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ORIGINAL ARTICLE

Homegardening for Food Security and Income Generation of War Affected Women-headed Families: A Case Study in *Cheddikulam*, Northern Province of Sri Lanka

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Abstract

The most fundamental social benefit of homegardening (HG) is its direct contributions to rural livelihood development. HG was introduced in the post-war era as a sustainable approach to ensure food security and income generation for unemployed women-headed families in *Cheddikulam* Divisional Secretarial (DS) division, of the Northern Province of Sri Lanka to mitigate the effects occurred due to lasted civil war in the area. A limited number of studies has been conducted to evaluate the role of homegardening on income generation while ensuring the food security of the selected households. Hence, this study was conducted to assess the role of HG on income generation and food security level of women-headed families in *Cheddikulam*. Hundred (100) home-gardening and 30 non-home gardening women-headed families in the DS division were randomly selected. Primary data were collected through pre-tested questionnaire, key person interviews and, focus group discussions from January to end of February 2019. Data were analyzed quantitatively and qualitatively. Results revealed that women-headed families earn an average monthly income of Rs. 4783.00 from homegardening, which is contributing 24% to their average monthly household income of Rs.20000.00. Average monthly household income of non-home gardeners is Rs.17000.00. Further, household dietary diversity score (HDDS) elicited a significant difference (*p= 0.047*) between the two groups as it was 7.31 for homegardeners, while 6.46 for non-home gardeners. Sixty-six percent (66%) of homegardeners and 47% non-home gardening families were characterized as a food secured (HDDS>6.5). Results conclude that homegardening plays a greater role in ensuring the food security and income generation of women-headed families in *Cheddikulam* area. Thus, introducing homegardening practice with a proper and continuous monitoring program to other potential rural localities would be a worthy investment for ensuring food and income security of rural livelihoods in Sri Lanka.

Keywords*; Food security, homegardening, Household Dietary Diversity Score (HDDS), income generation, women-headed families*

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1. Introduction

Homegardening has a great history in many tropical countries such as Sri Lanka, China, and Indonesia. Homegardens mainly consist of trees, shrubs, vines, and herbaceous plants, which are maintained by members of the household adjacent to a homestead or home compound (Nair et al. 1993). Home gardens play a fundamental part of local food systems, mainly in developing countries through facilitating direct access to a variety of nutritionally rich foods including roots & tubers, leafy vegetables, legumes, fruits and livestock products (Musotsi et al. 2008).

The most fundamental social advantage of homegardening is its direct contribution to ensuring household food security via increasing availability, accessibility, and utilization of quality food products. Food items from homegardens contribute substantially to the family energy and nutrition needs on a continuous basis (Galhena et al. 2013).

The economic benefits of homegardens go beyond food and nutritional security and subsistence, especially for resource-poor families. Bibliographic evidence emphasises that homegardens contribute to income generation, improved livelihoods, and household economic welfare as well as promoting entrepreneurship and rural development (Sthapit et al. 2003).

Food security is one of the Millennium Development Goals (MDGs) and for successful accomplishment, a country has to facilitate nutritionally satisfactory and safe food supply at both national and household levels. In addition, a country should sustain the continuous supply and access by each household to food sources to meet the needs of all (Latham and Beaudry 1999). However, food security of the rural livelihoods, especially in the Northern Province of Sri Lanka was affected by the prolonged civil war.

Sri Lanka recovered from this civil war in 2009 that disturbed the country's social, agricultural, environmental, and economic well-being for nearly three decades.

Realizing food security and income generation were the immediate necessities and also a major challenge for the Northern Province. The problems of food insecurity are highly affected by the wellbeing of the population of Northern Province. Such problems are severe in especially f marginalized groups, those who live in newly settled post-conflict areas in the North and East (Galhena et al. 2012). In order to address the issues related to the income generation and food security, multiple strategies are a compulsory requirement. As an internationally accepted phenomenon, homegardening has been documented as a

well-known strategy that is widely adopted and practiced by rural communities with limited resources and institutional support (Johnson-Welch et al. 2000).

Homegardening was introduced by several non-governmental organizations (NGOs) together with the Department of Agriculture, in 2011, as a supportive strategy to strengthen the income generation and food security levels of women-headed families in *Cheddikulam*. However, there is no proper study on assessing the contribution of homegardening for household food security and income generation from homegardens in this area. Therefore, this study was conducted to evaluate the contribution of homegardening for household food security and the income generation of women-headed families in *Cheddikulam,* Sri Lanka.

