Proceedings of 12th Agricultural Research Symposium (2013) 434-438

Estimation of Paddy Farmers' Income Loss due to Drought: A Case in Kurunegala District

W.M.P.M. WEERASEKARA, N.R. ABEYNAYAKE and A.M.C.M. ATTANAYAKE

Department Of Agribusiness Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawilla (NWP)

ABSTRACT

Paddy cultivation in Sri Lanka can be seen in many parts of the country as most of the people in Sri Lanka have rice as their staple food. Kurunegala is the third largest paddy producing district in Sri Lanka, where it has been significantly contributed to the paddy production of the country over past few years and there are so many people carrying out their lives from it. Various climatic risks are affected to the paddy production in Sri Lanka. Thus, the main purpose of the study was to estimate the paddy farmers' income loss due to drought in Ibbagamuwa Divisional Secretariat (DS), in Kurunegala district during the Yala season of the year 2012 (April to September). Data were collected at random from sixty selected paddy farmers scattered in the Ibbagamuwa DS area from January to April 2013. Both descriptive and inferential statistics were used to analyze the data. The outcome gathered from paired t-test, highlights that the paddy farmers have gained 95% loss of income due to drought that prevailed in the Yala season of 2012. With respect to the qualitative analysis, most of the farmers have not contributed to the insurance schemes due to lack of knowledge. Hence, the study suggested that strengthening of extension services, innovation of drought tolerant rice varieties and introduction of agricultural insurance schemes to the paddy farmers may overcome the risk associated with natural calamities like droughts.

KEYWORDS: Drought, Income loss, Paddy cultivation

INTRODUCTION

Paddy sector plays a vital role in Sri Lankan economy with a contribution of 1.5% to total GDP. Paddy cultivate as wetland crop in the all districts of Sri Lanka especially in Ampara, Polonnaruwa, Kurunegala, and Anuradhapura. There are two cultivation seasons namely; Maha and Yala which are synonymous with two monsoons. Maha Season falls during "North-east monsoon" from September to March in the following year. Yala season is effective during the period from May to end of August.

Around 879,000 farmer families engaged in paddy cultivation in Sri Lanka. They are 20% of the country's total population and 32% of the employment (Anon, 2012). In year 2011, 1218,000 ha of land devoted to paddy cultivation (Anon, 2011). In Sri Lanka, 64% of paddy is cultivated in Maha season while 35% is cultivated in Yala season. However, the whole area devoted for paddy is not being cultivated mainly due to the impact of adverse weather conditions such as droughts, floods, etc.

Drought is an important and recurring climatic risk that has received a lot of public attention, especially because it often results in severe economic hardship to farmers (Smakhtin and Hughes, 2012). In Sri Lanka, drought proneness of the intermediate zone and dry zone are relatively high with compared to the Wet zone. All agro-ecological regions (AERs) in the low country intermediate zone are vulnerable to droughts. Excluding the AERs that adjoin the high rainfall receiving AERs of the wet zone, all other AERs of the mid country intermediate zone are also prone to droughts. In contrast to Yala seasons, almost all AERs of the dry zone are less likely to experience droughts during Maha seasons except those located in the extreme North Western and South Eastern regions.

North western province (NWP) is the third largest paddy producing region in Sri Lanka. Kurunegala and Puttalam are the two districts of NWP and Kurunegala is more popular for paddy cultivation than Puttalam. In year 2011 (Yala season) Kurunegala district had the highest paddy land use (63224.7 ha) in Sri Lanka (Chithranayana and Punyawardana, 2011). However, contribution to national paddy production was only 13% (Anon 2010). But when consider about the districts like Ampara and Polonnaruwa, their paddy land use were comparatively lower than Kurunegala district. However it contribution to national paddy production were 15% and 14% respectively. That reveals Kurunegala district productivity is much lower than other district, even though large amount of lands devoted to paddy cultivation. High proneness to weather related risk might be the factor affecting for this phenomena.

When consider about Kurunegala district total paddy production and gross extent sown has not been much changed over past few years (Table 1). Further, the data prove that all

the time harvested extent considerably lower than sown extent (Table 1). Weather related risks are the main factors for this decline because most of these cultivations were mainly based on rain fed and minor irrigations schemes.

