HKI, 2001; Mictchell and Hanstad, 2003). Home garden provides fruits and vegetables to the household with direct access to important nutrients that

may not be readily available or within their economic reach. Home garden is one of the most complex and diverse agro-ecosystems worldwide. Home garden systems have existed for millennia (Kumar and Nair, 2004; Soemarwoto and Conway, 1992) in many tropical regions, where they played an important role towards the development of early agriculture and domestication of crops and fruit trees, a still ongoing process (Kimber, 1978; Miller and Nair, 2006; Ninez, 1987; Smith, 1996).

Therefore, home gardening would be a good means to improve household food security. Equally important, home gardening has been shown to be a source of additional income, because the household can sell a portion of the garden's produce. The home garden, literally known in Nepali as *GharBagaincha*, refers to the traditional land use system around a homestead, where several species of plants are grown along with livestock and maintained by household members and their products are primarily intended for the family consumption (Shrestha *et al.*, 2002). In Nepal, 72% of households have home gardens of an area 2-11% of the total land holdings (Gautam *et al.*, 2004). The current research highlights the contribution of home garden to total household economy.

## II. MATERIALS AND METHODS

Table 1. Distribution of the home garden practitioners by family type

Type of family	Name of VDCs			Total (N=90)
	Dharampur (n=30)	Dangibari (n=30)	Dhaijan (n=30)	
Joint	18(20.0)	11(12.2)	21(23.3)	50(55.6)
Nuclear	12(13.3)	19(21.1)	9(10.0)	40(44.4)
Total	30(33.3)	30(33.3)	30(33.3)	90(100.0)

Source: Field survey, 2013

Figures in parenthesis indicate percentage

$\chi^2$ - value 7.110 at 2 df ( $p=0.029$ )

### Land holding characteristics

The mean size of land holdings of the home garden practitioners was higher in Dangibari (23.61 kattha) followed by Dharampur (10.13 kattha), whereas the mean

Home garden approach is a group based inclusive intervention which intends to contribute household food security and family nutrition through homestead agro-biodiversity management. The study was conducted in three VDCs of Jhapa district to analyze the effectiveness of home garden approach for household food security and socio-economic empowerment of disadvantaged people. Both descriptive and analytical survey design was used for this study. Altogether 120 respondents (40 respondents from each VDC) were randomly chosen. Descriptive statistics, one way ANOVA test, chi-square tests were employed to address the objectives set forth.

## III. RESULTS AND DISCUSSION

### Distribution of home garden practitioners by family type

Home garden practitioners were classified on the basis of the family type such as joint and nuclear. The study revealed that majority of the household was under joint family system (55.6%). Among the three VDCs, Dhaijan had the highest percentage of joint family (23.3%) followed by Dharampur (12.2%). Nuclear family type was found highest in Dangibari VDC (21.1%) followed by Dharampur VDC (13.3%). The distribution of home garden practitioners by family type is statistically significant ( $p=0.029$ ) across the VDCs (Table 1).

land holding under home garden was also higher in Dangibari (2.25 kattha) followed by Dhaijan (2.12 kattha). The maximum land holding was 60 kattha whereas the minimum was found 0.5 kattha; moreover, the maximum land holdings under home garden were 8 kattha and minimum 0.2 kattha in the study area (Table 2).

Table 2. Distribution of home garden practitioner based on land holdings in the study district

Name of VDCs	Mean	St. Deviation	Maximum	Minimum
Dharampur				
Total own land (Kattha)	10.13	9.81	40	1
Home garden size (Kattha)	1.64	1.12	6.0	0.2
Dangibari				
Total own land (Kattha)	23.61	15.35	60	0.5
Home garden size (Kattha)	2.25	1.67	8.0	0.5
Dhaijan				
Total own land (Kattha)	7.15	5.54	20.0	1.0
Home garden size (Kattha)	2.06	1.08	6.0	1.0
Total				
Total own land (Kattha)	13.63	13.04	60.0	0.5
Home garden size (Kattha)	1.98	1.32	8.0	0.2

Source: Field survey, 2013

From this study it was evident that average home garden size was 14.52 % of average total land holdings which is slightly higher than the findings of Gautam *et al.*, 2004 i.e. 72% of households have home gardens of an area 2-11% of the total land holdings and smaller than the findings, it occupies 20% of the total arable land (Jensen, 1993). The variation in such result may due to differential socioeconomic character.

