INCoH 2017
The Second International Conference On Humanities

ASSESSING THE HOME GARDEN AGRICULTURE IN THE SUBURBAN AREAS IN GALLE-SRI LANKA

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Abstract

The suburban areas of Galle, just as in many other parts of Sri Lanka, typically have single housing units built on 6 to 20 perch land plots. Most of the plots with single housing units in Galle have been set up with home gardens that can even be used for agricultural purposes. The home gardens serve to provide a relaxing hobby for the home owners while allowing some agricultural produce to be grown for their consumption as well to generate some extra income. Recently, the government has started a campaign to improve the home garden agriculture in each household as a solution to achieving greater self-sufficiency in the people's food requirements. For this study, 105 households were randomly selected as the sample in the Four Gravets Division in Galle. The dependent variable of the model comprised both Government subsistent families and non-subsistent families. Five independent variables were used with a logistic regression model. The results were incorporated into the GIS model together with their probability values. The results indicated that the higher Wald value and odds ratio for the variable Education are 8.778 and 4.983, followed by Consumption 5.438 and 3.520 and Skilled persons 4.54 and 3.295. Probability values of the Model have been linked with GIS household map to indicate the level of contribution of each household in the home garden agricultural activities. Suggested model can be used to manage the household agricultural system in suburban areas.

Keywords: Household, home garden, land use, urban planning, GIS, Geo statistic.

1. Introduction

In Sri Lanka most of the suburban areas of regional cities have single, detached housing units scattered about (Silva, 2005). Galle is the third largest city in Sri Lanka and its suburban areas too have a large number of closely packed single housing units. Galle District essentially has an agriculture based economy. Therefore, a high proportion of the houses throughout the district are involved in homestead agriculture (DCSSL, 2012). The Government of Sri Lanka also has a policy of encouraging home garden agriculture as part of the National Programme. This study examines people's perception of Home Garden Agriculture in the suburban areas of Galle by conducting a survey of households engaged in this activity. This approach it is expected will be useful for understanding the issues relating to this subject and pave the way for its further development. Especially, individual household agricultural production will contribute towards food security, promote nutrition and health, and prove to be of economic advantage to those involved.

1.1. Household , Home Garden and Suburban

According to the definition of Soemarwoto and Conway (1992) a home garden is the result of a unique combination of high levels of productivity, stability, sustainability, and equitability of a household in a particular area. The condition and quality of a home garden will depend upon the dispersion pattern of the household (Amerasinghe & d'Auria, 2007). A suburb can also mean one of the residential areas surrounding a big city and a group of these can collectively be regarded as the suburbs. They can actually form part of a really big city, or they can be aggregates of several distant residential areas. Quite often, it is seen that the suburbs have a lower population density than the main urban territory (Irwin & Bockstael, 2004).

1.2. Study Area

In the Galle District there are 19 Divisional Secretariat Divisions. Based on data analysis done in Galle, the Gravets Division had the highest number of suburban home agriculture gardens. The Galle Four Gravets Division consists of 50 Grama Niladari Divisions (GNDs) as shown in Figure 1.
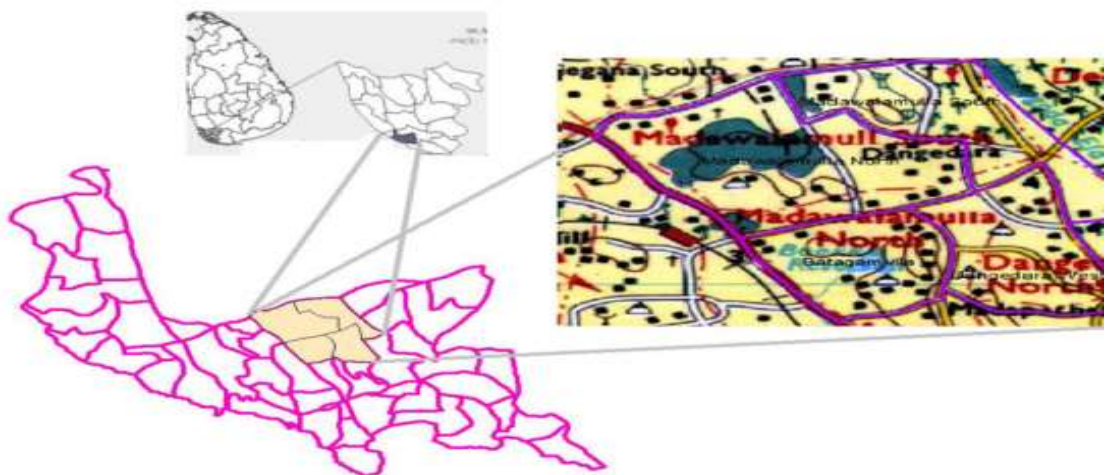
Figure 01. Locations of Study Area

