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# Abuses of Chemicals in Agriculture: A Menace to Health of Soil, Water and Human-A Study in Mekhliganj Subdivision of Cooch Behar district, West Bengal, India

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Profit making attitude, gradually surpass the morality, ethics and other values of human, acquire through the cultural evolution, causing threat to human society itself. Jamal daha is an Anchal (i.e. Group of Gram Panchayets constitute an Anchal) under Mekhliganj subdivision in Cooch Behar district, West Bengal. It was famous for tobacco and jute cultivation, but the last twenty to twenty five years growers show their interest in short term cash crops like potatoes, tomatoes, teas etc. Like all the high yielding crops, they need more water, fertilizer, insecticides and weedicides also. Unscientific uses of Borax, Ether, Collagen powder and extraction of huge amount of water from soil creates a long term and short term effects on the yield and nature also. Several field visits, number of interviews of the honest cultivators and as witness of the above uses during the period of studies in the field affirm the study. It shows how the abuse of Borax, to grow the vigor of Potatoes, Tomatoes, Chilies etc. makes the soil dusty and effect jute production of the coming year. Collagen powder to get more leaves of tea reducing the viability of tea plant body, and spraying of unlawful use of Ether to ripe tomato overnight causing human health hazards and the quality of the tomatoes. Tea the most important economical crop of North Bengal, probably to the small range of environment becomes the most dangerous also because of their water extraction capacity from soils, tea is a perennial plant year after year same cultivation in a particular area become the Eden of insects, to combat them ill educated growers uses insecticides, herbicides most unscientifically. All these activities are to get short-term benefits but have long-term effects to the human health and to the health of nature.

**Introduction**

Potato, tea, tomato all are economical crops in India. The production rate of these economical crops like potato increases with the use of high yielding seed/ breeds, and use of external source of fertilizers, and supply of huge amount of water. Of late the use of borax become a common practice to the potato grower of this locality for getting larger and uniform size of potatoes, without testing the proper requirement of boron to the soil. Consequently excess boron to the soil cause deleterious effect to the production of next crop i.e. jute mainly *Corchorus olitorius* and also change the nature of soil. In addition, decrease storing capacity of potato tuber. Boron regulates transport of sugars through membranes; numerous reports have noted changes in cell wall structure as a result of Boron deficiency. Boron deficiency in beet (Lorenz, 1942) and celery (Spurr, 1957) results in thickening of the cell wall and the formation of small irregularly shaped cells. In this place, tomato leaves, cell walls became thicker, and a disorganization of the middle lamellae was evident 8hour after transfer to Boron deficient conditions. Symptoms of boron deficiency are symptoms of sugar deficiency. The role of boron in sugar translocation has been supported using  $C^{14}$  labeled sucrose.

Boron also plays a key role in cell division, cell development and auxin metabolism. Deficiency Symptoms: Growing buds die. Plants appear bushy, having shorter internodes, leaves thicken and roll upward. Leaf tissue darkens and collapses. In the long term, this causes accumulation and may lead to desertification of soils (Aydin and Seferoglu 1999). Boron is absorbed by plants directly from the soil solution as boric acid ( $B(OH)_3$ ), and there is a strong linear correlation

between boron concentration in the soil solution and in the plant tissues (Yermiyahu et al., 2001). Normally potatoes require less than 0.1 ppm B (Kovanci 1979).

Spraying of ether in tomato to change the green color to red is a serious issue. Ether is highly injurious to human health sometimes fatal when it comes in excess it may damage fertility or injurious to unborn child. It is harmful for eye, skin.

#### Objectives:

In this paper we try to identify the following objectives such as:

- Abuses of borax in cultivation to get more vigor in crops like potatoes tomatoes, chilly and tea etc.
- Original breed of potatoes are loosing
- Deteriorating the soil qualities in the potatoes fields and adverse affect on environment
- Lowering of ground water level
- Indigenous jute cultivation is threatening
- Use of ether spraying to change the color of tomatoes ultimately effects the human health
- Use of collagen powder to get more green leaves of tea plant in short duration reduces the viability level of the plant body.

#### Materials and methods

##### Study area

The study area lies in the south western part of Cooch Behar district, West Bengal covering area of (Map enclosed) 8264 hectares and is enclosed within latitude 23°42'-23°40' and longitude 87°20'-87°22' in the survey of India topographical maps (73M10,73M11,73M14,73M15). The area located just midst of two rivers Jaldhaka, flowing in the west, the Teesta, in the east, physically, the area is a flattened land nearly meters height from mean sea level. Typical subtropical climate and lateritic soil helps to origin large areas of forest patches in the said areas.