2. Materials and Methods

2.1. Study Area

The study was carried out in Cheddikulam divisional secretariat (DS) division situated in the low country dry zone. Administratively, Cheddikulam is in Vavuniya district in the Northern Province of Sri Lanka (Fig. 1). The population of Vavuniya district was reported as 181,051 in 2017 (Statistical Information, Northern province, 2017). Cheddikulam DS division comprised of 20 Grama Niladhari (GN) divisions. Among them, 9 GN divisions were randomly selected for the study.

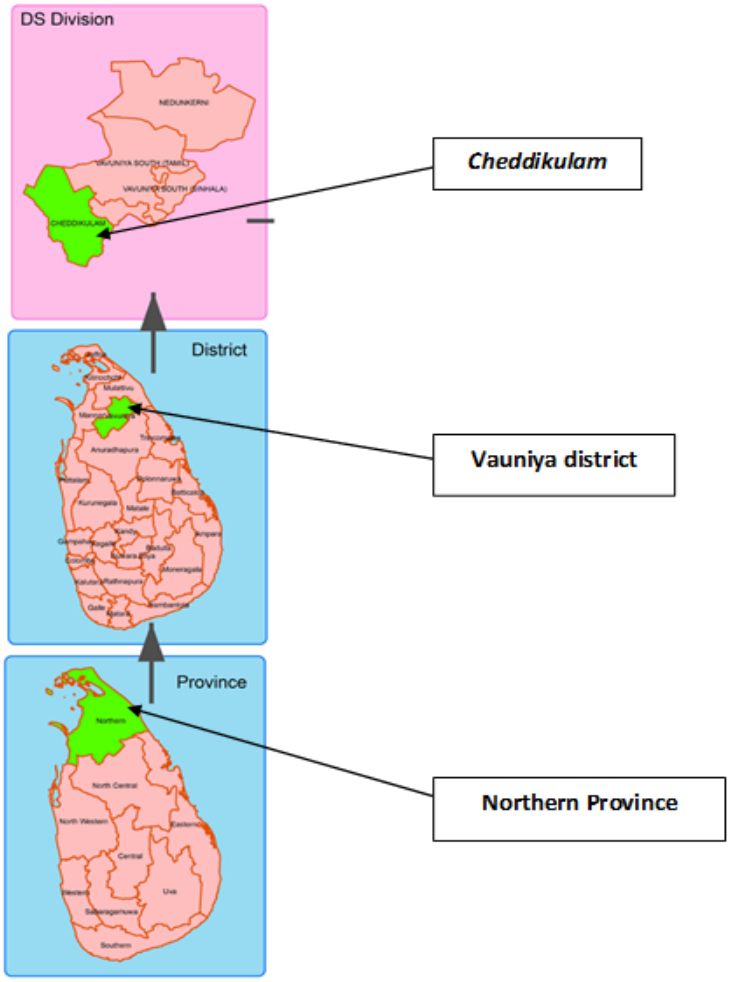

Figure 1: Location of the Study

Source: World atlas, accessed Feb, 2019

2.2. Study population

The population of the study comprised of 100 home gardening women-headed families and 30 non-home gardening women-headed families in *Cheddikulam* DS division.

2.3. Sample Selection

Hundred (100) home gardening women-headed households were selected from the list, maintained by NGOs and the Department

of Agriculture officials in the area, using random sampling method. A pilot survey was conducted by the research team one month prior to the data collection in order to obtain an understanding of the existing population of the area. Since pilot survey proved homogeneity of non-home gardening households and hence only 30 non-home gardening women-headed households were selected for this study from 9 GN divisions in Cheddikulam, DS division.

2.4. Data Collection and analysis

Data were collected using a structured pre-tested questionnaire. The questionnaire addressed both quantitative and qualitative aspects related to the food security of households and income generation due to home gardening.

Household Dietary Diversity Score (HDDS) was measured based on food consumption information within the recall period of the last 24 hours to assess the food security level of women-headed families. For the calculation of HDDS, 12 food groups were considered including cereal grain staples, roots and tubers, vegetables, fruits, meat, eggs, fish, pulses and nuts, dairy products, oils and fats, sugar, and condiments. (Swindale and Bilinsky 2006). Each food group is assigned a score of 1 (if consumed) or 0 (if not consumed). Then the household score will range from 0-12 and is equal to the total number of food groups consumed by the household:

Sum (A + B + C + D + E + F + G + H + I + J + K + L)

The average household dietary diversity score for the population of study can be calculated as follows:

$$\text{Average HDDs} = \frac{\sum HDDS\ of\ households}{\text{Total number of households surveyed}}$$

Collected data were analyzed using descriptive statistics using the SAS software version 9.0. The Pearson Correlation Coefficient was then applied to determine the relationship between home gardening land size and income level.