2. Problem Statement

Home gardening has gradually entrenched itself as an essential economic activity among the low income and middle income households in the suburban areas of Sri Lanka (Deadman, 2005). Although low income households are involved in home gardening primarily for economic gains, the middle income households use it to partly meet their food requirements and also as a relaxing and fulfilling pastime. Recognizing this, the study will examine the current practices and issues relating to home gardening in the suburban areas. A limited number of typical suburban areas in the City of Galle, Sri Lanka have been selected for the study. The logistic statistical model in conjunction with the Geographic Information System was applied in the analysis (Hills & Trucano, 1999).

3. Research Questions

What is the current context of home garden householders in Suburban areas

How to assess the benefits of home gardening in suburban areas

4. Purpose of the Study

(a) To examine the profiles of current home garden householders in suburban areas

(b) To assess the benefits of home gardening to householders in suburban areas

(c) To identify strategies to promote home garden agriculture

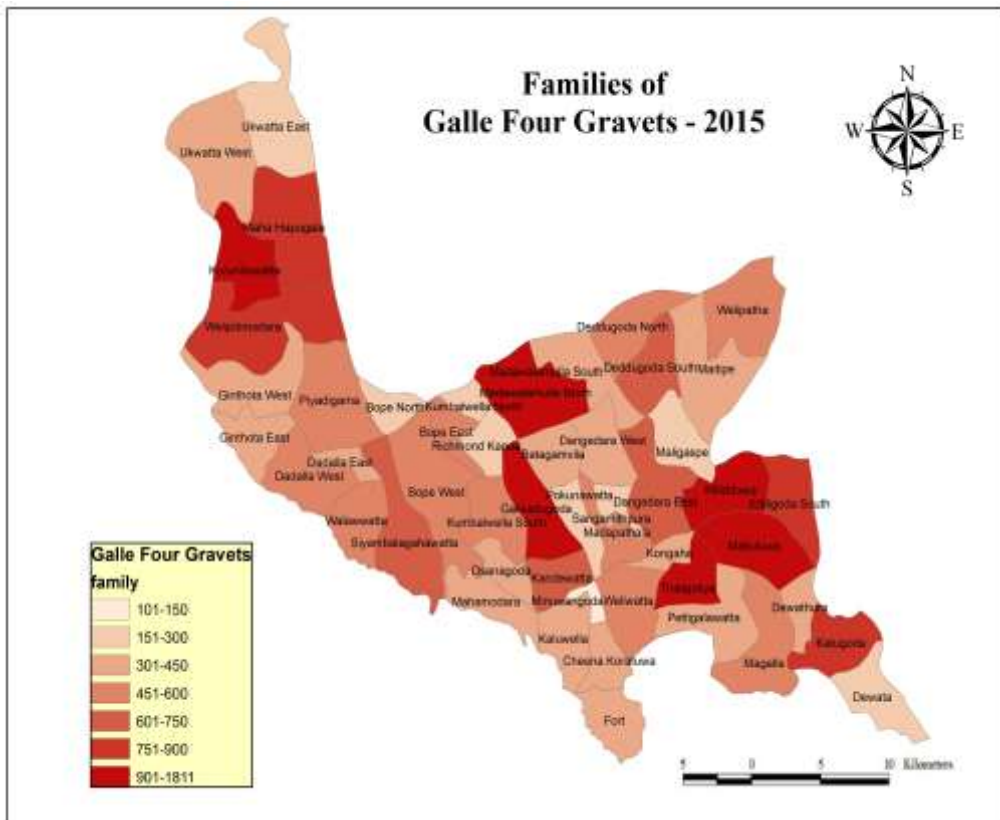(d) To build a geo-statistical model for improving home gardening practices in Sri Lanka

