

Changing Scenario of Red Chilli Cultivation after Cyclone Aila in Haripur

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ABSTRACT

Cyclone Aila was hit the Bengal coast which is under Indian Sundarban on 25th May, 2009. It destroyed the agriculture system of this area. It also affects chilli cultivation of the Indian Sundarban. This paper aimed to find out the effects of Aila on change of production of chilli, to examine the causes of chilli cultivation, to assess the changes of area of chilli cultivation. Under observational study design, descriptive study method has been applied for this study. The study area Haripur which is a mouza located in western bank of Saptamukhi River in South Western Sundarban in Namkhana block which was affected very extensively. It is a part of Haripur Gram Panchayet. In this study cadastral map has been used for plot to plot survey to explore chilli cultivation change. Landsat -TM satellite image which captured on 26th May, 2009 has been used to delineate the flood area through setting standard FCC colour composition method by Image processing software QGIS-2.14.10. During the survey and field visit some peoples and local surveyors were interviewed and surveyed for plot to plot chilli cultivation area identification. Primarily chilli cultivation plots were plotted on cadastral map and since that after Aila temporal final chilli cultivation maps have been prepared by author. After all author is belongs to the study area. So his observation and knowledge about the study area ANOVA analysis has been used through MS Excel for analysis of changing chilli cultivation. The result shows that chilli cultivation areas are rapidly decreasing. The main cause is pest attack. Study also has found that the other important causes are increase in temperature, water crisis, salinity enhancement etc.

Keywords:

INTRODUCTION:

Aila, a tropical severe cyclone was fallen on West Bengal coast before nine years ago. It totally devastated the area of Sundarban as per human livelihood is concern. Simultaneously agricultural activity was affected by this cyclone due to aggressive ingress of high saline water. Chilli cultivation among the other crop cultivation most affected crop cultivation. Cultivators are not showing interest for this cultivation. There are many causes for this situation. The scenario has been totally changed especially red chilli cultivation which is started in winter season and collected in pre monsoon.

LITERATURE REVIEW:

Several researches conducted to assess the impacts of Aila. Roy et al [1], Baten [2], Halder [3], Jahan [4], Sharmin and Naznin [5], Mukherjee et al. [6], Moniruzzaman et al [7], Kabir[8], Kabir et al[9], Kar and Bandyopadhyay [10], Chakraborty [11], Mallick, Ahmed and Vogt [12]. Lahiri [13] found out that 64% farmland of Sundarban occupied by Red Chilli cultivation. He also measured the production of dry chilli in Rabi season. Mondal [14] investigated that the farmers of Sundarban do not get huge profit but they are trying to get good return. So the people had decided to cultivate chilli in this saline belt over the decades. Barring the soil and climatic problems, chilli still now, is the first choice of the Sundarban farmers. The crop has another advantage that it can be stored as dry chilli. He studied that chilli cultivation in Sundarban is simultaneously facing a stiff challenge due to high prevalence of leaf curl complex. In the leaf curl complex, simultaneous attack of two pests (yellow mite and thrips) and predisposition of the chilli leaf curl virus have been well documented, yet which biotic stress incite the complex most is still not very much clear. He mentioned that according to agro-ecosystem analysis, Sundarban belongs to 'CDR System' which implies Critical, Diversified and Risk prone area. The agrarian system in Sundarban faces the problems of salinity in both soil and water, poor drainage system during rainy season and poor irrigation opportunity. Patel and Mondal [15] examined that chilli leaf curl causes huge crop loss in Sundarban Islands that occurs primarily due to attack of thrips, yellow mites and white fly followed by invasion of chilli leaf curl virus. Their attempt was made to find out the cost effective management schedule to minimize the crop loss. Chand, Trivedi, Dubey and Beg [16] reported that during winter people grows chilli. Chilli production disturbed due to temperature rise and pas attack. The scarcity of rainfall in the period of Rabi cultivation necessitates supplementary irrigation. Early monsoon in the month of May hampers the harvesting of chilli. They mentioned that water requirement of crops like chilli is 15 cm.