3. Results and Discussion

3.1. Role of Home Gardening on Food Security Level of Women-Headed Families in Cheddikulam

Both home gardeners and non-home gardeners consumed twelve food categories. Among them cereals, other starchy foods, vegetables, pulses/legumes and nuts, milk and milk products, oil and fats and sugar, and beverages are the highly consumed food groups. Least consumed food groups are green leaves, fruits, meat, eggs, fish and seafood (Fig. 2).

The HDDS is explained as the number of unique foods consumed by household

members over a concerned time period and recognized as a useful approach for measuring household food security in terms of access. Higher dietary diversity among both home gardeners and non-home gardeners was observed since mean HDDS was recorded as 7.31 for home gardeners and 6.46 for non-home gardeners. Results of the statistical analysis elicited a significant difference of HDDS between two groups (Test results <0.05; p= 0.0471). Majority of home gardening households consumed at least 5- 9 food types per day while non-home gardeners consumed 5 food categories per day (Fig. 3). This is mainly due to the improvement of access to different food sources through diversified crop cultivation.

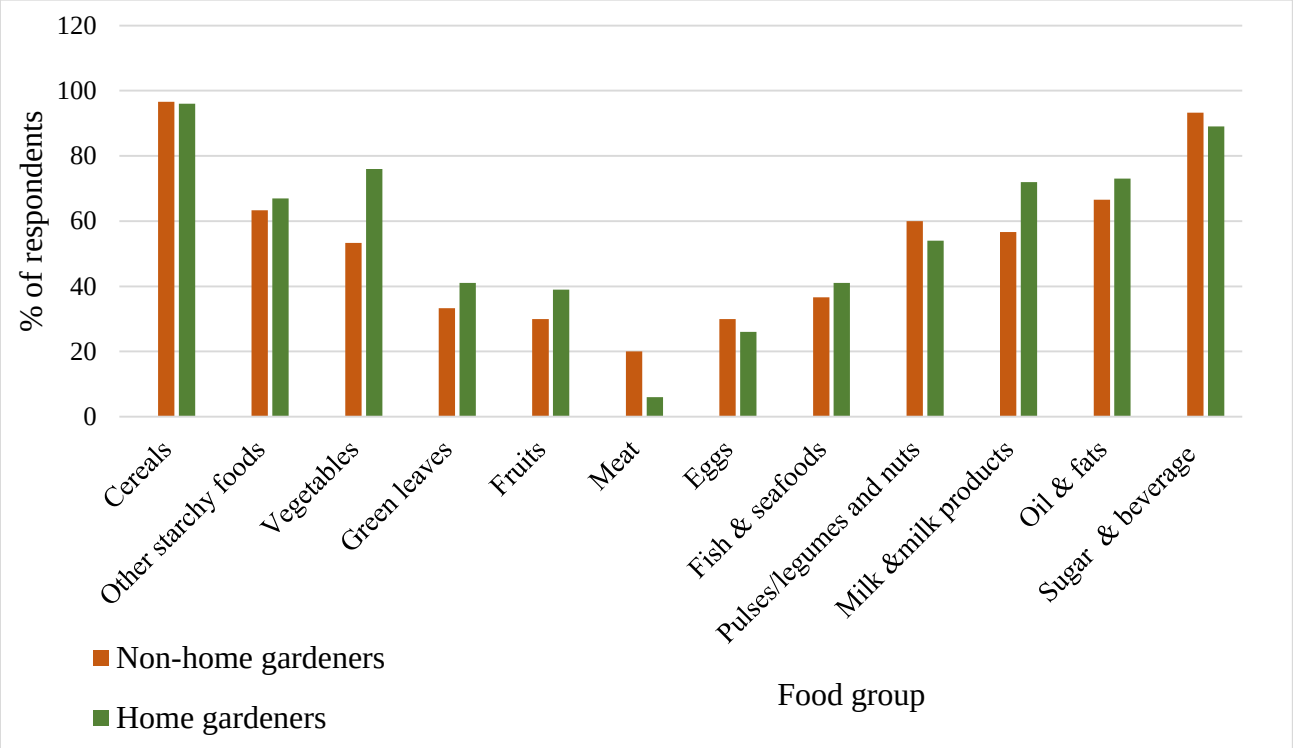

Figure 2: Food Consumption of Respondents

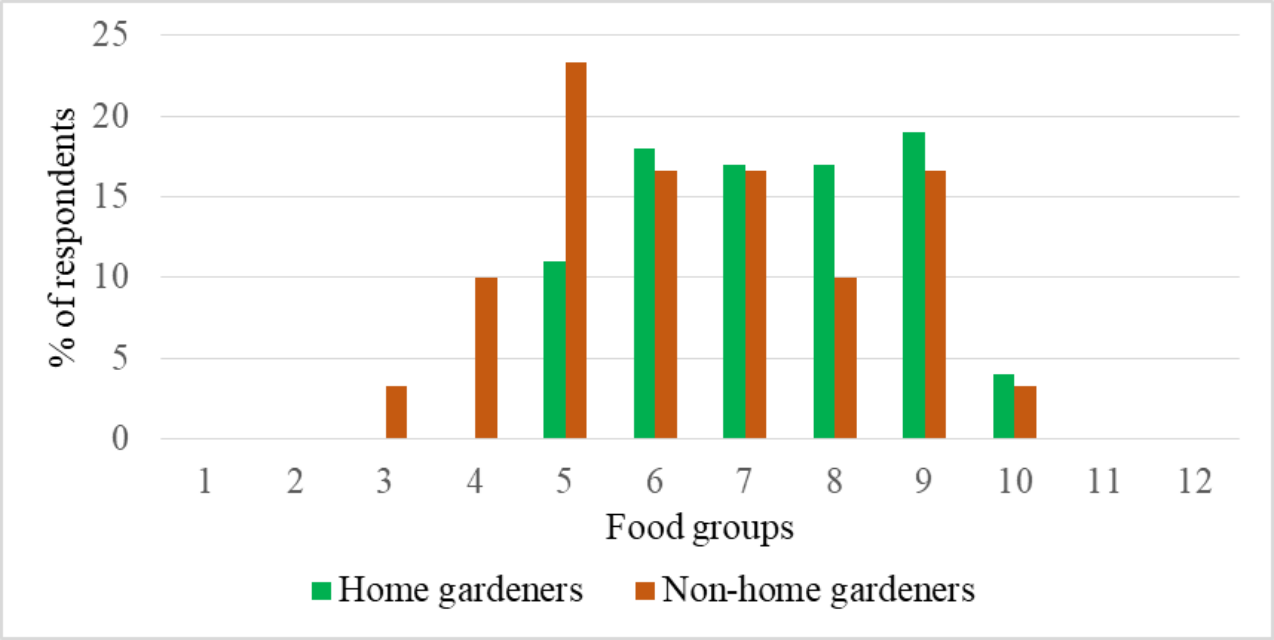

Figure 3: Daily Dietary Diversity of the Home Gardeners and Non-Home Gardeners

Based on HDDs, the population was classified into three groups based on their household food security as high food secured (>6), moderately food secured (4.5-6) and less food secured (<4.5). Among the home gardeners' 66% belonged to the highly food-secure group while 33% of home gardeners belonged to moderately food-secured groups respectively. Among the non-home gardeners, 47% was identified as highly food-secure while 40% and 13% belonged to medium and less food-secure groups respectively (Fig. 4). A study of home gardens in Cuba revealed that home gardening is a viable strategy to increase resilience and ensure food security due to the economic crisis and political isolation (Buchmann 2009).