5. Research Methods

5.1. Selection of Core Study Area:

Out of the 50 GN Divisions, 4 GN Divisions were identified as the most important, based on population (Figure 2), number of families (Figure 3), and involvement in home gardening (Figure 4). After analysis of secondary data in combination with the multi-layers of the Geographical Information System (Bernhardsen, 2002), the GN Divisions of Madawalamulla North, Madawalamulla South, Dangedara West and Bataganwila were identified as the most suitable core areas to conduct the survey.
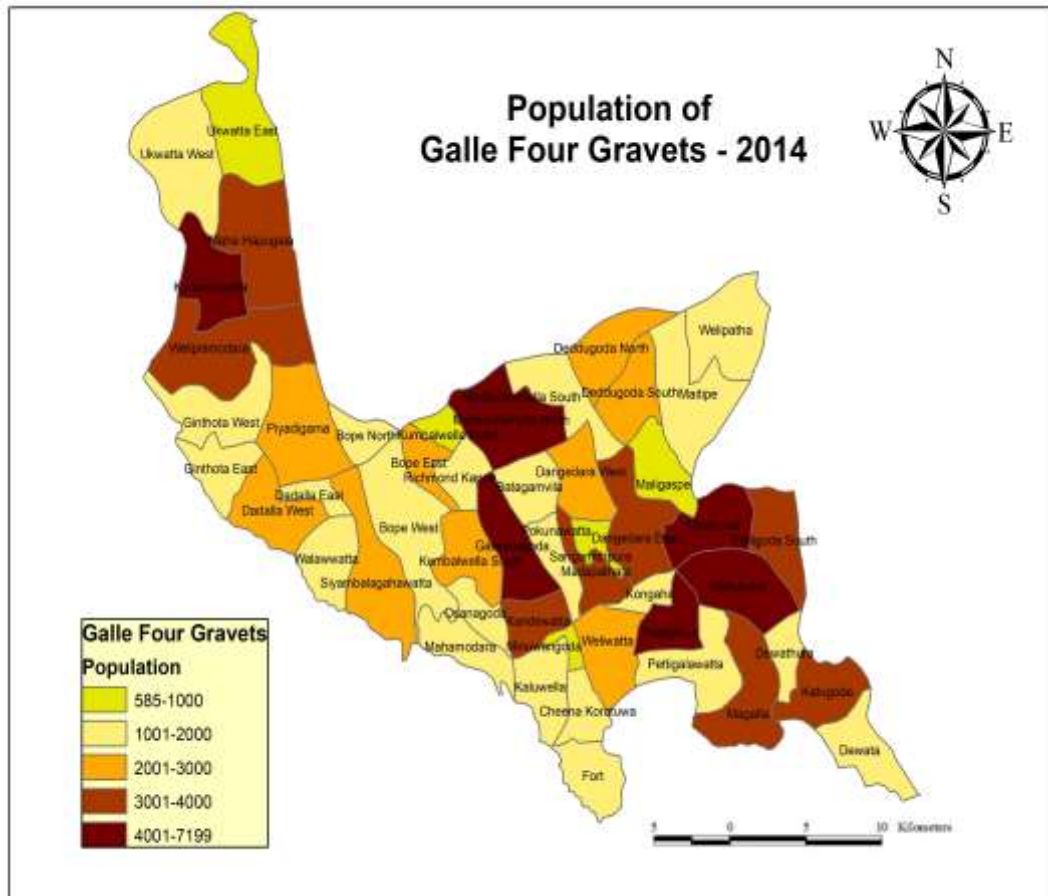
Figure 02. Population of Galle Four Gravets - 2014

Figure 03. Families of Galle Four Gravets-2015

Figure 04. Home Gardens of Galle Four Gravets 2015

5.2. Sample

In the core study area, 105 households have been plotted using GPS (Ayalew & Yamagishi, 2005) in a field survey and classified into two categories as low income and middle income. The plotted households in the field with their real locations (denoted by GPS coordinate values) are illustrated in Figure 5. Samples have been selected using a reasonable distribution method in the spatial areas (Abeykoon, 2004).

