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Application of Manures and Chemical Fertilizers in Assam- A Study in Historical Perspective

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Abstract

The word “manure” or “fertilizer” is closely related with agriculture. For more production of crops, use of manures and fertilizers works as nutrients. Economy of Assam is mainly dependent on agriculture. So, use of manures and chemical fertilizers is very much essential in Assam for higher agricultural production. As Assam’s soil was naturally fertile due to ecological causes, so the cultivators did not realize the necessity of manuring processes, though they had good knowledge about it.. After the advent of the British to India chemical fertilizers were used here for cash crops. Only after independence, common people of Assam became familiar with the use of chemical fertilizers. This paper is an attempt to study about the different stages of application of manures and chemical fertilizers in Assam from ancient times.

Key word: Application, manure, chemical fertilizers, Assam, historical perspective.

Introduction: Society of Assam is an Agricultural society. Like other parts of India, agriculture is the main base of economy in Assam. It is difficult to say from when, where or who had introduced agricultural activities here. Yet it is confirmed from different source materials of ancient Assam that people were closely related with agriculture and different types of crops were cultivated. Paddy was staple food of ancient Assam. Besides paddy of different varieties, people cultivated other crops like pulses, mustered, sugarcane, various kinds of fruits and vegetables etc. Even in medieval Assam, all the people from noble downwards were connected with agriculture directly or indirectly. According to S.L. Baruah, except the Brahmins, all people including the princess knew how to plough in medieval Assam. With the coming of the British to this place, cultivation of cash crops obtained special importance. From ancient times, different agricultural implements were used in cultivation like plough, bamboo, harrow, sickle, spade, axe, chopper etc. Generally *jhum* cultivation or shifting cultivation was prevalent within most of the tribes of ancient Assam. But later on low land cultivation or upland cultivation methods were commonly applied. Irrigation system was also prevalent in Assam from ancient times. S.L Baruah writes that Assamese cultivators were not required to undergo hard labour in the cultivation

work because of the excessive fertility of the soil and the water received from heavy rain falls. Though Assam's soil was naturally fertile yet people of Assam had knowledge on different manuring processes since ancient times. Only the scope of use was not so extensive. In this paper a study has been made on application of manures and chemical fertilizers in agricultural land of Assam from ancient times to contemporary period.

Objective: The objectives of this paper is:

- 1) To find out what type of manuring processes were used in ancient and medieval Assam.
- 2) To study what manuring processes were used by the British in Colonial Assam.
- 3) To find out from when chemical fertilizers were used in Assam.
- 4) To find out how people of Assam became familiar with chemical fertilizers.
- 5) To study what types of fertilizers were used in Assam after independence.

Methodology: This paper is mainly prepared basing on different secondary sources like books, articles, magazines, internet etc.

Discussion and Findings: S.L.Baruah, Sir Edward Gait etc, famous historians has written in their works that, no manure was used for any of the major crops. The over flowing rivers of Assam deposited a fresh top dressing of silt and prepared the field for luxuriant cultivation every year.¹ However from the 'Sayings of Dak' or "Dakar Bachan" which are most popular in Assamese society, we can assume that people of Assam had knowledge on different manuring processes of soil. 'Dak' is a legendary wise man. "Saying of Dak" is some oral maxims which are prevalent in Assamese society from unknown times. 'Dak' says—

1. Add cow dung to black pepper, red soil to betel vine, clean banana plants monthly, they will grow very fine.
2. Nurture 'Pura' banana with kitchen water apply ash to grown 'Malbhog', best 'Monohar' grow with household waste, for 'Athia' banana cow dung is best. (*Pura, Malbhog, Monohar. Athia*-all these are varieties of banana)
3. Apply cow dung to betel nuts, cover bamboo roots with earth, cut only the coconut roots if it fails to bear fruit etc.²

So, from such maxims we can say that Assamese people know different types of manuring system from ancient times.

In 'shifting' or 'jhum' cultivation (which was commonly practised in ancient and medieval Assam) a special system was undertaken for manuring agricultural land. A piece of land is cleared by cutting and burning the forests. After the fire is out, the ashes are strewn all over the field. The ashes works as valuable manure. Thus different crops were cultivated through shifting cultivation.

According to H.K. Borpujari, manuring remained underdeveloped in Assam under the prevailing ecological condition. Low, marshy and flooded rice fields required little manure as the running water carried in it organic substances capable of improving the soil. Cow

dung was used mainly for raising vegetables and fruits in orchards and family compounds. The hill tribes, who did not domesticate cows and buffaloes as in the plains, generally did manuring by *jhuming* in hill areas where the upper thin layer quickly lost its fertility.³

H.K. Bopujari's view can be supported as it is true that though manuring was well-known to the people of Assam, yet it was not widely practised due to ecological condition of Assam. Assamese farmers were negligent in using manures due to naturally fertile land.