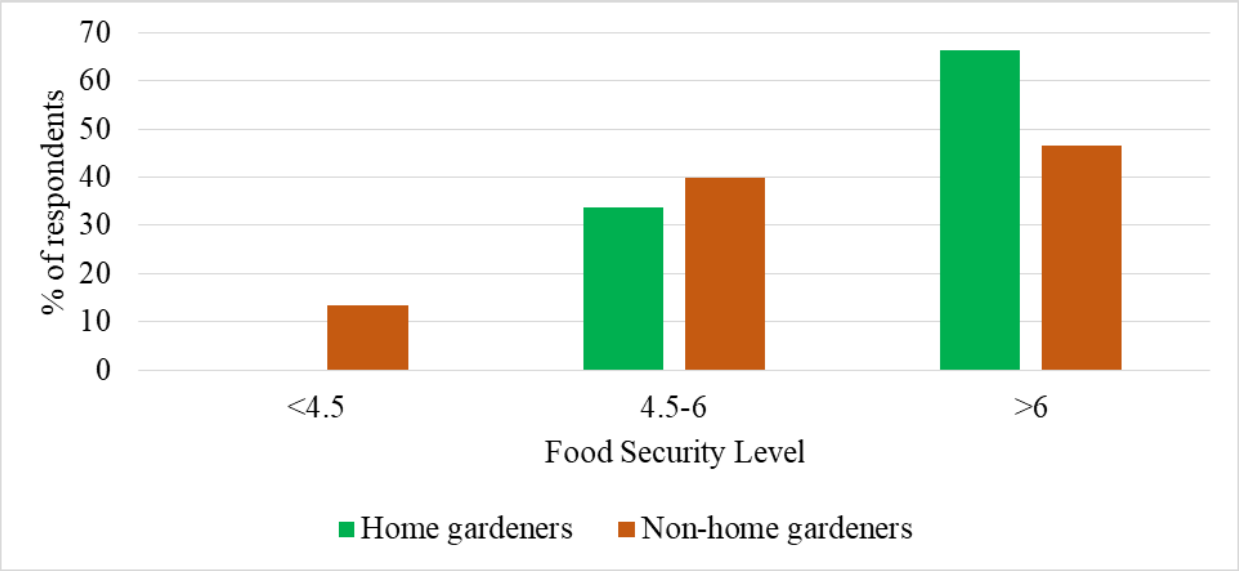

Figure 4: Food Security Level of Households of the Home Gardeners and Non-home Gardeners

3.2. Contribution of Home Gardening for the Income Generation of Women-headed Families in Cheddikulam

Though the main purpose of home gardening is to fulfil the household food and nutrition requirement, excess production (97% of the home gardeners) could be either shared among the neighbours or sell at the local market. Home gardeners earned an average monthly income of Rs.4700.00 from home gardening through selling excess production of vegetables such as Long bean (*Vigna marina*) , Cassava (*Manihot esculenta*), Okra (*Abelmoschus esculentus*), Brinjal (*Solanum melongena*), Pumpkin (*Cucurbita maxima*), Tomato (*Solanum lycopersicum*) and Bitter guards (*Momordica charantia*: Cereals such as, Green gram (*Vigna radiate*), Cowpea (*Vigna unguiculata*) and Black gram (*Vigna mungo*): Oilseed crops as Groundnut (*Arachis hypogaea*) and fruit crops such as Citrus (*Citrus aurantifolia*). Seventy-nine percent (79%) of home gardeners involved with the small-scale livestock production as cattle and poultry rearing and benefitted with additional income generated through livestock products as fresh milk and eggs. Literature states that families in mountainous areas of Vietnam generated more than 22% of household income through home-gardening activities (Trinh et al. 2003). Similarly, in Sri Lanka, farmers of a community group in Batticaloa district also sell the varying scale of excess production of the home gardening at their farmers' market called as 'Bridge market' every Saturday (Ginigaddara et al. 2018).

Instead of marketing fresh products, 49% home gardeners preserved their excess products mainly through the production of pickles and drying (Fig. 5). Lime pickle was the main value-added product. Other than that, they dried Moringa leaves, Turmeric, Lemongrass, and Brinjal; extract Coconut oil, and produce Chili powder, Mango pickle, and jam. Ten percent (10%) of the home gardeners produced snacks as cassava chips, potato chips, and involved with beekeeping as indirect income sources. Thirty-three percent (33%) of them sold their value-added products through seed bank of Rainforest Rescue International (RRI), own shops, other shops, local markets, friends and direct selling.

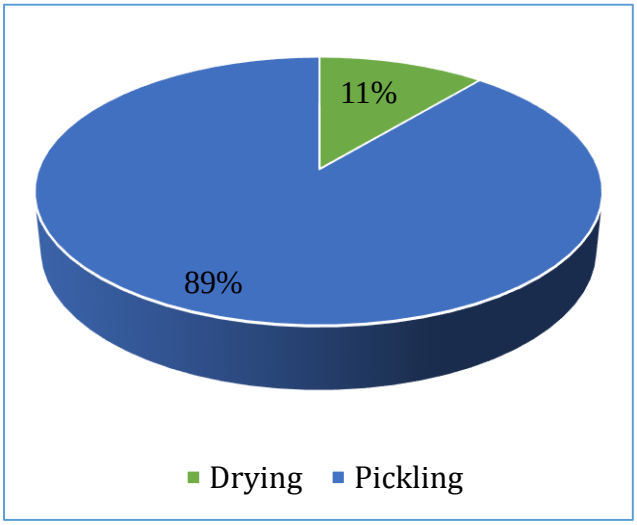

Figure 5: Preservation Methods of home garden products

Ninety-eight percent (98%) of home gardeners maintained the home gardens to produce their nutrient necessities according to the family requirement while doing other occupations. Results revealed that the average household monthly income of home gardeners was Rs. 20,835.00 (varied from Rs.5000.00 to 50000.00). Home gardening contributed 24% of it through providing an average income of Rs.4783.00 (varied from Rs.0 - 40000.00) per month. Further, it was found that the average household monthly income of non-home gardeners was Rs. 17,100.00. Average monthly expenditure range of home gardeners for food was calculated as Rs. 8054.00 (ranged from 0 – 28750.00). Similarly, the home garden project conducted in Bangladesh also reported that 54% of households reported selling of home garden products and earning the cash equivalent of 14.8% of total average monthly income (Guuroh et al. 2012). Home gardeners utilize home gardening income mainly for household activities (47%) such as buying clothes, medicine, etc. and 37% for the maintenance of the home gardens through buying tools, equipment and planting materials (Fig. 6).