Figure 05. Sample Locations and Distributions

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5.3. Methods

This study employs two research methods/ techniques. One is the Logistic Regression model (Hosmer & Lemeshow, 2004) to assess the benefits of home garden agriculture. The following Applied Multivariate Logistic Model formula is used for the study:

$$Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 \dots\dots\dots\dots\dots (1)$$

Where,

Y = Low Income/ Samurdhi = 0 & Middle Income/ Non-Samurdhi = 1

X_1 = Consumption

X_2 = Occupation

X_3 = Family Income

X_4 = Income from Home Gardening

X_5 = Level of Education

Secondly, the predicted value derived from this formula has to be incorporated with the housing locations to find the best performing houses in respect of home garden agriculture in the study area (Bewick, Cheek, & Ball, 2005).

6. Findings

Accuracy of Model: Table 1 indicates that the entire data model is reliable and consistent showing a 77.1% correct percentage for data model. The model correctly classified 77.3 percent of cases overall at step one of the step-wise model run, indicating the high accuracy achieved.

Table 01.　　　　Model corrected Percentages

Observed			Predicted		
			Poverty		Percentage Correct
			Samurdhi	Non Samudhi	
Step 1	Poverty	Samurdhi	19	15	55.9%
		Non Samurdhi	9	62	87.3%
Overall Percentage					77.1%

6.1. Model Running and Results

Table 2 illustrates the values of the independent variables obtained for all 105 families. After assessing the low income families and the middle income families, it was apparent that the overall education level of suburban residents has a lot of potential to allow them to engage in home gardening agriculture. The educational level of the area has an odds ratio of 4.983, Wald value of 8.778 and significance of 0.003. This is followed by consumption, which has an odds ratio of 3.520 and Wald value of 5.423; occupation

has an odds ratio of 3.295 and Wald value of 4.540. In addition, family income variable shows no change either in the low income or middle income category even if it has some significance in the database. However, agricultural output and production value are not significant.

Table 02. Highly Significant Variables of Geo-Statistical Model

Steps	Variables	B	S.E.	Wald	df	Sig.	Exp (B)
Step 1[a]	Consumption (X^1)	1.258	0.540	5.438	1	0.020	3.520
	Occupation (X^2)	1.192	0.560	4.540	1	0.033	3.295
	Family Income (X^3)	0.000	0.000	4.219	1	0.040	1.000
	Home Garden Income (X^4)	0.000	0.000	0.971	1	0.324	1.000
	Education Level (X^5)	1.606	0.542	8.778	1	0.003	4.983
	Constant	-2.223	0.817	7.396	1	0.007	0.108
a. Variable(s) entered in step 1							

6.2. Probability value classification

Probability value chart shown in Figure 6 indicates the levels of probability in respect of the performances of two classes of households. According to the chart, it is clear that most of the Middle Income Families and Non-Samurdhi Families have a high probability value.
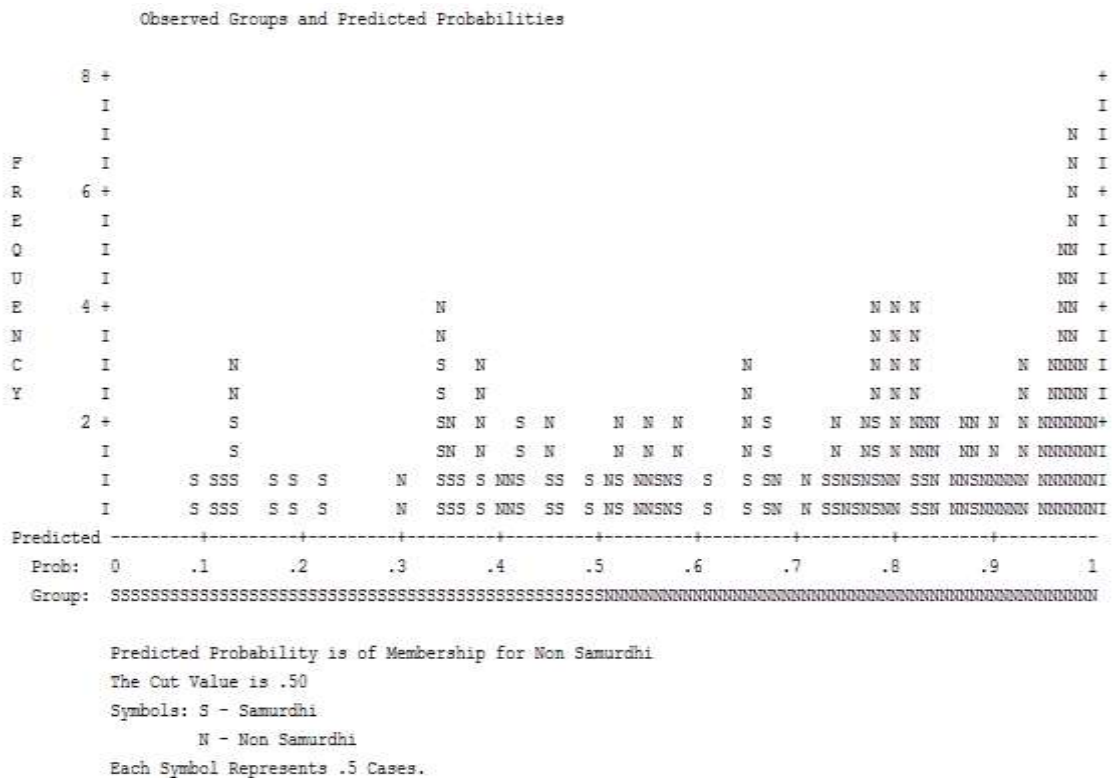
Figure 06. Probability Plot Groups