Table 1: Paddy Statistics of Kurunegala District

Year	Gross Extent Sown (ha)	Gross Extent Harvested (ha)	Total Production ('000 Kg)
2012 Yala	41535.223	15159.109	54516
2011/ 12 Maha	62647.773	56742.51	235246
2011 Yala	63224.696	60925.506	254716
2010/11 Maha	81297.976	80240.486	280632
2010 Yala	56705.668	56409.717	237402
2009/10 Maha	68787.449	68051.822	289256
2009 Yala	48936.842	46535.628	173316
2008/09 Maha	77323.482	76844.534	319110
2008 Yala	68941.296	68217.409	226292

Source: Department of Census and Statistics

In 2012 Yala season Kurunegala paddy farmers obtained lower yield than they expected due to severe drought condition that they experienced in the first quarter of the year (Table 1). However, the official assured that there was a surplus of paddy in the 2011 Maha and Yala harvests and the country was not in any immediate danger of facing a rice shortage. The statistics of Agriculture ministry shows that while the national targeted acreage for cultivation during Yala season in 2012 was 494,100 hectares only 348,761 hectares have actually been cultivated and the estimated harvest was 1.25 million metric tons (Anon, 2012). This situation makes them trouble, because most of these farmers main income source is paddy and they recover their investments and bank loans by using their income.

Therefore, the main objective of this study was to estimate the paddy farmers' income loss due to drought in Kurunegala district, Ibbagamuwa divisional secretariat (DS).

METHODOLOGY

The Kurunegala district was selected for the study due to its greater contribution to the paddy cultivation of Sri Lanka. Ibbagamuwa DS is the second largest paddy growing area in Kurunegala district and selected as a case to study the income loss from paddy cultivation. Hence, the study was carried out in purposely selected six Grama Niladari (GN) divisions in Ibbagamuwa DS namely Thalgodapitiya, Aragama, Udathammita, Pannala, Muruthawa and Ibbagamuwa. These areas were selected by using a list of 30 GN divisions and That GN divisions were selected by based on the available paddy land extent and the irrigation system (major, minor and rain fed) was also considered in selection.

Data Collection

The primary data of this study were collected by the means of structural questionnaire, which consisted of three parts, as general information, expenditure information as well as income information. The questionnaire was pre tested prior to survey with a sample of 15 randomly selected paddy farmers in the study area. The survey was conducted by randomly selecting 60 paddy farmers in the identified area.

Data Analysis

Data were statistically analyzed by using Minitab (version 15). Both descriptive and inferential statistics were used to analyze the data. Most of demographic factors such as age, sex, education level, etc. of the sample were analyzed by using descriptive statistics. Paired t test analysis was utilized to find out the significant differences between Yala yield in 2011 and Yala yield in 2012. Further paired t test was used to see whether there is any significant difference among income earned by the farmers in the area due to severe drought that they experienced in year 2012.

RESULTS AND DISCUSSION

Descriptive Statistics

According to the information gathered from the survey, the majority of paddy farmers (60% of the total sample) were categorized into the above 50 year age group (Figure 1). It reveals that the young generation is not interested in paddy farming in the study area. All the farmers have cultivated during both Yala and Maha seasons in the region.

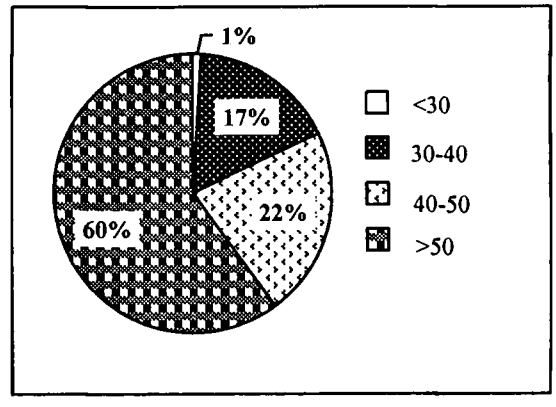

Figure 1. Age distribution of farmers in Ibbagamuwa in Kurunegala district

Among the total respondents 95% of the farmers were males and 5% of them were females. Therefore, results revealed that the paddy farming was dominated by males. It can be backed by the role of the male as the bread winner of the family. Most of the families (33 %) had at least 3 family members.