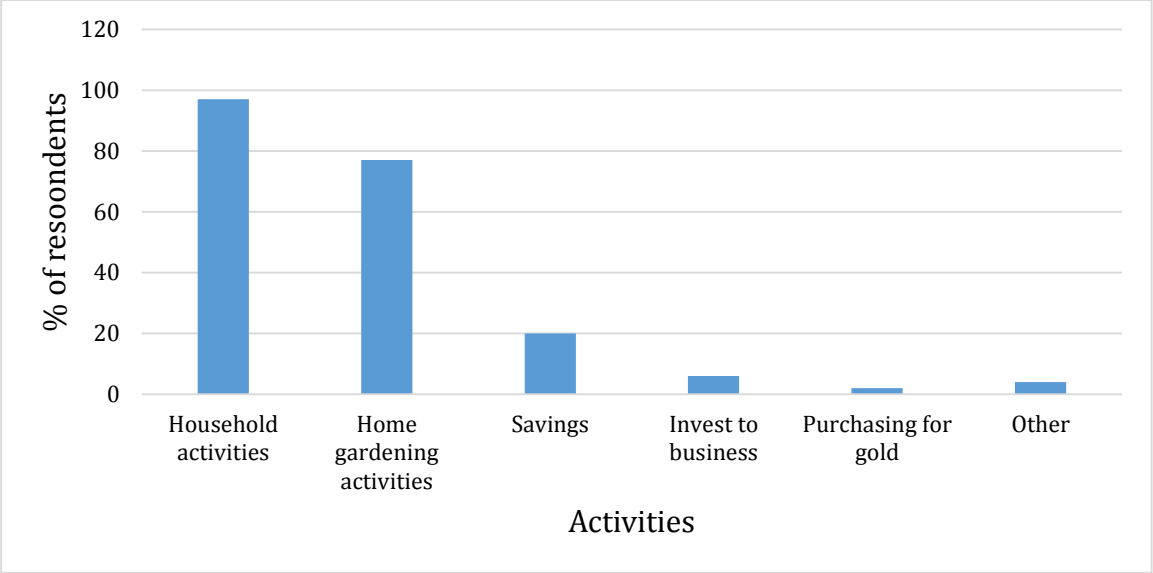

Figure 6: Utilization of Home Gardening Income

The income of home gardeners and the expenditure for food were compared with that of non-home gardening women-headed families to identify the role of home gardening evidently. Non- home gardeners were solely dependent on other livelihood options as manual labor, minor employees of the government institutions, etc. It was also found that non- home gardening households are spending Rs.12783.00 for foods per month from the average household monthly income of Rs.17100.00 which is equivalent to 75%. This clearly explains contribution of home gardening for the income generation as home gardeners are able to retained their monthly income by 63.9 % (Rs. 12781.00) for other incidentals and savings while non- home gardeners spending 75% (more than Rs. 12700.00) of the income only for fulfil food requirement of the family (Table 1).

Table 1: Information on income and expenditure of the respondents

Type of respondent	Monthly income (Rs.)	Monthly food expenditure (Rs.)	Monthly remains for the other incidentals and savings (Rs.)	% of Monthly remains for the other incidentals and savings
Home gardening women headed families (n=100)	20,835.00	8054.00	12781.00	63.9 %
Non-home gardening women headed families (n=30)	17100.00	12783.00	4317.00	25.2 %

Home gardeners acquire a considerable amount of eggs (73%), green leaves (60.9%), fruits (53.8%) and vegetables (31.5%), cow milk (50%) and goat milk (9.6%) from their home gardens and purchase other food sources which can't be produced by themselves. However non-home gardeners have to depend entirely on outside food sources to fulfil the dietary requirement.