Mondal, Saha and Acharyya [17] analysed that hot pepper (*Capsicum annum* L) commonly known as chilli, is an important commercial crop of this region as it sustains to higher levels of salinity, drought tolerance and easy storability. Again, poor communication related to weather forecasting is also an important problem. Simultaneously chilli leaf curl complex is another problem, whose prevalence is quite high. The present scenario is very bad. Chatterjee [18] explained chilli (bell pepper) is an important vegetable as well as spice crop in Indian Agriculture. Though India ranks first in the world with reference to area and production of chilli, however the average productivity is very low in comparison to other countries. A major constraint in chilli production is direct damage to fruit by different types of pest at vegetative growth of plants. As chilli is one of the most popular and profitable crop, farmers everywhere feel the need to protect such high value crops from any type of damage caused by insect pests. They often use synthetic insecticides indiscriminately and insect resistances to insecticides are very common in the tropics. The author recommended organic pesticides to control chilli damages by thrips and fruit. Chowdhury, Maiti, and Bhattacharyya [19] studied that people of Sundarban trying to recover from agricultural loss due to cyclone Aila by cultivation of newly structured and oriented crops like chilli, tomato, eggplant garden with organic agriculture. Balaji and Chandran [20] examined the influence of such factors on output of chilli in two different production conditions, namely irrigated and rainfed, within a dry land agricultural system by using primary data. Their results revealed that number of irrigation significantly increased chilli output. Factors like seeds, manures, fertilizers and plant protection chemicals also had significant positive impact, with varying degrees under irrigated and rainfed conditions. Still, inefficiency was observed in resource use, particularly in labour (in both conditions) and seed-rate (in rainfed condition). Costs and prices realised were higher in irrigation crop production, which ultimately resulted in increased returns. Shortage of agricultural labourers, high wage rates, excess rain during harvest but paucity of water at seed germination and early growth stages followed by pest and disease incidences were critical constraints in chilli production. Danda [21] found that low precipitation and extreme summer temperatures damaged my chilli pepper crop. Subsequent disease outbreaks killed the chilli pepper plants. Author also mentioned chilli peppers are important cash crops in Mousuni Island under Namkhana block.

Yadav [22] examined that Suryamukhi and NP-46A are the most suitable for high yields. Chilli cultivation is going with very short irrigation. Source of water is rain water which is harvested in ponds like water bodies. Samanta [23] studied that impact of Aila on agriculture in Haripur. He found that chilli is one of the important crop which damaged in large amount in this area. He also assessed that after Aila people did not cultivate chilli in Rabi season. Chakraborty [24] investigated on the impact of severe cyclone Aila on agriculture in Kultali block. He found massive agricultural damages which includes agricultural land, crops etc. Development Research Communication and Services Centre [25] reported that people has lost large amount of chilli crops like other crops due to washed action of storm surge due to Aila. Organization also had formulated management plan to recover from this problems. They have also suggested to farmer that chilli cultivation would be best in the Rabi season. Debnath [26] assessed the impact of Aila on agriculture in Gosaba block on Indian Sundarban. He studied about the crop damages in this area.

OBJECTIVES:

- To assess the geographical changes of chilli cultivation area
- To find out the causes of chilli cultivation problem

METHODOLOGY:

The study is based on primary and secondary data. To complete the objectives of the study the whole work has been completed through three stages: (1) Pre-field study: Literatures, relevant information from newspapers, various reports published by different government and Non-government Organizations were studied. Cadastral maps (1954) published by Govt. of West Bengal and Satellite image (LANDSAT –TM, captured 26th May, 2009) from United States Geological Survey web portal had been collected for this study as materials. (2) Field Study: As the author belongs to the study area, chilli cultivation area wise data were collected very precisely from the field by plot to plot survey through conversation with the affected people and local surveyor and ground inspection. All field data have been compiled and superimposed on the cadastral map during field survey by conversation with local surveyor and inhabitants and cultivators of the study area. During the field visit questionnaire surveys were done by self prepared questionnaire by author on 30 cultivators to understand changes of chilli cultivation. Survey questionnaire has been made with 4-point Likart scale which expressed as Strongly Agree, Agree, Disagree and Strongly Disagree where strongly agree rated as 4 and strongly disagree rated as 1 with respect to five groups like pest attack, temperature

rise, water crisis, salinity increased after cyclone Aila and high cultivation cost . (3) Post field study: In this phase collected maps on which field data were plotted are scanned and digitized by GIS platform (QGIS 2.14.10). After that chilli cultivation maps (year wise) have been prepared. Hypothetical test like Anova test has been applied to establish the rationale of the findings like causes of change of chilli cultivation through the scores of questionnaire. At last collected information and data, prepared maps have been analysed and interpreted.

STUDY AREA:

Administratively the study area Haripur mouza is located within Haripur Gram Panchayet under Namkhana CD Block, in South 24 Parganas district of West Bengal, India. It was the worst affected area due to Aila. The area of affected part is 310.72 hectares or 1935.25 bigha (1 hectares = 6.23 bigha). The study area extended in latitude from 21°37'00" N to 21°38'56" N and in longitude from 88°16'36" E to 88°17'55" E. The Saptamukhi River boarded the east of this area. North, West and South side of this area are bounded by Ainsley Creek, Maharajganj and Debnibas and Bijoybati mouza. There are embankments along the creek and river.

