Gender Based Comparison on Participation of Farmers in Agricultural Extension Activities

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Agriculture extension service plays a significant role in dissemination of technology among rural farmers. Therefore, participation of female as well as male farmers for these activities and application of agricultural knowledge is vital in developing the agricultural sector. However, to authors knowledge, studies on gender-based comparisons of participation in extension activities are lacking in Sri Lanka. Therefore, the present study is an attempt to find the determinants of women and men participation of extension activities separately. Taking a sample of one hundred and fifty female farmers and one hundred and fifty male farmers using simple random sampling technique this study was conducted in Medadumbara Divisional Secretariat and Poisson regression was applied to find the determinants. Study results showed that civil status of female farmer, time barriers, inflexible domestic activities and improper extension activities are the major barriers of the participation of female farmers in agricultural extension activities. Similarly, time barriers such as lack of time available to participate in extension activities, household responsibilities, financial problems, lack of enthusiasm in participating to extension activities are the major constraints that hinder male farmers’ participation in agricultural extension activities. This study recommends that wealthy female farmers should be encouraged to participate in extension activities. Furthermore, they should be educated with more cost management strategies in allocating inputs in the production through extension activities.

Key words: Agriculture extension, Comparison, Female farmers, Male farmers, Poison regression

INTRODUCTION

Sri Lanka is a developing country, having vast and varied rural sector and primarily agrarian socio-economic system. According to the Sri Lanka socio economic data, (Central Bank of Sri Lanka Annual Report, 2016) agriculture sector has remained as the strength of its economy, as it contributes 7.1% towards the Gross Domestic Product (GDP). The majority of country’s population directly or indirectly depends on agriculture. More than 82% of the population who live in rural areas depend directly or indirectly on agriculture (Sireeranhan et al., 2013).

It is said that the fundamental problem of agricultural growth is education. There is a need of education for the rural development in agriculture to develop new technologies, new inputs of production, educating farmers to improve their skills, replace their traditional attitudes with modern ones and improve their innovative etc. The farmers’ education and extension contacts enable them to acquire access and aim new information (Wharton, 1965).

The Agricultural Extension Service can be defined as an agricultural information exchange system which shows the actors, people and institutions, their interactions and communication networks between these actors to coordinate the information related processes (Saravanan et al, 1999).

Agricultural extension services play an essential role in ensuring that the farmers have access to improved and proven technologies. Agricultural extension contributes to improving the welfare of farmers and other people living in rural areas. It strengthens the farmer’s capacity to innovate by providing access to knowledge and information.

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Therefore, Farmers’ participation is an important factor for sustainable agriculture in rural areas. Farmers' participation issues are the areas of concern at national and local level (Subedi, 2008). Without participation, there are obviously no partnerships, no developments, and no progress (Antholt et al., 2010). Lack of participation in decision-making to implement an agricultural policy therefore can lead to failure in agricultural development. Unfortunately, there is an inadequacy of available literature on the participation of farmers in agriculture extension activities, especially the women. Therefore, this study attempts to make a comparison between female and male farmer participation in agricultural extension service as a case study in Medadumbara Divisional Secretariat, Kandy District, Sri Lanka.

**MATERIALS AND METHODS**

**Data**

**Study Area**

Medadumbara Divisional Secretariat in Kandy District, Central Province has five Agriculture Instructor’s Divisions in Medadumbara Divisional Secretariat as Theldeniya, Namadaga, Ambala, Wendaruwa, Udispaththuwa. Total land area in Medadumbara Divisional Secretariat is 40,994.719 acres (Divisional Secretariat Office, Medadumbara – Branch of Land). Out of the total land area the cultivated land area is 17420.7 acres.

Out of the total cultivated land area there are paddy cultivation 19.2%, vegetable cultivation 4.5%, fruit cultivation 1.47%, pulse cultivation 0.35%, tuber crops 0.75%, leafy vegetables 0.308%, tea cultivation 2.75%, coconut cultivation 2.71%, and minor export crops 5.25% (Divisional Secretariat Office, Medadumbara - Branch of Land, 2015).