Forty percent of farmers' secondary income was in between Rs.15000 and 30,000 (Table 2). However, the majority of farmers have not involved in other occupations. It shows that most these farmers are full time paddy farmers. Further, it reveals that income generation from paddy cultivation is very important for the farmers in the area.

Table 2. Descriptive statistics of the sample

Parameters	Percentage (%)
Gender	
Female	5
Male	95
No of family members	
1	10
2	30
3	33
4	23
5	2
6	2
Secondary Income (Rs)	
<15000	25
15000-30000	40
30000-45000	22
45000-60000	8
>60000	5
Education level	
No schooling	13
Primary	54
Secondary	30
Tertiary	3
Extent of land (ac)	
<0.75	27
0.75-1.5	50
1.5-2.25	10
2.25-5	13

Most of the farmers have obtained only primary education (Table 2). When considering the extent of land, 50% of farmers have cultivated paddy in 0.75-1.5 acres of land. They can be categorized as small or medium scale farmers. Farmers, who cultivate paddy in Ibbagamuwa DS, have scarcity of land areas. But most of the farmers have not rented land due to uncertainty of the yield. They mentioned that the last ten years time period, they have faced several climatic as well as economic problems. Therefore, now farmers are fed up with paddy cultivation.

Out of those 60 farmers there were 45% of farmers consumed 660-880 Kg/per season. One of them was getting loans from bank and all the others were using their own capital for paddy cultivation. The farmers mentioned that, they have trepidation to bank loans due to uncertainty of climatic effects. The majority (95%) of farmers have sold their paddy yield. Out of 60 farmers, two farmers have not sold their yield and rests of the farmers have sold paddy harvest to the retail market. The majority (67%) of the farmers have used part of their income as next season expenditure (Table 3). Out of total farmers, 33% of farmers not used parts of their income as next season expenditure.

Table 3. Other information

Parameters	Percentage
Self-consumption Amount (Kg)	
<440	3
440-660	28
660-880	45
>880	24
Selling place	
Retail	2
Farmers market	95
Not selling	3
Financial assets	
Bank loan	2
Own capital	98
Next season expenditure	
Yes	67
No	33
Expenditure for next season (Rs)	
<10000	21
10000-20000	36
20000-30000	26
>30000	17

Variation of Profit Loss

There was a minimum profit loss in 2011 Maha season while comparing the profit loss percentages in 2011 Yala season. According to the scores given by the DOA, drought can be seen in each and every Yala season and farmers obtain low yield in the Yala season

while comparing Maha season. That is a common situation of paddy cultivation.

But when comparing profits in the 2011 Yala and 2012 Yala seasons, it indicated that the 2012 Yala profit was lower than 2011 Yala season profit (Table 4). It reveals that the yield of 2012 Yala has been significantly affected from severe drought.

Table 4. Variation of profit loss with irrigation system

Irrigation system	Profit loss percentage		
	2011 Yala	2011 Maha	2012 Yala
Minor	10	5	95
Major	3	3	85
Rain fed	5	5	95

Rainfall is a major climatic condition which is highly important to the paddy cultivation. Rain fall is essential for the stage of seed sowing to maturity. But when comparing the rainfall distribution in 2011 and 2012, rainfall in 2012 was comparatively lower than rainfall in 2011. (Figure 2).

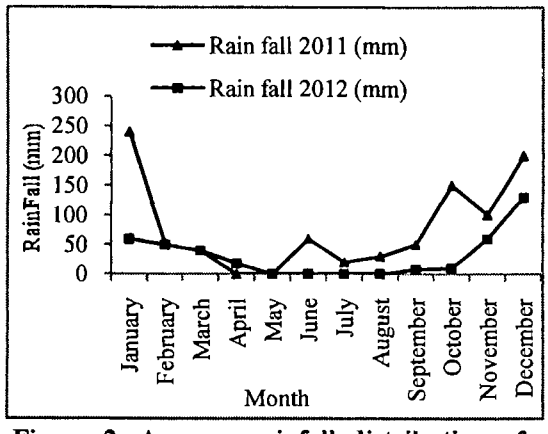

Figure 2. Average rainfall distribution of 2011 and 2012

According to the mean values given by the descriptive statistics, the highest yield obtained from 2011 Maha season. Generally Yala season yield is comparatively lower than Maha season yield. However, farmers were getting considerable yield in Yala season. But when comparing 2011 and 2012 Yala yields the lowest mean value was given by 2012 Yala season. It proved that drought was affected the yield distribution (Table 5).