3.3. Correlation among Home Gardens' Size and the Income Generated thorough Home Gardening

According to the Pearson correlation analysis, results elicited that there is no significant relationship existing between home gardens' size and income generation from home gardens (Test results <0.05; p=0.5962). Twelve percent of (12%) home gardeners with larger land extent (≥ 0.4 ha) cultivated different timber crops such as Neem (*Azadirachta indica*) and Teak (*Tectona grandis*). And also, they were practicing home gardening along with other occupations. Due to lack of adequate time to engage in home gardening and lack of family labor to maintain the home gardening properly, the land-use efficiency of larger lands remains at a very low level (30%). But 77% of home gardeners with small-sized lands (≤ 0.2 ha) maintained the productivity of land at a satisfactory level due to the easiness of maintaining, law requirement of organic materials for plants and available high species density in the home garden.

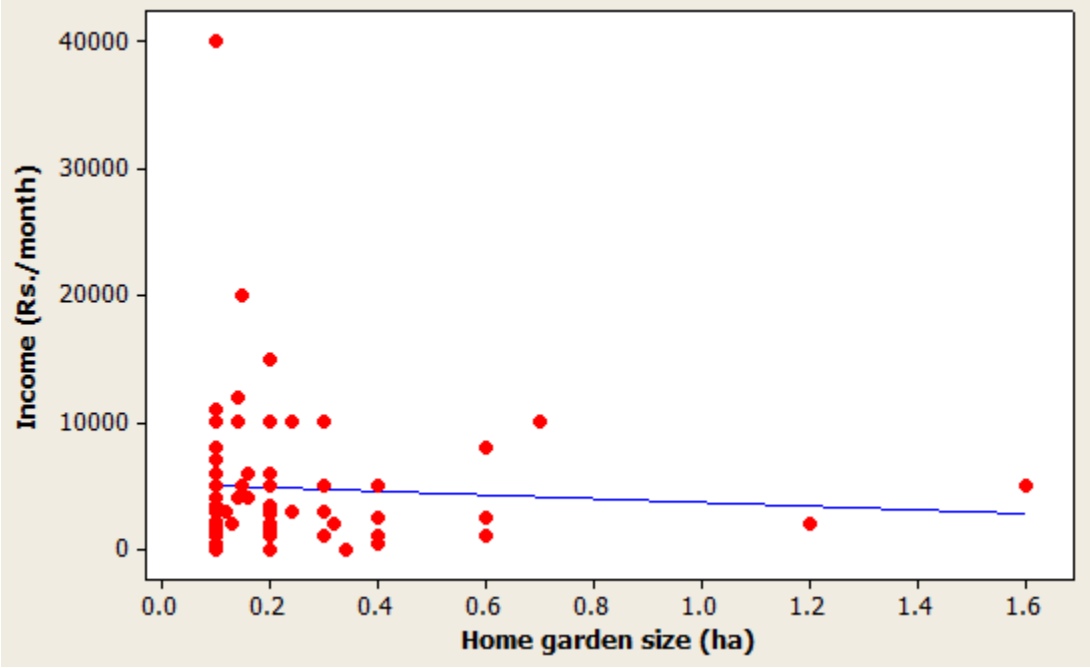

Figure 7: Correlation Between Home Garden Size and Home Garden Income

The uniformity of cultivated crop varieties was remained the same at every home garden due to the selection of cultivating crops according to the dietary pattern of the selected community. Every home garden consisted of Brinjal, Long Bean, Okra and Banana. Results of Pearson correlation analysis also explained that there is no significant relationship between home garden size and the available number of annual crops species (Test results <0.05; p=0.3630) (Fig. 7).

According to the results of the study, the potential for home gardening to enhance food security and income generation was confirmed. Similar studies had been conducted to popularize home gardening among the rural communities in Nepal and in Kinshasa and discovered its potential for a year-round supply of food to households with considerable income generation (Midmore et al. 1991; Mpoy and Paulus 1991; Shrestha et al. 2001).

However, the study found that there are some constraints for home gardening in the *Cheddikulam* area. As per the perception of community, 80% complained that they are water scarcity for home gardening, 88% complained about lack of awareness of farmers regarding the pest and disease control, efficient irrigation methods (40% complained), unavailability of high-quality planting materials (68% complained), wild animal attacks (63% complained) and lack of well-established marketplace to sell excess production (100% complained).

According to the information collected through the discussions with the key informants of the study, following requirements were identified for overcoming the key constraints on productivity and sustainability of home gardens and improving them into a more viable and sustainable enterprise in C*heddikulam* area. They are;

1. introduction of climate-smart agricultural practices to mitigate the constraints arising due to climate change
2. facilitating training programs to improve the knowledge of home gardeners regarding effective cultivating methods, improved seed varieties, and effective irrigation methods.
3. popularizing the value addition methods and quality standards among the home gardeners to obtain high-quality home gardening products
4. establishment of proper extension service and regular monitoring strategy for the home gardening with the participation of the Department of Agriculture, Sri Lanka and,
5. facilitation of proper market linkages to sell their excess production at reasonable prices.