6.3. GIS Model and Household Spatial Distribution

Figure 7 indicates the high and low probability values of households engaging in home garden based agriculture. Households depicted in green colour have high probability values while those in red colour have low probability values. The spatial distribution map is very important for making policy decisions, assessing environmental impacts and as a guide to future studies.
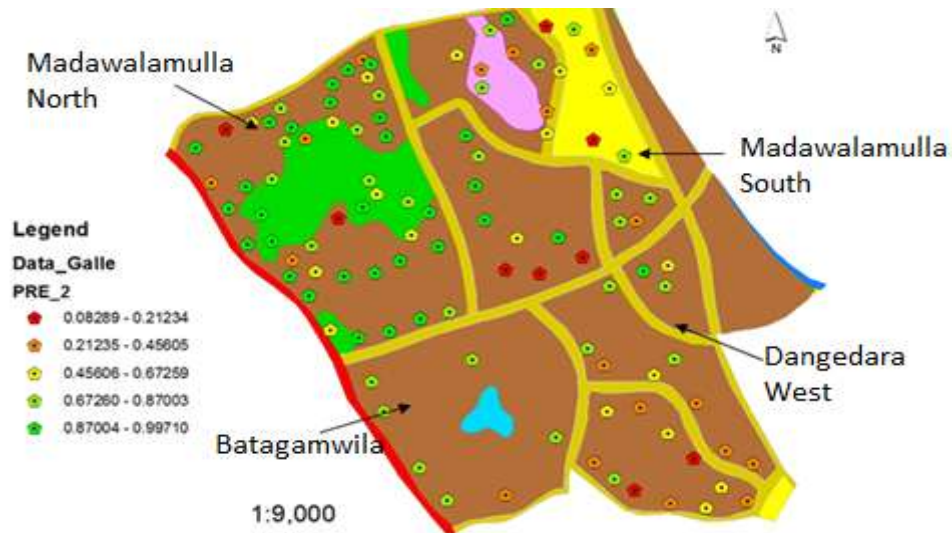

Figure 07. Probability Values of Households

7. Conclusion

This pilot survey was conducted to assess the status of household based agriculture in suburban areas. Results indicate that presently middle and high income families have a strong interest in taking up home garden based agriculture as they know that it can provide them with fresh food, a healthy hobby and some extra income. Even the Government of Sri Lanka has a policy to improve the economy of low income families through Home Garden Agriculture. This study has proved that the level of education of middle income groups involved in home garden agriculture was higher by 4.938 comparing with low income groups. The value of 4.938 (odds ratio) results have been compatibly support with the value of significance 0.003 and Wald value of 8.778 for middle income households than low income households. Secondly, home garden agriculture has been used for consumption by the middle income group 3.52 times more compared to the low income families. Further, a majority of skilful persons from middle income households appreciate the importance of home based agriculture 3.295 times more than the less skilful persons from low income households.

On the other hand, both groups think alike that home gardening could generate some extra income but are not too confident about it because it has an odds ratio of 1.00. Both low income groups as well as middle income groups have indicated that their home gardening agricultural production is still not at a satisfactory level and needs to improve. In any case, policies intended to promote home garden based agriculture must take into consideration the fact that family income also plays a crucial role in achieving a successful outcome.

Acknowledgments

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