Bengal Agricultural Experimental Farms : A Study of Sibpur Farm, 1885-1904

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Abstract: *From ancient times Agriculture has been the backbone of Indian economy; a large proportion of the national revenue is generated from agricultural sector. Thus agricultural science has been one of the most important branches of research in India from ancient period, the colonial period being no exception. Since the early phase of ninteenth century they realised that in order to make profitable agricultural turnover the farming system of this country needs to be developed. Hence the british rulers consentrated on agricultural reforms from the early phase of its regime in India. In all countries of the world, be it England or Germany, the issue of agricultural science is inherently linked with experimental farms and India was no exception. Three Agricultural Experimental Farms were developed in Bengal in the 1880s at Burdwan, Dumraon and Sibpur, they made significant contribution to the agricultural development of the province. Among these farms, Sibpur farm played a vital role. This farm was directly under the control of provincial agricultural department. In this farm there was a combination of western knowledge and traditional Indian knowledge, resulting in verious successes, such as- inovation of Sibpur plough. So, in my article,I will discuss in detail about the initiative taken in the sibpur farm from 1885 to 1904.*

Keywords- Agriculture, Bengal, Experimental Farms, Sibpur, Manure, Plough, Seed.

For times immemorial, Agriculture is the backbone of Indian economy; a large proportion of the national income is generated from agricultural sector. Thats why, agricultural science seems to be one of the most important branches of research in India from ancient period. The colonial period is not an exception. Since the early phase of ninteenth century the colonial authority realised that the farming system of this country needs to be developed in order to make profitable agricultural turnover. Hence the British rulers concentrated on agricultural reforms from the early phase of their regime. In all countries of the world, be it England or Germany, the issue of agricultural science is inherently linked with experimental farms. India was not exception at all. There were three Agricultural Experimental Farms developed in colonial Bengal in the 1880s at Burdwan, Dumraon and Sibpur. These made significant contribution to the agricultural development of the province. Among these farms, Sibpur farm played a vital role because of its special nature. This farm was directly under the control of provincial agricultural department from 1885 to 1897.[1]In 1897, it was handed over to the Principal of the Sibpur Engineering College. The total area of the farm was twenty six acres, out of which eighteen acres were used for experimental farming and rest of the portion other constructions were put up along with the quarters of the caretaker. In this farm there was a combination of western and traditional Indian knowledge, resulting in verious successes, such as- inovation of Sibpur plough. So, in this article, it will be discussed in detail about the initiative taken in the sibpur farm from 1885 to 1904.[2]

It was a part of British agricultural policy to recruit an in-charge of farms in order to supervise the entire system. The officers in-charge played animportant role regarding the success of a agricultural experimental farm. In 1887, at the time of the establishment of the farm, Bhopal Chandra Bose was in charge of it. Babu Nityagopal Mukherjee was incharge of this farm in between 1894 to 1896. In the mid of 1896 B.C. Bose again took the charge of Sibpur farm, till the farm marged with

Engineering college he was the in-charge of this farm. In 1897, bengal provincial agricultural department handed over this farm to engineering college and Babu Kalidas Roy was appointed as a new in-charge. It is known that the farm has benefitted economically throughhis initiatives.[3]

Experiments with crops:

Agricultural research on the farm was mainly carried out from 1887 to 1896 AD. Later, after handover to the engineering college, the farm virtually lost its experimental character.In government farms, the British government mainly carried out experiments on cash crops. This policy was applied in sibpur farm too. Various types of experiments were conducted at this farm on potato, barley, Ulatkmbal (one type of fiber), Fodder Grass, Tobacco, oats, rice and wheat.Apart from these, a special iron plough had been prepared on Shibpur farm, which has demonstrated across the country. In the next part, we will discuss about various experiments which were conducted at Shibpur farm.

