

## Role of Homegardens In Achieving Food Security In Batticaloa District, Sri Lanka

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**Abstract:** Growing population pressure and urbanization, coupled with land degradation and frequent climate change are causing food insufficiency in most parts of Sri Lanka. Due to the war and the Tsunami, livelihood of people in Batticaloa district had been severely affected. In order to rebuild the district much still needs to be done. Homegardens are found to be one of the strategies as they can provide important protections against family food insecurity of these people. In order to improve the homegarden system there is a vital need to study the existing status of food security and the contribution of homegarden to the household food security. The study was conducted in three Divisional Secretariat divisions in Batticaloa district where comparably higher extent of homegarden were found. In these three D. S. divisions 206 samples were collected.

To identify the food security status coping strategies index score was used. Majority (62.6%) of the homegardeners were in moderate food secure condition. Only 24.3% of the homegardeners were in food secure condition of which 26% having single layered system, while the rest owning multi layered system. Chi-square test results showed that there is no statistically significant association between different systems and food security categories by both methods.

The result of the 2SLS analysis of data on multi storied systems revealed that the larger the land size, the more the food stocks. As the age of the head of the household and its logarithmic value increases, value of homegarden products decreases ( $p < 0.1$ ). But as spouse ages, value of homegarden products they are extracting increases significantly. A percentage increase in the size of household increases the value of homegarden products by 24.66% ( $p < 0.1$ ). Coefficient value of coping strategies index score implies that if there is an increase in food insecurity by one percentage, value of extracted homegarden products increases by 5.65%. Hence, the results of the study argue that, sustainability of food security is often enhanced through multi storied system.

Results of this study revealed that effective development and management of homegardens will improve the food security status. An strategic policies should be implemented for improve the food security awareness among the rural household.

**Keywords:** Homegarden, Food security, Coping Strategies Index

### 1. Introduction

From the dawn of civilization, food security has been a major human goal. Historically, food production in the overall Asian context increased at the same rate as that of human population (FAO, 2003a). However, population growth has outmaneuvered the food production trends in the past decade, implying the need to augment food production. According to FAO (2003b), there are about 800 million people in the developing world who suffer from hunger. And most of this (60%) is in Asia with South Asia accounting for about 36%.

Sri Lanka has long been recognized as a country that has achieved success in attaining high levels of literacy and health outcomes, despite low levels of per capita income (IPC, 2007). According to the UN

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Children’s Fund (UNICEF), that although Sri Lanka’s overall health indicators are on track to achieve the 2015 Millennium Development Goals (MDGs) except the nutritional status of children and mothers. The worst-hit districts include Trincomalee and Batticaloa. In Batticaloa an average poor person receives 1709 kcal and 50.9% of the population in the district consumes less than 2030 kcal level of dietary energy that set as the minimum level required in 2002. (Department of Census and Statistics, 2008). This situation was aggravated by the war that lasted for more than two decades and the tsunami that ruined the district to an unimaginable shape.

A well-developed home garden has the potential, when access to land and water is not a major limitation, to supply most of the non-staple foods that a family needs every day of the year. The significance of homegardens to rural livelihoods is well appreciated throughout the world (Fernandes and Nair, 1986). Homegarden has been described as an important social and economic unit of rural households, from which a diverse and stable supply of economic products and benefits are derived (Christanty 1990; Campbell *et al.* 1991). Sri Lankan homegardens have been reported to produce 60 percent of leaf vegetables and 20 percent of all vegetables consumed by the household (Hoogerbrugge and Fresco, 1993). Despite above potential benefits, homegardens in the Batticaloa district have not been evaluated in depth for their contribution to household food security. In order to improve the homegarden system there is a vital need to study the existing status of food security and the contribution of homegarden to the household food security in Batticaloa.

## 2. Methodology

### 2.1. Study site and sampling

Batticaloa district is situated in Eastern Sri Lanka, covering an area of 2,854 sq km of which 229 square km are inland waters and lagoons. Majority of the families in the district depend on agriculture for their household income. Three Divisional Secretariat (D.S.) divisions were selected where comparably higher extent of homegarden were found viz., Eravurpattu, Manmunai South & Eruvilpattu and Korelapattu Divisional Secretariat divisions (D. S. divisions) (Department of Census and Statistics, 2002). In these three D. S. divisions, eleven Grama Niladhari divisions were selected and from those, seventy, sixty seven and sixty nine samples were collected, respectively from each D. S. divisions and altogether 206 samples were collected.

