

The Impact of Rainfall on Paddy Production in Batticaloa District

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Abstract

The high unpredictability of rainfall due to climate change would impact unfavorably, and hence affect the rice production. Therefore, the study is conducted to examine the impact of rainfall on paddy production in Batticaloa district by using correlation analysis. The study utilized secondary data in the period of from 1995 to 2014. According to the correlation analysis, the correlation statistics indicate that there is a weak positive linear relationship between those variable as about 43 percentage. It indicating that if increase rainfall it would lead to raise the paddy yield by 43 percentage. It indicating that if increase rainfall it would induces the paddy yield in Batticaloa district.

Key Words: Yield, Paddy, Rainfall, Batticaloa district

01. Introduction

Rice is the most vital food crop engaging nearly 29 % of the total agricultural land in Sri Lanka. (Chithranayana and Punyawardena, 2014). Likewise, Paddy is a crucial food staple and backbone for the rural population in Batticaloa district which include about 61,321 hectares of paddy land. There are 49,850 agricultural families in Batticaloa district and among the agricultural families most of the farmers occupy on paddy farming (District Secretariat, Batticaloa 2015).

“If the water conditions are appropriate, almost all kinds of soils could be used for rice cultivation” Chithranayana and Punyawardena (2014). Thus, rainfall play an important role on paddy production. It contributes remarkably to paddy farming. “Rice production in Sri Lanka is heavily dependent on the rainfall distribution pattern of the cultivating season” Amarasingha et al. (2015).

The high unpredictability of rainfall due to climate change would impact unfavorably, and hence affect the rice production. Particularly, rained paddy cultivation including over 30 percent of all rice paddies in the Sri Lanka. Among the major rice growing areas Dry Zone, where nearly 70 percent of the paddy is cultivated. It is already viewing an increasing number of consecutive dry days because of rainfall unpredictability. The both dry and intermediate zones are the most vulnerable to drought. In particular, Jaffna, Killinochchi, Batticaloa, Polonnaruwa, Kurunegala and Anuradhapura districts having the highest probability of experiencing drought. “The growth and yield of the paddy grown in these regions are largely determined by the variability of rainfall either positive or negative anomaly” Chithranayana and Punyawardena (2014). They emphasized that “paddy cultivation is highly vulnerable to climate change”. Particularly, crop failures due to delayed onset of rains, early withdrawal of rains, weather deviations, and the occurrence of

different degrees of drought at different stages of crop growth are common in paddy cultivation Chithranayana and Punyawardena (2014).

Therefore, it is important to identify the impact of rainfall on paddy production in Batticaloa district since the economy of Batticaloa district depends mostly on agriculture and fishing. Thus, paddy is cultivated in two main distinct seasons such as Maha season from October to March, and Yala season April to September. Except those two seasons, farmers also grownup paddy in inter seasonal cultivation which called also late Maha¹. During the Maha season, there is usually enough water to sustain the cultivation of almost all rice fields, nevertheless in the Yala season water is available for cultivation of about half the land extent. It is important to mention about the trend of paddy production in Batticaloa district. Farmers' paddy production has not been showing the clear trend in Batticaloa district. It shows fluctuation on farmers' paddy production. Paddy farmers, who reside engage in paddy cultivation. They do not earn adequate yield. In addition, they have been experiencing continuously instability of paddy production. Particularly Yala season has been trending lower average yield and also Maha season has been facing fluctuation in average yield. It may be happened due to inadequate rainfall, early withdrawal of rains and increase in rainfall. In this context, the present study

try to identify the impact of rainfall on paddy production in Batticaloa district.

02. Objective

The main objective of this study is to examine the impact of rainfall on paddy production in Batticaloa district.

03. Literature review

Rice production in Sri Lanka is heavily dependent on the rainfall. Hence, many of the researches have been focused on assessing whether a relationship between paddy yield and rainfall. They found out the mixed results, for example, the following.

The study was conducted on investigation of the factor affecting paddy yields in two districts. Further, their results revealed that climate variable have not influence on yield in Anuradapura district since greatly changes in technological factors. Based on the study, the results showed that total extents cultivated land positively raise the paddy yield. Moreover, transplanting, type of variety, fertilizer and irrigation also played significant role on paddy production. The scholar emphasized that climate variables which are important depend on the technology employed. In Anuradapura district, the Yala season has increasingly depend on major irrigation schemes and temperature was shown to be important, though during the Maha season some farmers still depend on, to a certain extent on rainfall and subsequently rainfall was indicated as an important climate factor (Ann, 1984).

The study was conducted to examine the impacts of climatic changes on paddy

¹It is practiced during February to May by the farmers in some areas with the help of minor tanks.

production in Malaysia by Alam et al. (2014). Their study reveals that both temperature and rainfall have negative impacts on paddy production.

“Diminished rainfall has reduced soil moisture in the study area reducing the water availability and impairing the plant growth” (Bhandari, 2013). Bhandari has conducted a study on impact of rainfall and temperature on the yield of major cereals in Jumla District of Nepal. The study found that decline in rainfall pattern had influenced on rice and maize production adversely in Jumla.

Zakaria et al. (2014) found the results that in North-Eastern regions rice production is proportional to rainfall and maximum temperature does not prominent variables. they indicated that the rainfall effects the rice production prominently. In the South-Eastern region rainfall and maximum temperature both are in repetitive and reveals less effect on production. It shows other variables are prominent in this region. Like that, in South-Western region the both rainfall and temperature are prominent in this region. They emphasized that maximum temperature is the dominant aspect in this region which increases the rice production significantly as they found that rice production increased although rainfall declined expressively in North-Western region and also average maximum temperature was high in this region. Though, they remarked that based on the entire results, both rainfall and maximum temperature may prominent in this region in Bangladesh.