On the other hand from different sources of ancient India, it is known that manure was widely used in different parts of ancient India. Kautilya's *Arthashastra*, the *Agni Purana*, *krisi parsara*, *vrksayurveda* etc. books inform us that people of ancient India used cow dung, fish, bone, milk and extracts of cereals and pulse, excreta of goats and sheep, water mixed with barley sesame etc. as manuring products in agricultural land.⁴

Use of chemical fertilizer was totally unknown in Assam till the advent of the British. Fertilizer is one of the main ingredients of scientific inputs which help in restoring fertility of land. Due to prolonged use and heavy cropping the soil of our country has depleted its natural fertility. Agriculture research reveals that the imbalance in the nutrients in the soil reduces the yield of crop and hence it is important to use fertilizers. Organised research into fertilizer technology began in the early 17th century. Early scientists such as Franchis Bacon and Johann Glauber described the beneficial effects of the addition of saltpetre to soil. Glauber developed the first complete mineral fertilizer which was a mixture of saltpetre lime, phosphoric acid, nitrogen and potash. As scientific chemical theories developed, the chemical needs of plants were discovered, which led to improved fertilizer compositions. Organic chemist Justus Von Liebig demonstrated that plants need mineral elements such as nitrogen and phosphorus in order to grow.⁵

Some other major contributors related to chemical fertilizers are- Sir John Lawes, Fritz Herber etc. Foundations of the fertilizer industry were laid primarily in Germany, Norway, U.K and North America. Modern synthetic fertilizers are composed mainly of Nitrogen, Phosphorous, and Potassium compounds with secondary nutrients added.

Use of fertilizer in India was overlooked till the last decade of nineteenth century. Later on due to different reasons like- Inauguration of different species of new crops, necessity of higher production, frequently occurred famines etc. Compelled the British Government to establish fertilizer industry here. In case of Assam, due to plantation of tea and other cash crops, British government gave importance on improved manuring processes. Tea was discovered in Assam in 1823. Initially the British tea planters tried all possible ways to establish and expand tea plantation in the State. But they did not have any scientific guidance and so they felt the need of scientific research in Tea plantation. In 1911 an experimental station for tea cultivation was established in 1911 at Tocklai (in Jorhat District). In Tocklai experimental station, after extensive research, it was recommended that manure should be applied on the basis of soil physical properties for higher production.. Soil as a medium of growth continued to receive attention in research at Tocklai during the period of 1920-1930. Effort was given to enhance knowledge on the aspects of plant

nutrition. Preliminary trials indicated that among inorganic fertilizers tested, Ammonium Sulphate was effective. But, application of Sodium Nitrate was found harmful. Many studies of fertilizer application in young and mature tea were carried out during this period.⁶

Though chemical fertilizers were inaugurated in Assam by the British, yet common people of Assam were not familiar with chemical fertilizers during colonial period. Anandaram Dhekial Phukan observed the drawbacks of the prevailing system of agriculture during colonial period. To him, manuring of fields for better harvest was ill understood by the people of Assam⁷. Though use of manure was known to the cultivators, yet they made limited use of it. Generally, they used organic manuring processes. Sugarcane was manured in Nogaon. The growers used to manure tobacco.⁸

After India's independence, special importance was given on establishment of fertilizer industries for higher agricultural production. Influence of Green Revolution inspired cultivators to use fertilizers. The first fertilizer plant in India was set up in 1906 at Ranipet in Tamil Nadu to produce single superphosphate (SSP) using powdered bones and sulphuric acid. British Government took initiative in this regard as they felt the need of fertilizer for more production. A company named "EID Parry" was associated with producing fertilizer in Ranipet. In 1924 another SSP factory was set up in Bombay. It was only in 1941 that the first plant came up in Belangula near Mysore to produce nitrogenous fertilizers based on synthetic ammonia and using electrolysis of water technology. It had a capacity of five tonnes per day. This plant however ceased functioning during the course of time. The Fertilizer & Chemicals Travancore of India Ltd. (FACT) was the first large sized fertilizer plant established at Cochin in 1943.⁹

A series of events were responsible for the initiative taken by the British Government towards establishing companies to produce chemical fertilizer and the establishment of Fertilizer Corporation of India (FCI) was the outcome of such events. The havoc created by the Famine of 1943 forced the British Government to think of measures which can increase food production. Consequently a Food Policy committee headed by G.S. Growing was set up.