There are ongoing extension programmes such as Awareness Programmes on Good Agricultural Practices (GAP), Awareness Programmes and Field Demonstrations on new crop varieties, Soil Conservation Programme, Creating Organic Farming Villages, Soil Sample Testing, Creating Fruit Villages, Business Farmer School (Entrepreneurship Development Programme), Field Demonstrations for the Para shoot method in paddy cultivation etc.

**Sampling**

Total farmer population in Medadumbara Divisional Secretariat is 10,614 (Medadumbara Divisional Secretariat –Branch of Census and Statistics, 2015). Out of the total farmer population there are 1,426 female farmers and 9,188 male farmers.

List of female farmers and male farmers in each division were taken separately. The numbers of female/male farmers required from each Agrarian Division to fill the sample size were calculated separately. Simple random sampling technique was employed to select the farmers.

<table>
<thead>
<tr>
<th>AI Divisions</th>
<th>Theldeniya</th>
<th>Namadaga</th>
<th>Ambala</th>
<th>Wendaruwa</th>
<th>Udispaththuwa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of female/male farmers</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>Proportion of female/male farmers selected for the sample</td>
<td>A *150 T</td>
<td>B *150 T</td>
<td>C *150 T</td>
<td>D *150 T</td>
<td>E *150 T</td>
</tr>
</tbody>
</table>

A + B + C + D + E = T (Total female/male farmers in Medadumbara Divisional Secretariat).

Both Female and male farmers required for the sample were selected randomly from the farmer list.

**Data Collection**

A primary survey was used to collect the required data for the study. Semi-structured questionnaire was used to collect primary data. Secondary data for the research was collected from the Divisional Secretariat Office - Medadumbara, Provincial Agriculture Office - Peradeniya, and Agrarian Service Office in each Agrarian Division.

**Data Analysis**

Poisson regression analysis was used to determine the factors affecting woman and men farmer participation in extension service in Medadumbara Divisional Secretariat. Number of extension activities female/male farmers participated within three-month period was considered as dependent variable. As assumed for a Poisson model the response variable was a count variable, and participation of each farmer has the same length of observation time.
Descriptive data analysis was done to study the demographic characteristics of both female and male farmers who involved in agriculture extension service in Medadumbara Divisional Secretariat.

**Econometric Analysis - Poisson Regression Model**

\[
PA(Y) = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{MS} + \beta_3 \text{DEPY} + \beta_4 \text{DEPO} + \beta_5 \text{INCOME} + \beta_6 \text{EXPNDTR} + \beta_7 \text{LO} + \beta_8 \text{LA} + \beta_9 \text{NBWH} + \beta_{10} \text{AVSPD} + \beta_{11} \text{AVDL} + \beta_{12} \text{AS} + \epsilon_i
\]

\(\epsilon_i\) = Random error

**Dependent Variable**

PA = Number of extension activities participated by female/male farmers within three-months period.

**Independent Variables**

- AGE = Age of the farmer
- MS = Marital status
- DEPY = Number of younger dependents in farmer family
- DEPO = Number of older dependents in farmer family
- INCOME = Monthly income of farmer’s family
- EXPNDTR = Monthly Expenditure for agricultural activity
- LO = Land ownership
- LA = Labor availability
- NBWH = Number of working hours in the agricultural land
- AVSPD = Average schedule extension program duration
- AVDL = Average distance to location where the extension program is held
- AS = Availability of subsidies for the particular agricultural activity

**RESULTS AND DISCUSSION**

**Descriptive Analysis**

**Age Distribution of Farmers**

Majority of female farmers belong to the age category between thirty-one to thirty-nine years. Out of the total, 40% of female farmers belong to this age category. About 33.33% of female farmers in the selected sample belong to the age category between forty to forty-nine years. It seems that the majority of female farmers are in the middle age. The age category above sixty years shows the lowest percentage of age distribution, that value is 2.67%. There are 6% of female farmers in the selected sample whose age category is below thirty years.

