# "Pesticides Affects Biodiversity of the Region around Small Tea Gardens" –With Special Reference to Coochbehar District, West Bengal, India

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*Abstract*— The complete economy of North Bengal is mainly reliant on tree, tourism, tobacco and tea. Tea is the major one which leads to the economy of North Bengal. The cultivation of tea by using small land is fast gaining recognition among the farmers as it yields high profit. Small Tea Industry is an important part of tea industry. It is a rural based agro industry. Small Tea Growers (STGs) constitute an integral part of tea industry. The STGs covered 2.5 lakh hectares of land in India. Tea industry being the largest industrial sector of the northern part of west Bengal is playing a dominant role in the economy of the state. It is the largest single industrial sector in the northern part of the state, which is contributing a larger share in the state income of this part of the state. This study is based on primary data collected from 100 respondents of Coochbehar District by using purposive sampling method. Although Small tea growers are taking advantage by rising use of chemical fertilizers and pesticides in the small tea gardens, it harmfully effects on the environment. The rural environment is likely to be slowly but surely deteriorating due to the short of environmental awareness and unsuitable use of chemical fertilizers, pesticides. Obligatory steps are yet to be taken to defeat the problems relating to the use of chemical fertilizers and pesticides in the small tea gardens of Coochbehar district of West Bengal. An endeavor has been made in this paper to know the environmental effects of using chemical fertilizers and pesticides in the Small tea gardens of Coochbehar district of west Bengal. It is earnestly necessary to take positive steps to protect the nature and to save Biodiversity scenario of the region around the small tea gardens in Coochbehar district of West Bengal.

***Key words:*** Tea, STG, Pesticide, Biodiversity

## I. INTRODUCTION

The tea is a noteworthy part of Indian agricultural system. India is the world's largest producer, consumer and exporter of tea. It is a rural based agro-industry. A new chapter in the history of West Bengal in respect of tea cultivation had began with the advent of the concept of tea growing in small holdings by anyone who intended to go in for tea plantation. This concept has changed the production picture of tea, and consequently recognized it definitely in the expansion of economy to a large extent.

The tea board of India has made it public that small tea growers share in production was 44.01% in the year of 2016-17. The contribution of the big growers was 700.19 million kg, while that of the small growers was 550.30 million kg. The tea board differs small growers as a person who cultivates up to 25 acres. But in the current scenario, most growers own less than two acres of land.

The area under the small tea growers is increasing every year but the big growers have been uprooting one to two percent of their area under cultivation annually for the last 10 years. So, it is obvious for the small growers sector to contribute so much.

The importance of tea industry can be realized from the fact that West Bengal has about 40,000 small growers against a national figure of 2 Lakh. Around 154 million kg of brew was manufactured in 2016 in small tea sector that is over 40% of the total production in the region. The figure was 130.13 million in the year of 2015.The data have been released by the Tea board of India. Terai region where almost 60% of the total tea has come from this sector. Terai region where almost 60% of the total tea has come from this sector. Further small tea growers cultivated tea also contributes significantly to the national exchequer every year in the shape of foreign exchange through its export. In the fiscal ended March,2016,india had exported 232.92 million kg of tea valued at Rs.4493.10 crore of this 48.23 million kg was sent to Russia alone at a valuation of Rs.670.57 crore.

| | 2015-16 | 2016-17 |
|---|---|---|
| Total tea production | 1233.14 M Kgs. | 1250.49 M Kgs. |
| Small tea growers contribution | 417.43 M Kgs. | |
| Contribution of small tea growers in West Bengal | 140 M Kgs. | |
| Contribution of small tea growers in Assam | 180 M Kgs. | |
| Total small growers in India | Over2.5 Lakh cultivators | |
| Total small growers in Assam | Nearly1 Lakh cultivators | |
| Total small growers in West Bengal | 40,000 cultivators | |
| Share of Estate in tea production | | 64.94% |
| Share of Bought Leaf Factory(BLF) in tea production | | 35.06% |
| Contribution of estates in India | | 64.94 M Kgs. |
| Contribution of estates in BLF | | 35.06 M Kgs. |
| Contribution of Big growers | | 700.19 M Kgs. |
| Contribution of small growers | | 550.30 M Kgs. |
| Share of big growers(BG) in tea production | | 55.99% |
| Share of small growers(BG) in tea production | | 44.01 |

 

Table 1: Some significant figures relevant with tea industry in 2015-16.