4. Conclusion and Recommendations

The majority (66%) of home gardening families are highly food secured than non-home gardening families, with respect to the household dietary diversity score (HDDS). It can be concluded that home gardening plays a greater role in ensuring the food security of women-headed families in *Cheddikulam* area. Home gardening is a viable strategy for income generation of war-affected women-headed families in *Cheddikulam* area in Northern province of Sri Lanka.

Since there are several limitations are present related to the marketing, awareness on updated agricultural technologies, introducing home gardening along with proper extension support and training to other potential rural localities would be a worthy investment for ensuring food and income security of rural livelihoods in Sri Lanka.

6. Acknowledgment

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7. References

Buchmann C (2009) Cuban home gardens and their role in social-ecological resilience. Hum Ecol, 37:705–721.

Galhena D (2012) Home gardens for improved food security and enhanced livelihoods in Northern Sri Lanka. (Doctoral dissertation) Michigan State University USA. 37-39. Available at: http://file:///C:/Users /User/Downloads/Galhena_grad.msu_0128D _11680% 20(2).pdf [Accessed 5 Nov. 2018].

Galhena D, Maredia K and Freed R (2013) Home gardens: a promising approach to enhance household food security and wellbeing. Agriculture & Food Security, 2(8):2-13.

Ginigaddara G A S, Kodithuwakku AN, Dissanayake S P (2018) Impact of community markets on rural livelihood in Batticaloa district Sri Lanka, 4th International Symposium of Rajarata University of Sri Lanka,137

Guuroh R, Uibrig H and Acheampong E (2012) Home gardens as a Source of Income for Rural Households—A Case Study of Bieha District, Southern Burkina Faso. Agricultural Science and Technology, 2(7):798-813.

INDDEX (2018) Data4Diets: Building Blocks for Diet-related Food Security Analysis. Tufts University, Boston, MA. Available online at https://inddex.nutrition.tufts.edu/data4diets /indicator/household-dietary-diversity-score-hdds. [Accessed on 19 January 2019].

Johnson-Welch C, Alemu B, Msaki TP, Sengendo M, Kigutha H, Wolff A (2000)

Improving Household Food Security: Institutions, Gender, and Integrated Approaches. Available online at http://www.hubrural.org/IMG/pdf/basissem9911_panel3c.pdf. [Accessed on 19 January 2019].

Latham M and Beaudry M (1999) The impact of transnational corporations on food consumption and nutrition in Africa. *In* A. Ogunrinade with R. Oniang'o and J.May (Eds). Not by Bread Alone; Food Security and Governance in Africa. South Africa: Toda Institute for Global Peace and Policy Research: 222-241.

Midmore D J, Ninez V and Venkataraman R (1991) Household gardening project in Asia, past experience and future direction. In Food, Nutrition and Agriculture: Strategies to combat micronutrient deficiencies. Rome.

Mpoyi K and Paulus S J (1997) Promoting home gardening in Kinshasa, Zaire. *In* Traditional African Vegetables. Proceedings of the IPGRI International Workshop on Genetic Resources of Traditional vegetables in Africa: Conservation and use. Rome, FAO.

Musotsi A, Sigot A J and Onyango M O A (2008) The role of home gardening in household food security in Butere division of Western Kenya, African Journal of Food Agriculture Nutrition and Development, 4: 375-390

Nair PKR (1993) An Introduction to Agroforestry. Klgwer Academic Publishers, Netherlands: 85-96

Statistical information Northern province (2017) Available online at http://np.gov.lk/pdf/publications/Statistical_Information_NPC_2017.pdf [Accessed 23 Feb. 2019].

Shrestha P, Gautam R, Rana B R and Sthapit B (2001) Home Gardens in Nepal, status, and scope for research and development. *In* WJ. Watson & PB. Eyzaguirre (Eds). Home Gardens and in situ conservation of plant genetic resources in farming systems. Proceedings of the second international Home Gardens workshop. Rome, IPGRI: 105-117.

Swindale A and Bilinsky P (2006) Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide Version 2, USAID. Available online at https://www.fantaproject.org/sites/default/files/resources/HDDS_v2_Sep06_0.pdf. [Accessed 23 Feb 3019]

Trinh L N, Watson J W, Hue N N, De N N, Minh N V, Chu P, Sthapit B R, Eyzaguirre P B., (2003) Agro-biodiversity conservation and development in Vietnamese Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: *Indicator Guide* home gardens. Agric Ecosyst Environ,97:317–344.

https://doi.org/10.1016/S0167-8809(02)00228-1