#### One-way ANNOVA analysis of socioeconomic characteristics and income distribution of home garden practitioners

Different socio-economic parameters were analyzed among three VDCs using one way ANNOVA test. The variables such as total own land, area under home garden, total plant species, years of schooling, income from

different components, annual household income were analyzed. Among the three VDCs total own land, total plant species, were found significant and others were not significant. The value from Duncan's test helps in the determination of homogeneity of the variables. Mean total own land was found 13.63 kattha and significant ( $P=0.01$ ) among the VDCs, and on homogeneity test total own land of Dharampur and Dhaijan fall in same category, whereas total own land of Dangibari falls on other category. Mean of total plant species was found 42 and significant ( $P=0.5$ ) among the VDCs. Further, on homogeneity test total plant species of Dangibari and Dhaijan fall under one category, whereas total plant species of Dharampur falls under another group. Although, there is variation of income across the VDCs, but was not significantly differ (Table 3).

Table 3. VDC wise socioeconomic characteristics and income distribution of home garden practitioner using one way ANNOVA

Variables	Total Average (N=90)	Dharampur (n=30)	Dangibari (n=30)	Dhaijan (n=30)	F- value
Total own land (kattha)	13.6333	10.1333 <sup>a</sup>	23.6167 <sup>b</sup>	7.1500 <sup>a</sup>	19.100***
Total own land under home garden (kattha)	1.98	1.642	2.250	2.067	1.678
Total plant species	42	47 <sup>a</sup>	45 <sup>b</sup>	34 <sup>b</sup>	3.55**
Year of schooling	7.04	7.4	7.4	6.26	.931
Income from poultry component (NRs)	5465.9	6500	4850	4428.6	.472

Income from fruit component (NRs)	4200	2370.6	3156.2	5907.1	2.017
Income from livestock component (NRs)	21597	13260	22607	28270	2.372
Income from other component (NRs)	8183.4	8370.6	13706	4115.5	.601
Income from vegetable component (NRs)	9873.3	7976.7	10115.4	11560	0.834
Home garden annual income (NRs)	37697.24	29446.67	37278.36	46366.7	1.778
HH annual Income (NRs)	195419.1	193579	169116.7	223500.0	1.109

Source: Field survey, 2013

\*\*\* Significant at 1% level, \*\* significant at 5 % level

### Home garden and its component contribution to income

#### Contribution of home garden and its components on annual household income

As different components are integrated on home garden, its profitability in terms of income generation is

worthwhile to be noted. In this perspectives attempt was made to identify the most profitable component. From the study it was evident that the home garden contribution on annual household income was 19.23% and livestock component was identified as most profitable component as it contributes 50.92% of home garden incomes followed by vegetable component (25.02%) (Table 4).

Table 4. Contribution of home garden and its component on household income and home garden income

Particulars	Annual income (NRs)						
	Household	Home garden	Vegetable	Fruit	Livestock	Poultry	Other
Mean	196025.56	37697.20	9434.44	2846.60	19197.70	2672.22	3546.10
St. Dev.	141182.24	35082.10	10737.80	5553.40	24927.40	5257.50	13682.10
Percentage contribution		19.23 <sup>#</sup>	25.02 <sup>##</sup>	7.55 <sup>##</sup>	50.92 <sup>##</sup>	7.08 <sup>##</sup>	9.40 <sup>##</sup>

Source: Field survey, 2013

<sup>#</sup> Home garden contribution on annual household income

<sup>##</sup> Component contribution on home garden annual income

### Home garden and its contribution on household income

The total annual household income; income from home garden and income from home garden components were analyzed in home garden practitioner and non practitioner household and mean was compared.

The total household income was found higher in-home garden practitioner compared to the non practitioner household but it was not statistically significant. It was found that the mean annual income from home garden was

NRs 37697.24 in practitioner household and significant (P=0.05). Among the home garden components the annual income was found highest in livestock component (NRs. 19197.77) followed by vegetable component (NRs. 9434.44). The annual income from home garden components such as vegetables, fruits and livestock components were found significant and higher in practitioner household whereas annual income from poultry and other component was not significant and higher in non practitioner household (Table 5).