Chithranayana and Punyawardena (2014) who conducted a study to identifying

adaptation measures to the vulnerability of paddy cultivation in the dry and intermediate zones of Sri Lanka, based on rainfall. They have mentioned that during the Maha season, there is usually enough water to sustain the cultivation of almost all rice fields, nonetheless in the Yala season water is available only to about half the land extent. Their study showed that there is a high spatial variability of the onset time of both seasons. Moreover, timely cultivation with the onset of monsoon rains is important to decrease the risk of terminal drought.

Vishwa (2015) found that if one millimeter increase in rainfall in Terai Region would cause 1.59 Kg per hector reduction in paddy yield. Furthermore, the study predicted that more rainfall in future, might have negative impacts in the agriculture sector. Thus, previous studies have shown mixed results regarding on this topic.

04. Methodology

The study has utilized secondary data such as statistical data from Central Banka Annual Report, statistical data from District Secretariat. Further the study also utilized primary data through observation and interview. To examine the impact of rainfall on paddy production in Batticaloa district, the study used correlation analysis by using secondary data during the period of from 1995 to 2014.

Further the study also revealed the relationship between paddy yield and rainfall by using available data.

05. Result

The following table shows the average rainfall and average paddy yield in

batticaloa district based on the Yala and Maha paddy production seasons.

Table 1.1: Average rainfall and paddy yield (1995-2014)

Year	Rainfall	Yield (MT): Yala	Yield(MT): Maha
1995	1404	39,320	59,310
1996	1681.8	26,490	39,410
1997	1631.1	15,817	27,582
1998	1010.4	34,589	86,691
1999	1990.3	46,058	85,980
2000	2021.4	48,188	89,320
2001	1636.3	38,519	97,299
2002	1872.8	44,539	96,291
2003	1858.5	55,186	100,949
2004	2594.7	50,594	112,951
2005	1223.2	50,882	94,394
2006	1306.3	49,031	131,830
2007	1570.2	49,039	37,476
2008	1987.3	61,609	55,020
2009	2056	59,227	147,278
2010	1760.3	73,904	193,274
2011	3581.3	93,003	18,403
2012	1786.6	83,599	213,832
2013	1973.7	96,780	111,948
2014	2518.3	92,806	159,623

Source: Department of Census and Statistics

In Batticaloa district, during the period of Maha season 2011/2012 recorded as 212,832 metric ton which was highest

yield. In addition, yield for per hectare was 3855kg. At the same period rainfall was recorded as 1786.6mm. Extended land also

contributed to obtain highest yield during the 2011/2012 maha season. On the other hand, lowest yield is also recorded as 18,403 in the period of maha season 2010/2011 it may attributed since Batticaloa district was affected by flood. It reveals that rainfall contributed both highest yield as well as lowest yield. Lowest yield was occurred because of flood.

Further, Batticaloa district had experiencing with very lowest yield for per hectare it was 1924kg in 1996/1997 maha season. It happened due to the fact that cultivated land were affected by very lowest rainfall or lack of rainfall.

Like that, during the Yala season, in particular 2013 Yala season was recorded as 4919kg of highest yield of paddy for per hectare conversely 2001 Yala season. during the period of 2013, highest yield may be obtained due to enough rainfall to cultivate paddy. In general yield for per hectare has tended of flexible.

When compared to paddy yield and rainfall, particularly 1995 / 1996, 1996 / 1997 and 2006 / 2007 Maha seasons showed whether when experiencing with declining rainfall, yield also showed decreased trend continuously. Rainfall was lower during the 1997 / 1998, 2000 / 2001, 2004 / 2005 and 2005 / 2006 Maha seasons even though, the trend of paddy yield showed increasing level. When compared to previous year, in 2006 / 2007 and 2007 / 2008 maha seasons rainfall was increases though paddy yield not highest than before.

Further, during the seasons 2008/2009, 2009/2010, 2011/2012 and 2013/2014

paddy yield was increased based on increased rainfall. Even though, paddy yield was felled in 2010/2011 since rainfall was highest. It reveals that rainfall contributed both highest yield as well as lowest yield. Lowest yield was occurred because of flood. As well as whenever batticaloa district experiencing with inadequate of rainfall, it led to lower yield.

The study had evaluated correlation analysis to examine the relationship between paddy yield and rainfall in Batticaloa district. According to the correlation analysis, the correlation statistics between paddy yield and rainfall was about 0.4266 which indicate that there is a weak positive linear relationship between those variable as about 43 percentage. It indicating that if increase rainfall it would lead to raise the paddy yield by 43 percentage. It indicating that if increase rainfall it would induces the paddy yield in Batticaloa district. The result is dissimilar with the Ann (1984) who argued that climate variable has not influence on yield in Anuradapura district.

06. Conclusion

The study was conducted to examine the impact of rainfall on paddy production in Batticaloa district by using correlation analysis since the economy of Batticaloa district depends mostly on agriculture. The experience of batticaloa district corresponding to paddy cultivation, it reveals that rainfall contributed both highest yield as well as lowest yield. Lowest yield was occurred because of flood. As well as whenever batticaloa district experiencing with inadequate of rainfall, it also led to lower yield.

In general, sufficient rainfall associated with higher yield conversely when experiencing with either more rainfall or insufficient rainfall lead to lower yield of paddy production. Thus, rainfall impact positively on yield of paddy, even though if insufficient rainfall as well as increased rainfall also would not corresponding with higher yield of paddy. Correlation results also showed weak positive linear relationship between paddy yield and rainfall.

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