Majority of male farmers belong to the age category between forty to forty-nine years. Out of the total, 39.33% of male farmers belong to this age category. About 32% of male farmers in the selected sample belong to the age category between thirty-one to thirty-nine years. Majority of male farmers are also in the middle age. After the age category above fifty years, the male farmer participation in agricultural extension activities seems to be higher than female farmer participation.

**Marital Status**

Out of the total sample, the majority of both female and male farmers are married. In the selected sample, 87.33% of female farmers and 96% of male farmers are married. The unmarried percentage of female farmers is 12.66%. There are 4% of male farmers who are unmarried.

**Land Ownership**

More than 80% of female farmers have the ownership of their agricultural lands. Only 19.4% of female farmers do not have the ownership of their agricultural lands. As well as 72% of male farmers have the ownership of their agricultural lands. Compared to the male farmers the majority of females are working on their own agricultural lands.
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Income

According to the following figure 26% of female farmer families have an income level between twenty-one thousand rupees to thirty thousand rupees. Only 2.66% of female farmer families have a monthly income level below ten thousand rupees. The majority of male farmer families have the income level between thirty-one thousand to forty thousand rupees and only 1.33% of male farmer families show the monthly income level below ten thousand rupees. Female farmer families show higher income levels compared to the male farmer families.

Expenditure

The above figure shows the monthly expenditure for agricultural activities of farmers. Monthly 71% of female farmers spend higher than ten thousand rupees for agricultural activities. 69% of male farmers also spend more than ten thousand rupees on their agricultural activities monthly. Only 29% of female farmers spend less than ten thousand rupees monthly for the agricultural activities while 31% of male farmers show the monthly expenditure level for agricultural activities lower than ten thousand rupees.

Labour Availability

About 89.33% of female farmers are having family labourers for their agricultural activities. Similarly, 94% of male farmers are also having family labourers for their agricultural activities. Compared to the male farmers, majority of female farmers are hiring labourers for the agricultural activities as a percentage of 10.66%.
Regression Analysis

Table 1: Factors affecting female farmer participation in agricultural extension activities

| Notation | Variables | Coefficient | P>|z| |
|----------|-----------|-------------|-----|
| CONSTANT | Constant  | -7.465      | 0.000*** |
| AGE      | Age of female farmer | -0.389 | 0.455 |
| AGESQ    | Age squared | 0.0005 | 0.360 |
| MS       | Marital Status | 0.85  | 0.000*** |
| DEPY     | Number of younger dependents | -1.7 | 0.002*** |
| DEPO     | Number of older dependents | 0.482 | 0.000*** |
| INCOME   | Monthly income | 0.0001 | 0.001*** |
| EXPENDTR | Monthly expenditure | 0.0001 | 0.000*** |
| LO       | Land ownership | 0.057 | 0.546 |
| LA       | Labour availability | -0.449 | 0.012** |
| NBWH     | Number of working hours | 0.123 | 0.000*** |
| AVSPD    | Average scheduled program duration | 0.23 | 0.300 |
| AVDL     | Average distance to location | 0.009 | 0.000*** |
| AS       | Availability of subsidies | 0.482 | 0.000*** |
| ATV3M    | Total extension activities held within 3 months (OFFSET) | -1.778 | 0.000*** |

***significant at 1% level, **significant at 5% level, *significant at 10% level
n = 150; Log likelihood = -1020.1225; Prob> chi² = 0.0000; Pseudo R² = 0.1510

Marital status, number of younger dependents in farmer’s family, number of older dependents in farmer’s family, monthly income level, monthly expenditure for the agricultural activities, number of working hours in the agricultural land and availability of subsidies for the particular agricultural activity have an effect on both male and female farmer participation in agriculture extension activities.