### 2.2. Data analysis

Status of food insecurity was calculated using the Coping Strategies Index (CSI) in this study. CSI was constructed on the basis of asking questions about locally applicable coping behaviors.

2 SLS regression was employed to estimate the relationship between coping strategies index score against socio economic variables, agro- ecological variables and income from homegarden.

## 3. Results and discussion

### 3.1. Demographic characteristics of households

Demographic structure in the study area were presented in following Tables. It was revealed that the average family size of the respondents was 4.41 which is greater than the average figure for Batticaloa district (4.0) (Household Income and Expenditure Survey, 2006/07). 84.5% of the homegardeners were Hindu, 11.2% were Muslims and the rest were from other religion. Out of 206 surveyed families only three families were female headed households and the rest were male headed households.

Table 1: Descriptive statistics of demographic characteristics of the households

Variable	Mean	Standard deviation	Sample size
Household size	4.41	1.56	206
Average monthly income of HH	17723.30	9771.22	206
Age of Head of Household	47.53	11.56	206

Monthly income of Head of HH	13325.1	6669.36	203
Average additional income	877.21	2366.37	122

Average monthly income of household was Rs. 17,723.30 which was higher than the mean income of poor households of Batticaloa (Rs. 12, 720.00) but lesser than the mean income of non- poor households of Batticaloa (Rs. 21,901.00) (Household Income and Expenditure Survey, 2006/07).

Education level of the head of the household revealed that 63% had the education level upto Secondary level. Only 34.7% had the tertiary education. Almost all the head of the household were literate in the surveyed area.

Homegardens were classified into two systems based on the Shannon- Weiner index and the number of canopies. Two systems were single storied system and multi storied system.

*Status of food security in Batticaloa homegardeners*

Table 2: Cross tabulation showing different food security categories against different systems of homegardens

			System		Total
			Single layered	Multi layered	
<b>Food security categories</b>	<b>Food Secure</b>	% within Food security categories	26.0%	74.0%	100.0%
		% within System	27.7%	23.3%	24.3%
	<b>Moderate Food secure</b>	% within Food security categories	22.5%	77.5%	100.0%
		% within System	61.7%	62.9%	62.6%
	<b>Food insecure</b>	% within Food security categories	18.5%	81.5%	100.0%
		% within System	10.6%	13.8%	13.1%
<b>Total</b>	% within Food security categories	22.8%	77.2%	100.0%	
	% within System	100.0%	100.0%	100.0%	

Pearson – Chi square value 0.579 df=2 Asymp. Sig (2-sided) 0.749

CSI scores ranged in between 38- 65 with the mean of 49.5 and standard deviation of 5.36. Majority (62.6%) of the homegardeners were in moderate food secure condition. Only 24.3% of the homegardeners were in food secure condition of which 26% having single layered system, while the rest owning multi layered system. Majority (77.2%) owned multi layered system of which only 23.3% in food secure condition (table 2). Results of Chi- square test revealed that there is no statistically significant association between different systems and food security categories (on the basis of coping strategies index score). That is both systems equally contribute to the three different food security categories.

This study showed that rely on less preferred and less expensive foods was common in most (95.6%) of the households followed by purchase food on credit (93.6%) . It was evident that none of the household sends their family members to beg and none of them skip entire days without eating. This shows that they have some earning which they could use to run the day today life of household members.

### 3.2. Food insecurity and homegarden

It was evident that 10.18% of the income was contributed by homegarden trees. More than 45% of the household income was contributed by homegardening in surveyed area.

The data was divided into two categories based on the systems. It was evident that the food security status of homegardeners doesn't have any influence on value of products of homegarden they are extracting in single storied system. As when food insecurity increases, households owning single storied system don't depend on more and more extraction from trees. Because they are comprised only of banana or cashew or coconut trees. As the products harvested from these systems are homogenous food security cannot be achieved continuously as the households don't have access to different combination of nutritious food that meets their dietary needs.