Table 5. Distribution of yield of 2011 Yala, Maha and 2012 Yala (from descriptive statistic)

Season	N	Mean (Kg/ac /Yr)	Min (Kg/ac/ Yr)	Max (Kg/ac/ Yr)
2011 Yala	60	2052	280	2640
2011 Maha	60	2294	352	2800
2012 Yala	60	986	0	1265

A paired t-Test was used to find out the significant differences between 2011 Yala income and 2012 Yala income of the paddy farmers in the study area. According to the scores given by the paired t-test at 95% confident level, 2011 Maha and 2011 Yala season income have a significant income distribution. Significance measured according to the p value. Farmers had relatively high income in 2011 Maha season (Table 6), because of the 2011 Yala yield was comparatively lower than the 2011 Maha season yield (Table 5). According to the information gathered from the survey indicated that the low yield created low income.

Table 6. 2011 Yala versus 2011 Maha income (Rs)

Mean income (2011 Maha)	Mean income (2011 Yala)	Difference of mean income	P value
49258	43212	6045	0.000

Note:*significant at 95% confidant interval

The survey was carried out to find out the paddy farmers' income loss due to drought in 2012 yala season. The income was significant at 95% confident level. It implies that there was a significant difference in between 2011 Yala versus 2012 Yala income. 2011 Yala have obtained Rs. 43212 mean income value, which was higher than 2012 Yala season mean income value (Table 7). Most of the farmers stated that 2012 Yala season paddy yield was totally destroyed by the effect from severe drought. Not only that the majority of farmers failed to survive paddy yield for their own consumption. The ultimate result is to estimate income loss due to drought. There was a 95% income loss was given by the 2012 Yala season.

Table 7. 2011 Yala versus 2012 Yala income (Rs)

Mean income (2011 Yala)	Mean income (2012 Yala)	Difference of mean income	P value
43212	2428	40784	0.000

*Note: *significant at 95% confidant interval*

CONCLUSIONS

This analysis mainly discovered paddy farmers, income loss due to drought in Kurunegala district, Ibbagamuwa DS.

Farmers who cultivated paddy under major, minor and rain fed conditions; they lost their income due to severe drought. There was a 95% income loss as well as profit loss. However, few of them survived their yield only for their self-consumption.Moreover, according to paired t- test; it was proved that there was a significant yield and income difference between 2011 and 2012 Yala. However farmers gained their usual profit and income in 2011 Yala season with respect to the 2012 Yala.

Further the study claims that none of the farmers have used insurance schemes due to lack of knowledge. Innovation of drought tolerant rice varieties, keep good management practices, improve farmers' knowledge through agriculture extension would help to avoid those economic losses. Moreover, to minimize such type of income losses it is worth to introduce private or government sector insurance schemes for all paddy farmers in these areas.

ACKNOWLEDGEMENTS

Authors would like to express their gratitude to all the respondents for their valuable cooperation in responding to the questionnaire in spite of busy working schedule.

REFFERENCES

Anon, (2010). Annual Report Central Bank, (2010). Central Bank of Sri Lanka, Colombo (Accessed 3 March 2012).

Anon, (2011).Department of Agriculture (2011). Available from: http:// www. agridept.gov.lk/index.php/en/publication (Accessed 3 March 2012).

Anon, (2012).Paddy Cultivation in Sri Lanka. Available from: http://www.Paddygrowers.com/index. php/ other-services/90-paddy (Accessed 2 April 2012).

Chithranayana, R.D. and Punyawardena, B.V.R. (2011). Identification of drought prone agro-ecological regions in Sri Lanaka. *Journal of Severe Drought* , **20**, 10-12.

Smakhtin, V.U. and Hughes, D.A. (2012). Estimation and analyses of Drought indices of South Asia. Available from:http://www.iwmi.cgiar.org/Publications/Working_Papers/working/WOR83.pdf (Accessed 2 April 2012).