Due to appearance of the small tea sector there has been enormous employment in rural areas of Jalpaiguri, Alipurduar and Coochbehar district in the past 10-15 years.In 2016,there has been a considerable growth in production in the small tea sector both in the terai and Dooars, where altogether the increase has been around 24 million kg tea vis a vis the production of 2015.Stakeholders said that rise in production is an indication that in the coming years the tea industry will have two prominent sectors or branches, the tea estates(TE) and the small tea sector(STS).

The Dooars-Terai tea is characterized by a bright, smooth and full-bodied liquor that is lighter than Assam tea. Development of small tea gardens by small tea growers is very important in a district like Coochbehar of West Bengal for providing employment opportunities in the rural sector. Small tea growers are benefitted more by the use of chemical fertilizers and pesticides in the small tea gardens which badly affects on environment around the region of the small tea garden due to lack of environmental awareness, inappropriate use of chemical fertilizers and pesticides .There is an urgent need of taking positive steps to maintain a healthy biodiversity profile.

## II. OBJECTIVES

Following are the objectives of the present study:

1) To study about the pesticides used in the selected areas of small tea gardens.
2) To identify the environmental problems relating with the use of pesticides in that areas.
3) To suggest measures for solving the environmental problems due to pesticides.
4) To suggest necessary measures to protect and maintain Biodiversity scenario of the region around the small tea garden.

## III. METHODOLOGY

For the collection of primary data about the use of pesticides, insecticides and herbicides two small tea garden concentrated subdivision of Coochbehar district was been selected purposively, one is Mathabhanga ($26^0$20'33" N to $89^0$12'58// E) and another is Mekhliganj ($26^0$27'36" N to $88^0$58'21// E) subdivision. Cooch Behar lies between $25^0$57'47" to $26^0$36'2" North latitude and between $89^0$54'35" to $88^0$47'44" East longitude. A questionnaire was prepared to collect primary information of 100 sample respondents from each subdivision, which was selected randomly.

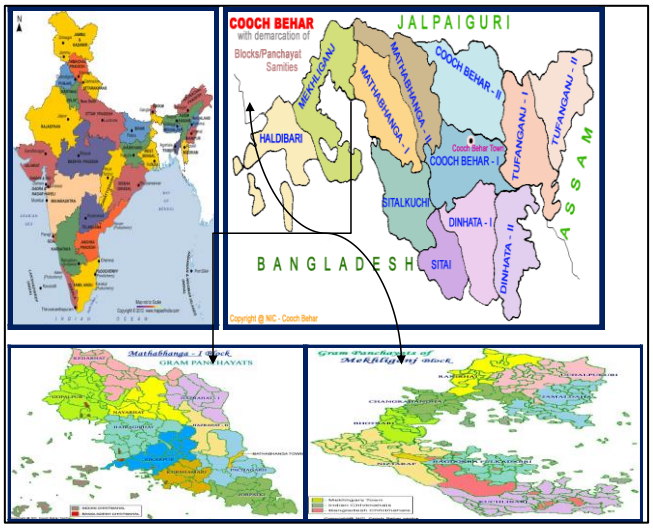


Fig. 1: Map of the study area (Mathabhanga 1 block and Mekhliganj 1 block) [Maps are not to scale]

Extreme care was taken to collect reliable information. Secondary sources were also used whenever necessary for the study. The secondary data are being obtained through journals, research papers, books and by visiting various websites which are being mentioned in the bibliography in the later part.

## IV. RESULTS & DISCUSSION

Out of 100 samples of small tea growers 70% are literate. Among the household surveyed 48% are involved in both tea and paddy ,jute, tobacco and other vegetable cultivation, and 52% are involved in paddy, jute, tobacco and other vegetable cultivation only.

Fig. 2: Use of Pesticide without any protective measure

 

Fig. 3: Spider invasion in tea leaves.

| Insecticide/pesticide/Herbicides/Growth promoter etc used by the tea cultivators etc | Target for which pesticides, herbicide, growth promoter are used |
|---|---|
| Magister, Tricel, Monosil, Mitgate | Red Spider |
| Tricel, Nimajal, Ekka, | Mosquito |
| Round up, Gamaxol, Glycel, | Grass |
| Master, Highlight | Other than red spider, mosquito, grass |
| Multiplex zinc high, Agrimic | Growth promoter |

Table 2: Different pesticides used by the growers.