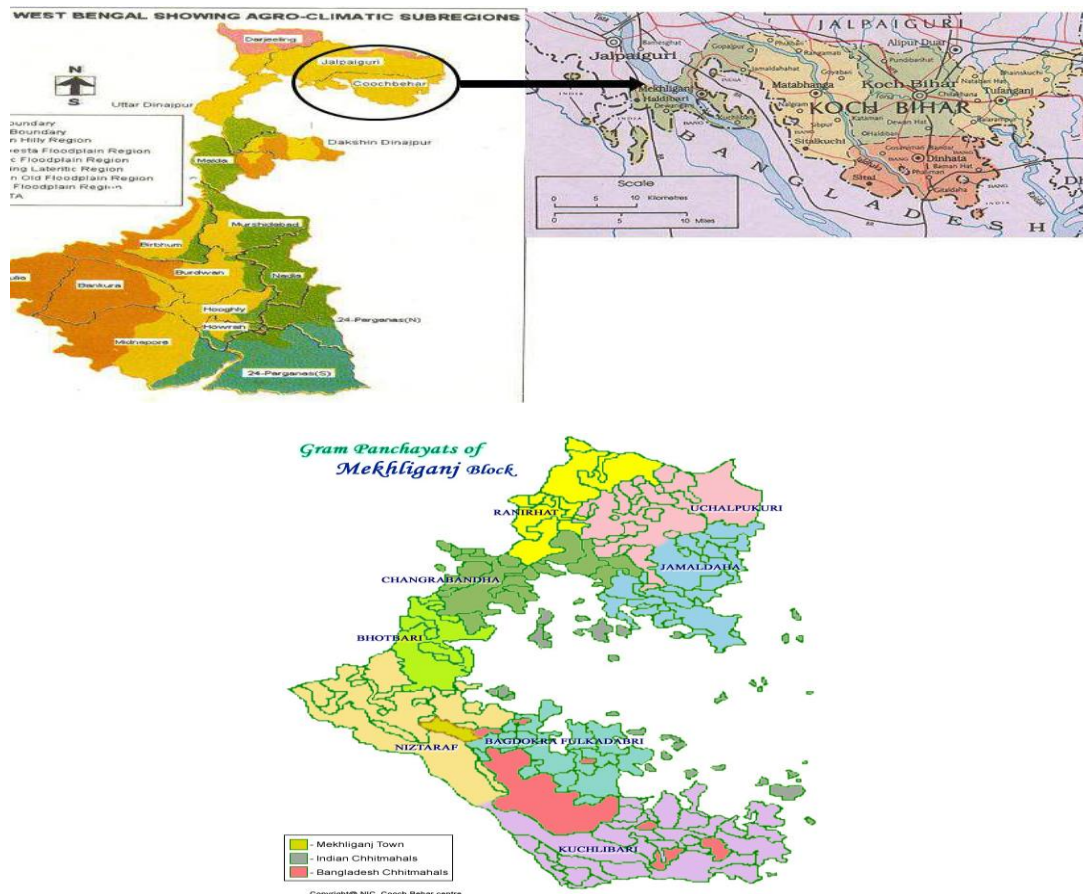
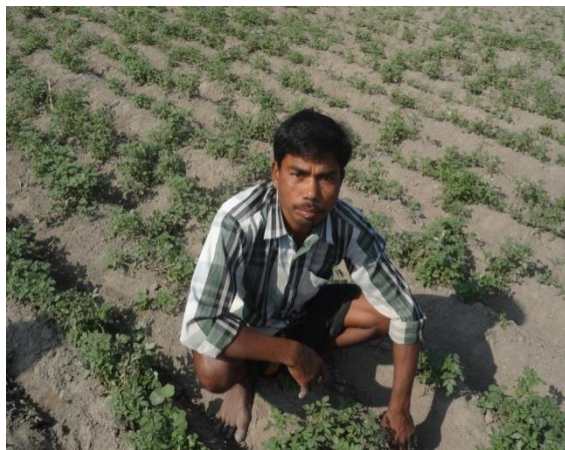


Fig. 1. Study area

#### Methodology

Information was gathered, taking interview of the informants and as witness of the uses during the period of studies in the field. The field study was carried out by putting questionnaire to the potato grower of the study area Information collected from them lured us to analyze the data scientifically and systematically that help us to correlates apparent gain of using borax as fertilizer to the potato, along with qualitative deterioration of soil fertility.



**Photo 1** Farmer in his potato field



**Photo 2** Spraying borax in potato field



**Photo 3** Potato grower in conversation



**Photo 4** River Sutunga under Boro cultivation



**Photo 5** Potato growers with the author



**Photo 6** Potato grower spraying insectis



**Photo 7** Author with Tea cultivator



**Photo 8** Author with Tea cultivator

*Pattern of using borax, ethar & collagen*

- Generally, 3-3½ kg borax is used per bigha, but sometimes it increases to 4½kg per bigha.
- Borax is never used in local pure breed.

- Borax are used in high yielding hybrid varieties of potatoes such as Pokhraj, Jyoti, Holland breed.
- Borax is generally used in two different phases 1<sup>st</sup> phase- at the time of soil processing the borax is mixed to the soil. Second phase-before 15 days of potato harvest borax is sprayed on leaf of potatoes.
- After plucking green tomatoes are kept in courtyard, at the onset of night they spray ether on it and allow it remain covered the whole night, the same thing repeated for the second night, green color will turn red.
- Collagen powder as Isabion and oviran is used after first time plucking of green tea leaves quantity of leaves will increase 30 to 35% higher in the second cycle of plucking.