Marital status shows a positive relationship with the female farmer participation in agricultural extension activities but it shows a negative relationship with the male farmer participation. Female farmers who are married are participating in agricultural extension activities more than the female farmers who are unmarried. Female farmers who are married have their household responsibilities along with the farm activities. By participating in the extension activities, they can manage their farm activities efficiently with the knowledge given through the extension activities. Female farmers who are unmarried are not much concerned about the participation in extension activities although they have time. If the male farmer is a married person he has the responsibility of earning money, caring family members among other responsibilities. As the male household, there may be a rejection of participation in extension activities. If the male farmer is unmarried he is free from those responsibilities. So, there is a choice for the unmarried male farmer to participate in extension activities.

The number of younger dependents in both male and female farmer’s family shows a negative relationship. When the number of younger dependents increases in the farmer family they do not participate in the extension activities because they have to look after themselves and younger dependents already at school age. There are time barriers for the female farmers to participate in those extension activities. Male farmers also have the responsibility of fulfilling their requirements. Male household head has to spend on their education, health care etc. Then the earnings from the farm activities may not be sufficient to fulfill all those requirements. So the male farmers may seek another career along with the farming activities. When there is no younger dependent or number of younger dependents decreases, the participation in extension activities increases.

Table 2. Factors affecting male farmer participation in agricultural extension activities

| Variables | Coefficient | P>|z| |
|-----------|-------------|-----|
| CONSTANT  | -0.081      | 0.000*** |
| AGE       | 0.0006      | 0.000*** |
| AGESQ     | 2.451       | 0.018** |
| MS        | -0.185      | 0.000*** |
| DEPY      | -0.171      | 0.009*** |
| DEPO      | 0.00007     | 0.020** |
| INCOME    | -0.0003     | 0.000*** |
| EXPENDTR  | 1.137       | 0.000*** |
| LO        | 0.014       | 0.000*** |
| LA        | -0.776      | 0.955 |
| NBWH      | -0.0005     | 0.036** |
| AVSPD     | 0.004       | 0.266 |
| AVDL      | 0.009       | 0.126 |
| AS        | -1.778      | 0.000*** |
| ATV3M     | Total extension activities held within 3 months (OFFSET) | -1.778 | 0.000*** |

***significant at 1% level, **significant at 5% level, *significant at 10% level
n = 150; Log likelihood = -1020.1225; Prob> chi² = 0.0000; Pseudo R² = 0.1510
The number of older dependents in the farmer’s family shows a positive relationship. It means that when the number of older dependents increases in the farmer family, the participation in extension activities also increases. But according to the literature it shows a negative relationship (Harirharan R., 2014). When the monthly income level of the female farmer family increases they are inspired to participate in the extension activities more and more because they can earn more money from farming activities rather than joining with another career. Through the extension farmers are given a new knowledge on farming techniques and scientific knowledge. Through the new knowledge they are encouraged to be successful in farming activities. On the other hand, when the income is getting lower female farmers may seek other careers. There can be negligence towards the agricultural activities. So, their participation in extension activities also becomes lower. But the monthly income level negatively affects male farmer participation in extension activities. When their income levels are getting lower, male farmers are inspired to participate in agricultural extension activities.

Agriculture can be an important engine of growth and poverty reduction (Adams, 2008). But the sector is underperforming in many countries in part because women, who are often a crucial resource in agriculture and the rural economy, face constraints that reduce their productivity (Folasade, 1991). Because men have had more education and training opportunities and greater access to resources than women, progressive farmers tend to be men. Extension approaches are more likely to reach men in any of its institutional forms (Yahaya, 2002). Since women lack access to certain key resources education, land, credit, income, labor, and political power they are not likely to be reached by those approaches. They will be disadvantage with respect to other types of extension programs (Thilakaratne et al, 2002). Through the extension service the farmers are given knowledge on techniques to increase harvest, reduce the wastage of production, introducing new market opportunities etc. Then male farmers can avoid their weaknesses which lead to make their income level lower and get the benefits of new advice given through the extension activities. If the monthly expenditure levels for the agricultural activities are higher, both female and male farmers may tend to participate in extension activities enthusiastically. By that they may expect to seek advice regarding reducing unnecessary cost of production and increase their income levels. If farmers participate in extension activities they are given subsidies for their farming activities so that they can reduce the cost for the planting materials, farm equipment, fertilizer etc. The knowledge regarding how to reduce production cost and waste management are also given. Through that knowledge farmers can reduce their monthly expenditure level for agricultural activities and earn more profit.