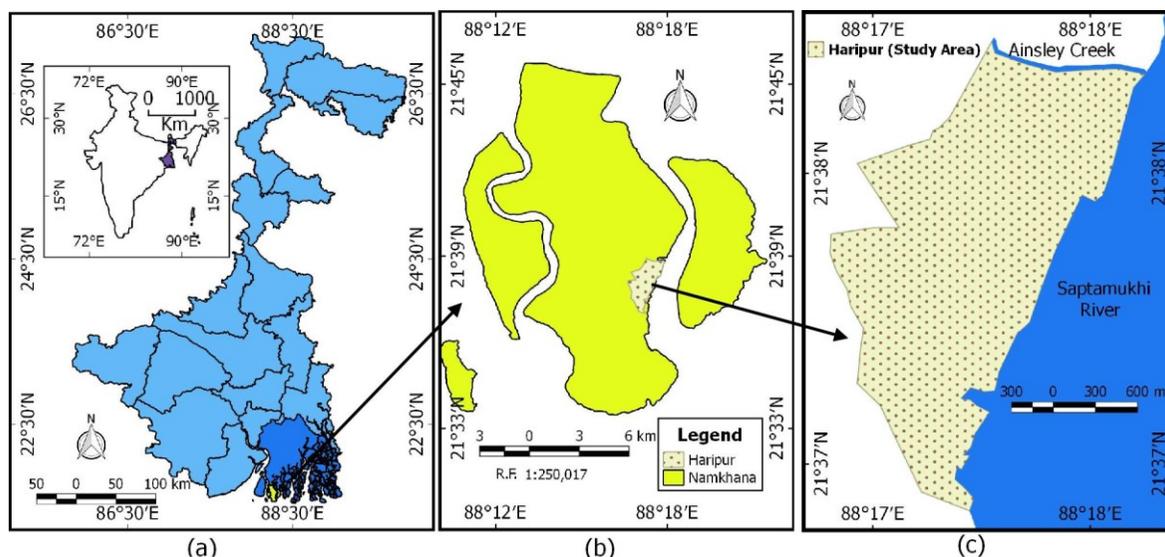


Figure 1: Location Map of the Study area

RESULT AND DISCUSSION:

Chilli cultivation of the study area has been changed drastically after Aila the severe tropical cyclone. After the field survey chilli cultivation area maps have been created by GIS technology. The prepared maps show the chilli cultivation area of before Aila as 2008, 2011, 2014 and 2017. Figure 2 shows the changing scenario of chilli cultivation area which has been decreased after Aila. Another scenario is that cultivation area remains in the western part of the study area. Eastern part of the study area has been given up the cultivation almost.

There may be many causes for this change. An interview based survey was conducted to explore these reasons. The result of this survey shows that most important cause is pest attack because most of the people opined to this option. Other important factors for reduced chilli cultivation are also the increase in warmth, the water crisis, the increase salinization of agricultural land. In the table below, the average values of opinion are showing that.

Anova test has been applied to identify the major causes for changing of chilli cultivation. Here the summery (Table 1) shows that maximum mean value is seen in pest attack and minimum mean value is seen in high cost of cultivation (Mean value = 2.77). So it can be consider that pest attack (Mean value = 4) is main cause for changing chilli cultivation. According to importance with descending order, other causes are pest attack, temperature rise, water crisis and increased salinization after Aila. These groups contain the mean value between 3 and 4.

Table 1: Anova Summary

Groups	Count	Sum	Average	Variance
Pest attack	30	120	4	0
Temperature rise	30	105	3.5	0.6
Water crisis	30	100	3.33	1.12
Increased salinization after Aila	30	102	3.4	0.93
High cost of cultivation	30	83	2.77	1.28