#### Purpose

- Borax is used to maximize the size of potatoes.
- Along with the size, the weight also increases.
- The surface becomes very glossy and thin in appearance.
- The texture of potatoes is affected as the solidity level of tuber decreases.
- Ether spraying is to false ripening of tomatoes.

#### Deleterious effect

The most important harmful effect is the low preservation capacity. It was a general practice in this locality that the land which is previously used for potato cultivation remains very rich in the level of fertilizer after potato harvest, and jute is being cultivated in this land very easily without using any extra fertilizer from outside source. In local term jutes are of 3 types 1) Tosha pat (*Corchorus olitorius*), 2) Suti pat (*Corchorus capsularis*), 3) Mesta pat among this three qualitatively tosha pat is the best and the next two come successively. According to the need of fertilizers and water tosha pat is the most sensitive it need more fertilizer and more water but water must not be accumulated at the surroundings of their roots in that case after getting 5 to 5<sup>1/2</sup> feet the shoot apex of the plant body will be curled and ultimately the plant will be rotted.

#### Results

- The agricultural land where high yielding potatoes are cultivated without using borax, tosha pat can be cultivated easily without any problem after potato harvest.
- But when borax used comparatively in larger quantity in potato cultivation Tosha pat (*Corchorus olitorius*) cannot be grown on that land normally
- Suti (*Corchorus capsularis*), or mesta (*Hibiscus sabdariffa var. altissima*) pat can be grown there.
- When the amount of borax used in larger quantity 4<sup>1/2</sup> to 5 kg per bigha of land a drastic effect is observed on the soil surface. It gets very dry the surface becomes full of dust.
- Growers do not used borax in the potato cultivation for their own consumption.
- Most of the farmers confessed that they use borax just to have larger size of potatoes.
- Almost all of them confessed that use of borax for getting immediate profit will ultimately disturb the soil fertility level and cause mineral imbalance.
- The soil pH level will increase. Borax regulates transport of sugars through cell membranes.
- Finally observed that the sample data from the farmers in this region that Jamal daha region in Mekhliganj CD block are very rich in agriculture, it is double cropped areas.
- Two main cash crops are tobacco and jute was cultivating.
- Recently farmers especially under the lease of land farmers are much interested with potatoes cultivation with heavy uses of borax to get much production.
- Lease farmers also not bothering about the deteriorating the land qualities or soil degradation.
- They least bothered about the environment qualities they think about high production and economic profit for short-term basis.
- Farmers are not practicing to use proper amount borax in the crop or other fertilizer
- The problem is facing large extension because the landowner is not cultivating their own land directly and the qualities of the land are losing.
- After cultivation of potatoes, land required more water for another crop like tobacco. Because abuses of borax makes the soil dried up and need more water than before. According to local landowners and lease farmers post potatoes cultivation is difficult for irrigation system. Farmers are realizing but they are interested about their production and economic profit rather than environmental deterioration.
- Tea is not the plants of plain area legally it is not permissible yet it is the fact that a large area of North Bengal is now under tea cultivation causing a great reduction of crop plants.
- Although weeds have deleterious effect, yet these are the most important converter of inorganic materials of soil into organic one. All the crop plants of present are the results of weeds intercross in the distant past. Eradication of weeds blindly in tea garden is causing the permanent loss of large gene pool.
- To have greater yield of green leaves local farmers are spraying collagen powder such as Oviran, Isabion on tea plant causing great harm on the tea plant.
- Red tomatoes by spraying of ether are immature cannot be suitably preserved under storage conditions.

### Recommendations

- From our sample study, it is very clear that abuses of chemical makes cultivation are very profitable to the farmers in short-term level. We recommended some suggestion and practices such as:
- Cultivator should be encouraged to allow double crops combination of tobacco and jute or tobacco and potatoes in an alternate year.
- Uses of other fertilizer like bio or eco-friendly fertilizer or green manures are to be encouraged.
- Think and keep the original breed of potatoes which are also gives high production with bio fertilizers
- Cultivators must encouraged about to keep soil qualities and control over water table lowering.
- Lease farmers discouraged about abuses of borax in potatoes by the landowners.
- Awareness programs are to be initiated by government and non-government organization level among the farmers to acquaint them about the detrimental effect of borax, collagen, and ether spraying on human health.
- Agriculture department take over the control in this region, supply good qualities high yielding seed, and encourage to uses green manures at great extent.

### Conclusion

Besides ignorance and lack of proper knowledge about the modern development of farming practice creates the hazards. Age-old traditional method of cultivation with which our farmers were well accustomed is now leaving its place to modern method of cultivation. Our ill-educated traditional farmers are still lagging behind to this system of modern capital-intensive, science-based methods of cultivation. Largely our farmers are economically poor, educationally backward; they are looking for short-term benefits, sustainability does not mean anything to them. Therefore, Government, N.G.Os, and Science Institutes should take measure to train our farmers with proper guidelines that may change the scenario in the end.

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