Table 3: Parameter estimates of the relationship between value of homegarden products against different variables using 2SLS in the multi storied system

		Dep. Var.: Value of HG products		Dep. Var.: log Value of HG products	
		Model 1	Model 2	Model 3	Model 4
Explanatory variables	Mean	Co-eff	Co-eff	Co-eff	Co-eff
Age HH head	47.94	-271.39 (206.26)		-0.037* (0.015)	
School. HH Head	7.96				
Age of spouse	42.50	380.37* (213.46)		0.04 ** (0.016)	
School. spouse	7.87	212.42 (280.43)		0.003 (0.02)	
Pres. emplo.		2618.95 (1887.57)		0.079 (0.14)	
HH size	4.42	700.03 (437.16)		0.04 (0.03)	
Land area	21.16	1253.08** (99.91)		0.083 ** (0.007)	
Coping hat		565.72* (329.97)	1037.73** (350.35)	0.043 * (0.024)	0.056* (0.02)
Log Age HH head			-10360.93 (11163.09)		-1.77 * (0.77)
Log School. HH Head					
Log Age spouse			13172.79 (10160.64)		1.69* (0.7)
Log School. spouse			937.77 (2208.98)		-0.04 (0.15)
Log land value			23517.07** (2287.69)		1.67** (0.16)
Log HH size			4343.45* (2024.94)		0.25* (0.14)
Constant		-49592.61** (15969.31)	-125318.5** (23148.35)	4.9555 ** (1.17426)	1.5330 (1.6051)
R squared		0.6525	0.5734	0.6152	0.5799
Adj R sqd		0.6332	0.5532	0.5939	0.5601
No. of obs.		134	134	134	134

Notes: Standard deviations are in parenthesis.

\*\* Significant at 1% level \* Significant at 10% level

The result of the analysis of data on multi storied systems is shown on the table 3.

In all the models, land area was significantly different from zero at 1 % level. This could be explained by factors such as lack of modern farming methods that can intensively produce food from small lands and also poor land use practices. The larger the land size, the more the food stocks.

A percentage increase in the size of household increases the value of homegarden products by 24.66% at 10% level (model 4). Coefficient value of coping strategies index score implies that if there is an increase in food insecurity by one percentage, value of extracted homegarden products increases by 5.65%. This is only true for multi storied system. Diversity of species of annuals and trees in ecosystems fosters recycling of nutrients, increases efficiency in the use of moisture, nutrients, and sunlight, and reduces incidence of weeds, pests, and diseases. Therefore a multistoried system with annual and perennial species in systems is considered as an essential component for reduce the food insecurity. And if size of the homegardens increases it will increase the value of the extracted products. In fact, it invites concentration to efficiently utilize the land resource.

## 4. Conclusions

While food security is a cross-cutting, complex and multifaceted phenomenon, the findings showed that only 24.3% households were in food secure condition of which 26% having single layered system, while the rest owning multi layered system, and 62.6% were in moderate food secure condition. Rely on less preferred and less expensive foods and Purchase foods on credit were common coping behaviors among homegardeners. Those behaviors commonly perceived as more severe, such as skipping entire days or sending children to beg, occurred at relatively low frequency.

More than 45% of the household income was contributed by homegardening in surveyed area. And from the regression results it was found there is no significant relationship among value of homegarden products and the food security status in single storied system. But in multistoried system land area, age of spouse, size of household and coping strategies index score significantly and positively affect value from homegarden products. When increase in predicted coping strategies index score, value of homegarden products also increased, showed that as the homegardeners become more and more food insecure, they depend more on homegarden. This results is very much useful to promote homegardening, and thereby food security.

### 4.1. Policy recommendations

Well-developed homegarden with different annuals and perennials can play a crucial role in providing household of high-nutrient food items, in low input costs, through producing diversity of food items that is consumed on a daily basis. The results of this investigation indicate that if a considerable array of plant species is nurtured in homegardens, these will become as an essential resource on which families, communities, nations, and future generations depend.

## 5. References

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