The committee pointed out that the reasons for low food production were the low contents of nitrogen and phosphorus in the soil. Consequently, the government set up a committee to look into the possibilities of setting up of fertilizer plants and to suggest their suitable locations. The committee recommended for the setting up of a fertilizer plant using coal and gypsum as feedstock either at Harduaganj (UP) or at Sindri (Bihar). The capacity of the plants as recommended by the committee was 3.5 lakh metric tons of Ammonium Sulphate (AS). The government decided to set up the First Public Sector Fertilizer plant at Sindri (Bihar)¹⁰.

The construction of the Sindri plant which commenced in 1946 was completed in 1950. The commercial production started on October 31, 1951. In 1952, the management of the Sindri plant was handed over to a government owned company called Sindri Fertilizer and

Chemicals Ltd. After India's independence fertilizer industries were established in different parts of India.

In case of Assam, first fertilizer industry was established in 1966 at Namrup (Dibrugarh district). Namrup Fertilizer Complex is first natural gas based industry of entire India. Establishment of this fertilizer industry helped in changing scenario of agriculture sector of Assam. People of Assam now became familiar with the use of chemical fertilizers. Namrup Fertilizer Complex tried to create awareness within the farmers about the usefulness of chemical fertilizers. This industry produces nitrogenous fertilizers like "Urea" and "Ammonium Sulphate". In a state like Assam, nitrogenous fertilizer is very much important. Because paddy is staple food crop in Assam. Besides Assam is also famous for tea cultivation. Nitrogenous fertilizer is useful for both paddy and tea cultivation¹¹. In this regard it is also remarkable that farmers of Assam also started to use Phosphorus (P) as well as Potassium (K) contained fertilizers in agricultural land. Yet consumption rate of nitrogenous (N) fertilizers is more than other two kinds of fertilizers.

Data on consumption of fertilizers in agriculture in Assam from the year 1969-70 are available with the Directorate of Agriculture, Government of Assam. However, figures related to a number of years from 1974-75 are problematic. So, one can get reliable data on fertilizer consumption in Assam only after 1975¹².

The increase trend in Fertilizer consumption in Assam (from 1975 to 2001)

Year	Fertilizer consumption (N+P+K) per hectare in Assam (in kg)
1975-76	1.72
1976-77	1.06
1977-78	1.75
1978-79	2.40
1979-80	2.04
1980-81	2.94
1981-82	3.12
1982-83	3.55
1983-84	4.79
1984-85	3.68
1985-86	4.7
1986-87	4.9
1987-88	6.8
1988-89	7.4
1989-90	6.5
1990-91	11.4
1991-92	10.5
1992-93	6.6
1993-94	10.99

1994-95	11.51
1995-96	12.53
1996-97	13.99
1997-98	17.84
1998-99	19.82
1999-00	26.94
2000-2001	34.37

Source: Technological transformation of Agriculture: A study of Assam by M.P. Bezbaruah¹³/ assamagribusiness.nic.in

Yet fertilizer consumption per hectare of cropped area in Assam has been found to be lower than that of other states in the country. It has been observed that within the states of India, Punjab consumes more fertilizer than any other states. She spent Rs. 273 on fertilizer for every hectare of cropped area in 1975-76, whereas the amount stood merely at Rs. 25 for Assam. Punjab had highest consumption per hectare of 156 kg followed by Tamil Nadu at 112.6 kg and Haryana 90.9 kg¹⁴. The lowest consumption among the major states was in Assam which stood as low as 7.4 kg per hectare in 1988-89. In case of India, per hectare fertilizer consumption reached a level of 95.89 kg in 1999-2000. But in Assam this rate was only 26.94.

Use of bio-fertilizer is getting popularity in Assam from 21st century. Some causes of low consumption of fertilizer in Assam are-ignorance and negligence of farmers, flood problems, lack of soil testing centers in rural areas etc. Besides though government is providing fertilizer at a subsidized rate yet some dealers are providing the same to the farmers at a high rate.

Conclusion: From above discussion we can come to conclusion that though people of ancient and medieval Assam had good knowledge on different manuring processes yet they did not realize the necessity of using them due to naturally fertile soil of Assam. After the advent of the British, chemical fertilizers were used in Assam. But the use was very limited. Only after independence, farmers of Assam are becoming familiar with chemical fertilizers. No doubt use of chemical fertilizer is bringing revolution to the agricultural sector. . But it is also remarkable that chemical fertilizers are though useful, too much use of them at higher levels causes a loss of certain plant species, depletion of soil nutrients, death of aquatic organisms and contamination of drinking water. Earlier people did not have to face such types of problems as they used only organic manures. So, at last we can say that though use of fertilizers is bringing revolution to agricultural sector yet one should not neglect its negative aspects also.

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