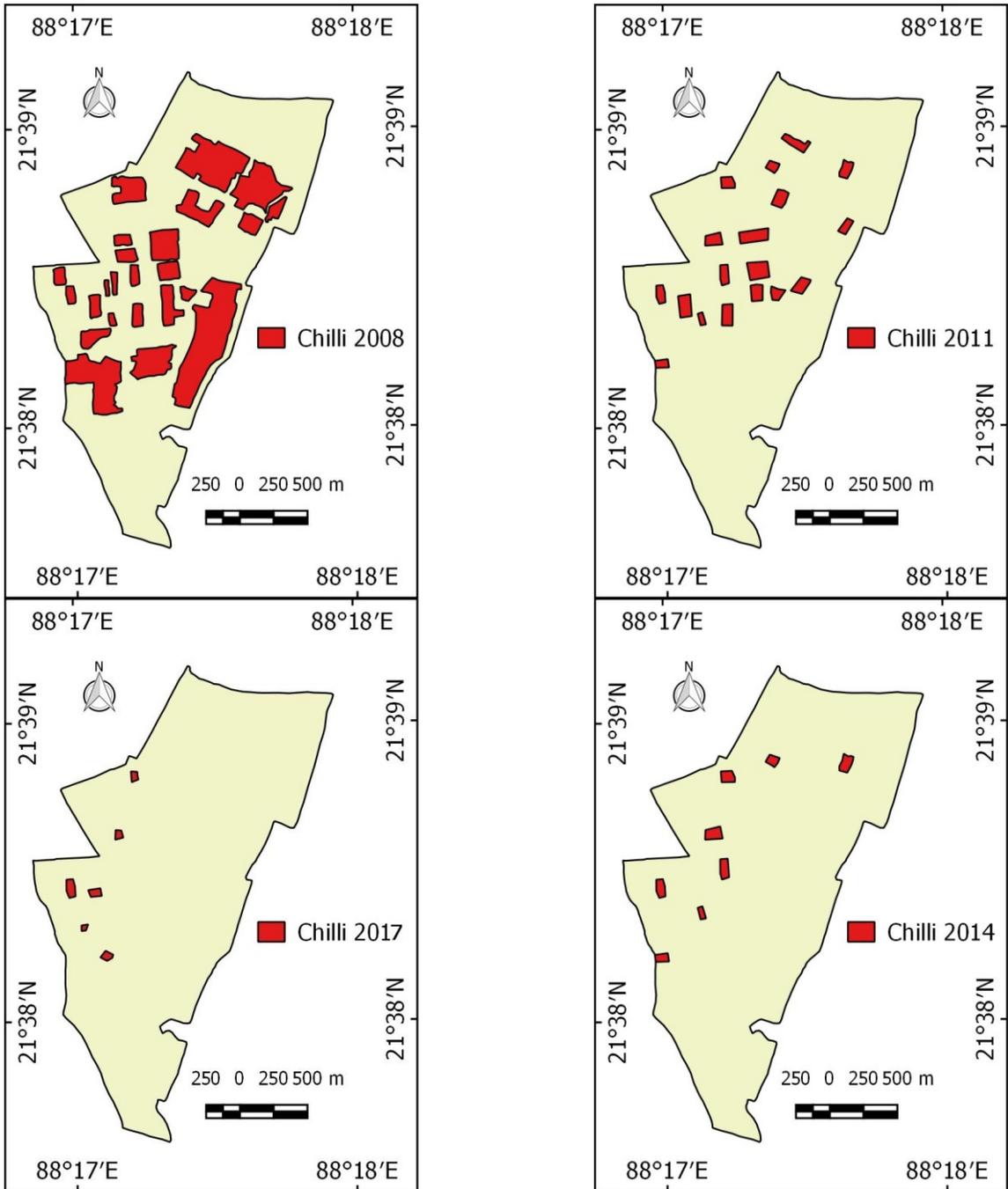


Figure 2: Changes of chilli cultivation area: Clock wise top left to bottom left 2008, 2011, 2014 and 2017. (Based of cadastral survey prepared by Author)

On the other hand Anova result (Table 2) shows that calculated value ($F_{cal} = 7.35$) is more than critical or table value ($F_{crit} = 2.43$) and p value is 0. So null hypothesis is rejected and alternative hypothesis is accepted. It can be concluded at level of significance 0.05 that there is difference among the causes of chilli cultivation. If we consider mean value of causes highest mean value is contained by pest attack. Other causes are temperature rise, water crisis, increased salinization after Aila and high cultivation cost respectively according to mean value.

Table 2: Anova Results

Source of Variation	SS	df	MS	F_{cal}	P-value	F_{crit}
Between Groups	23.26	4	5.81	7.35	0	2.43
Within Groups	114.73	145	0.79			
Total	138	149				

CONCLUSION:

From the above result and discussion, it can be concluded that the area of chilli cultivation is rapidly decreasing in Haripur. The reason for this can be identified as disease and pest attack. Other important factors are the increase in heat, water crisis, salinity enhancement, besides farmers are not benefitted as before. The market price has increased due to the decrease in the cultivation. But if these problems are to be solving, then the government or the voluntary organization will be able to solve it.

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