The number of working hours in the agricultural land shows a negative relationship. It indicates that if farmers spend more time in farming activities there is no time to participate in extension activities. If the number of working hours in the field is low their participation in extension activities increases because they are no time barriers.

Availability of subsidies for the particular agricultural activity shows a negative relationship. It indicates that although the subsidies are given to the farmers for their agricultural activities they may not participate in extension activities because the number of subsidies given may not be sufficient for them. For example, farmers are given fruit plants to grow in their field or home garden. But some farmers are not satisfied with one or two plants, and they expect more. Further, male farmers have an aversion to spend time to collect those subsidies.

Average distance to the location where the extension activity is done shows a positive relationship and it significantly enables female farmer participation in extension activities. That means if there is a short distance to the location farmers may not participate in the extension activities. But according to the literature it shows a negative relationship.

Labour availability for the female farmer’s agricultural activities shows a negative relationship. Labour availability means that there are family labourers to help the farming activities of female farmer. So, there may be no labour cost. Also, female farmer can get more ideas regarding farming activities from her own family members. Then there may be negligence in participation in the extension activities. But if they hire labourers for their farming activities female farmer has the responsibility to train her labourers, to give new knowledge on farming techniques, pest and disease management techniques etc. For that it is beneficial for farmers to participate in extension activities.

Average distance to the location where the extension activity is done and labour availability for the agricultural activities are not significant factors for the female farmer participation in agricultural extension activities.

Age squared shows a positive relationship with male farmer participation in agriculture extension activities. When male farmers are at young age they do not like to engage themselves in full time farming activities. Then the participation of male farmers in those extension activities becomes lesser. When they become middle aged or old they learn to join with full time farming activities. With that situation there is a tendency to participate with extension activities also.

Land ownership is positively and significantly having an influence on the male farmer participation in agricultural extension activities. If they have the ownership of the agricultural land, male farmers may tend to participate in the extension activities. If the male farmer owns the agricultural field, there is a freedom to make his own cultivation in the land. Advice given through the agricultural extension activities may be supportive to come up with magnificently cultivated agricultural land.
CONCLUSIONS AND RECOMMENDATIONS

Civil status of female farmer, time barriers, inflexible domestic activities and improper extension activities are the major barriers of the participation of female farmers in agricultural extension activities.

Time barriers, household responsibilities, economic problems, lack of inspiration are the major constraints of participation of male farmers in agricultural extension activities. Both female and male farmer participation in agricultural extension activities still remains low in the study area.

Agriculture is still remains as a major source of livelihood and income for both male and female farmers. They have to face a lot of challenges to acquire necessary resources to increase farm productivity and income. Female farmers are still struggling to perform their roles and activities in farming by unequal rights, access to and control over productive resources and cultural restriction imposed by gender. The domestic obligations of women farmers restrict their mobility, time and energy to do farming activities. But male farmers are not facing those challenges. Male farmers have full access and control to village level and retail markets as they have to sell their products to meet household and personal needs. It is important to ensure that extension activities are easily accessed by women farmers as well.

With conclusions drawn the study suggest following recommendations to the policy makers.

- There should be a well-planned extension service to create tendency in younger generation to involve with the farming activities.
- Both male and female farmers should be inspired by viewing the benefits of extension service to participate in the extension programs.
- Well prepared programs on the farming activities should be there for the extension activities such as soil tests in agricultural fields, soil conservation programs and crop clinics. For that there should be more and more awareness programs concerning the importance of such kinds of extension programs.
- Farmers should be attentive on both traditional knowledge and new technological knowledge.
- The farmers should be given economic goals to earn more profits from the farming activities. Through that their negative perspectives towards the extension activities can be avoided from their mind.
- There should be more consideration on extension activities available for the farmers who are engaged with the mushroom cultivation and bee keeping requires more consideration

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