Table 5. Annual household incomes from different sources

Annual HH income	Home garden practitioner (n=90)	Non practitioner (n=30)	Mean Difference	t-value
Total HH income (NRs.)	196025.56	168873.33	27152.22	0.987
Home garden annual income (NRs)	37697.24	19463.34	18233.91**	2.593
Annual home garden income from vegetable (NRs)	9434.44	2723.33	6711.11***	3.375
Annual home garden income from fruit (NRs)	2846.66	1166.66	12297.77*	1.631
Annual home garden income from livestock (NRs)	19197.77	6900.0	12297.77***	2.660
Annual home garden income from poultry component (NRs)	2672.22	3033.33	-361.11	-0.289
Income from other component (NRs)	3546.13	5640.0	-2093.86	-0.550

Source: Field survey, 2013

\*\*\* Significant at 1% level, \*\* significant at 5 % level, \* significant at 10%

Study revealed that home gardens adoption had positively contributed to income generation which is similar to the findings of Calvet *et al.* 2012 and Vassey, 1985 that is home garden contribute to income generation, improved livelihoods, and household economic welfare as well as promoting entrepreneurship and rural development.

#### Sufficiency of home garden products on household requirement

Home gardens, with their intensive and multiple uses, provide a safety net for households when food is scarce. To analyze duration of food supply by home garden, duration of time was categorized as year round, 9-12 months, 6-9 months, 3-6 months and 0-3 months. On

study, 85.6% home garden practitioner responded that a vegetable produced under home garden was sufficient for more than 6 months. Furthermore, 71.1% and 48.9 % respondent agreed that fruit produced under home garden and animal protein derived from home garden is sufficient for only 0-3 months.

Table 16. Sufficiency of home garden components on household requirement

Components	Sufficiency				
	Year round	9-12 months	6-9 months	3-6 months	0-3 months
Vegetable	23(25.6)	27(30.0)	27(30.0)	11(12.2)	2(2.2)
Fruit	2(2.2)	6(6.7)	9(10.0)	9(10.0)	60(71.1)
Animal protein requirement	6(6.7)	7(7.8)	19(21.1)	14(15.6)	44(48.9)

Source Field survey, 2013

Figures in the parenthesis indicate percentage

From the study it was found that home garden plays important role on year round supply of food particularly vegetables which is consistent with the finding of (Budowski, 1990; Eiblet *et al.*, 2000). According to Budowski, 1990 and Eiblet *et al.* 2000 home gardens are very important for supplying the household with food products year-round.

#### IV. SUMMARY AND CONCLUSION

The distribution of home garden practitioners by family type is statistically significant. The mean size of land holdings of the home garden practitioners was higher in Dangibari (23.61 kattha) followed by Dharampur (10.13 kattha), whereas the mean land holding under home garden was also higher in Dangibari (2.25 kattha ) followed by

Dhaijan (2.12 kattha). From this study it was evident that average home garden size was 14.52 % of average total land holdings. Mean total own land was found 13.63 kattha and significant ( $P=0.01$ ) among the VDCs, and on homogeneity test total own land of Dharampur and Dhaijan fall in same category, whereas total own land of Dangibari falls on other category. Mean of total plant species was found 42 and significant ( $P=0.5$ ) among the VDCs. From the study it was evident that the home garden contribution on annual household income was 19.23% and livestock component was identified as most profitable component as it contributes 50.92% of home garden incomes followed by vegetable component (25.02%). The total household income was found higher in home garden practitioner compared to the non-practitioner household but it was not statistically significant. Mean annual income from home garden was NRs 37697.24 in practitioner household and significant ( $P=0.05$ ). Home garden plays important role on year round supply of food particularly vegetables

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### AUTHORS' CONTRIBUTIONS

B. Prasai conducted research and wrote the paper. D. Devkot, K.K. Pant, and R.H. Timilsina revised and finalized the paper.

### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding publication of this manuscript.

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