Every 100 respondent use different types of pesticides, insecticides, growth promoter for their production purposes. Different types of insects are reported and recorded by our extensive survey work such as red Spider, tea mosquito Bag (Helopelotis), looper etc. Various insecticides are used such as Magister, Tricel, Monosil, Medicate etc. For control of grasses and climbers the Round up, Gamaxol, Glycel, is the remedy. All are sprayed with the help of sprayer after proper dilution. But in our study it is revealed that most of the workers are using pesticides without proper protective measure such as mask, goggles etc. Growth promoters are Multiplex zinc high, Agrimic, etc. our survey analysis shows that only 26% growers are using organic manure.

Fig. 4: Unsafe pesticide storage

Fig. 5: Pesticides sprayer, container with the tea Farmers but absence of mask, goggles etc.

Most of the tea cultivators know about the harmful effects of pesticides which may cause different types of physical problems. But they are using pesticide in unsafe manner due to lack of their knowledge and in some cases casual mentality is responsible for it.

Tea cultivation has given them a good advantage and solved the unemployment problem to some extent in the rural areas of Coochbehar district specially in Gopalpur, Kedarhat, area of Mathabhanga block I and Uchalpukuri , Jamaldaha area of Mekhliganj block.

Fig. 6: Affected tea leaves by the attack of spider, mosquito and other reasons.

Harmful effects of pesticides are seen among the farmers directly. Most of the workers have rigorous pain on the stomach, headache, dyspepsia, skin rashes and other skin

 

related problems are seen and these are identified by the farmers is that pesticides are responsible for such type of problems. Through inhalation of aerosols, dust and vapor which contain pesticides that is harmful to them.

We have identified two rivers which are polluted by the used chemical fertilizers and pesticides. Actually many tea gardens are very adjacent to the river Shutunga and Giria in the Mekhliganj Subdivision. Chemical pesticides contaminate the ground water and river water also in polluting the primary source of drinking water and consequently creating many water borne diseases. In these areas living organism are also reducing day by day due to uncontrolled use of chemical pesticides and as a result the biodiversity scenario of the region is deteriorating day by day. If we compare the variety of fish found in between ten years ago and present days, there is a huge difference. Most of the common fish are rare now and this clearly shows that there is a changing picture of biodiversity scenario around the small tea gardens in Coochbehar district.

Fig. 7: The location of tea garden very close to river.

Fig. 6: Use of the river water for pesticide mixing.

## V. SUGGESTIONS & CONCLUSION

Tea cultivation is well thought-out as an essential part of Indian economy and is mainly a rural based agro industry. About 44.01 per cent Tea is contributed by the Small Tea Growers in India. The full-size tea gardens are also depended on Small Tea Growers production. In West Bengal, the Small Tea Growers are playing a significant role in tea production system. Small Tea cultivation system helps in changing socio-economic life of the growers, labours and middleman also. Middleman creates a bridge in between Big house and STG. Growth of small tea garden by small tea growers is especially vital in a district like Coochbehar in West Bengal for providing employment opportunities for the rural youth. Actually in Coochbehar district, there is very limited scope of industrial growth. Small Tea Growers play an essential part in production of tea. The farmers' economic situation have also been tainted due plenty of working opportunities offered by the Small Tea Growers. Small tea growers are benefitted more by use of chemical fertilizers and pesticides in the small tea gardens but it unfavorably effects on human being and the environment and finally the loss of biodiversity of the region. To save the earth and to save human life from hazard of pesticide pollution ,growers are slowly convert the tea cultivation process to organic one which have a good international market value to earn foreign money and to maintain eco-friendly environment for sustainable development to maintain a good biodiversity profile of the region around the small tea garden. There is an urgent need for Proper education and training for the grower and worker. Proper guidance should be provided to the small tea growers and workers in case of using fertilizers and pesticides. Technical know-how should be entrusted to both growers and the workers by the government as well as NGO also. Organic manure have many profit such as it develops the soil texture, increase in water retention capacity of the soil, increase the humas content in the soil , reduce soil erosion, improves fertility, decline in water and environmental pollution, safe for animals and human being .The ultimate goal is to improve quantity, quality of the tea production and use of proper pesticide application to maintain a good biodiversity profile around the region of small tea garden.

## ACKNOWLEDGEMENT

The author expresses his gratitude to district agriculture department and also agriculture department of subdivision and block level, farmers for giving valuable information in different times during this study. We are also gratified to M. Das for typographical and computation during preparation of this manuscript. The assistance received from Mr.M. Barman, Mr. K.Roy, Mr. G. Saha, Mr. H.Saha during the time of extensive survey is acknowledged.

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