Experiments on paddy at sibpur farm had not been in large quantity like other Bengal farms. On the small scale of Shibpur farm,irregularly experiments were conducted on the application of Bonemeal, castor cakes, dung and saltpeter on Aush paddy. Where bonemeal and saltpetre was proven to be better than other fertilizers. From 1899 to 1904, 14 species of rice were cultivated on experimental basis, where two type of aman paddy named quarse Assam and Badshabhog became the most economical rice.[4]

Jute is one of the crops that were tested in Shibpur during the nine years of our review. Three types of experiments were conducted on jute. First, the comparison and mixed use of castor cakes and bonemel on jute, this test shows that the bonemeal is producing more but the cost of its application is high.[5] The second experiment was crop rotation. This test was done with potato and juteand this test was become successful because castor cake was generally applied on the potato and this fartilizer was also helpful for jute, so the cost of fertilizer was less during jute cultivation. The third test started in 1894, intensive sowing and uneven sowing, but this test could not show any definite results.[6]

There were three types of tests conducted on the Shibpur farm with potato. Firstly, the comparison of various fertilizer tests and green fertilizer examinations, including castercake, bonemeal, saltpetre, dung, sulpher phosphate. This examination has been done several years after it is found that the production ofusing caster cake is the highest growth in production, but bonemeal is more cost-effective than application of Caster Cakes. In the case of green fertilizer, the application of castor cake jointly with hemp were best served as fertilizer.[7] In 1899, the use of dhaincha as green fertilizer was started and was become quite successful.The second test was on comparative farming between English, Darjeeling, Nainital and local potato. The three species of imported seeds were producing better than local seeds, but the most successful was the Nainital seed.[8]According to Dr Leather's suggestion, the third test started in 1893, with the sowing of potato seeds, sowing of seeds in two rows like North Bengal and sowing of seeds in a row like South Bengal. In this examination, it is seen that after sowing the seeds in two rows, the yield was increasing 20 maunds per acre, which will prove beneficial to the farmers. Fourthly, from 1895, whole tubers and cut sets of potatoes were examined to sow as seed. The production of whole tubers became slightly higher.[9]

Experiment on sugarcane started at this farm from 1887 onwards. Between 1887 and 1897, there were mainly 4 types of experiment conducted on sugarcane. First, the effects of various types of manure tests on sugarcane. Second, comparative farming of different types of sugarcane. Thirdly, comparative examination between Mauritius Trench system and local methods for sugarcane cultivation. Fourthly, examination ofratooning cultivation on local khari variety and saharanpur

variety. The first test showed that the production of the yield was maximum increased by the using of castor cake. In between 1889 to 1897, 11 variety of sugarcane were experimentally cultivated in the shibpur farm. It has been found that Saharanpur Red, Samera and Bombey variety of sugarcane were being cultivated successfully.[10] Comparative examination between Mauritius trench system and local method cultivation was seen that the first method produced a little more than second one. The fourth test, that the test of sugarcane ratooning cultivation started from 1891-1892, and this test was done on separate land segments above the local khari variety and imported samsera variety. In the process of ratooning cultivation, the lower part of the same sugarcane was sown for years after year, only the upper part was cut off. In that test it has been found that the local khari variety produced more but after three years the sugarcane starts to be sturdy, for that it was difficult to get the juice out and that's why procution of sugar and gur were reduced.[11]

Between 1887 to 1898 there was a continuous experiment with the fodder grass on shibpur farm. From 1887 to 1892, the experiment were carried between sorghum and luana luxarians, it has been found that sorghum cultivation was benificial as a fodder grass. Renowned agronomist and manager of calcutta dairy Mr. G.C. Bose brought all the fodder grass of this farm and reported that this resulted in increased cow milk production.[12] In between 1893 to 1897, comparative cultivation was done among Guana Grass, Luana luxarians and sorghum. In that experiment, fodder crops were grown in each case without artificial irrigation and with ordinary natural manures. Where Guinea grass and sorghum gave the best results.[13]

During the period between 1887 to 1892few experiments on Ganja and a wild fiber named Ulatkambal (abromaaugusta) were seen at the shibpur farm. The aim of the Ganja cultivation in this farm was to compare it with the ganjas which are yielded at rajshahye tracts. But this test did not reach any concrete decision. In the case of ulatkambal, fiber quality was good but outturn were not favourable.[14]

From the time of establishment to 1895, there was a number of tests on wheat in sibpur farm. Firstly, the use of hemp as green manure and applied Castor cake, sltpetre and dung as regular manure on wheat. In the case of green manure, hemp has given satisfactory results. However the tests of other manures were irregular, which did not appear to be sucessful. The second experiment was to ascertain the merits of drilling and dibbling the seed (with the help of N.G. Mukherjee invented seed drilling mechine) as contrasted with the ordinary method of sowing behind the plough. After two years of continuous experiment, the endeavour shows that the seed drilling tracts were producing more than the ordinary method. In the guidence of Dr. Paine, the third test was the comparative farming of all varieties of wheat which produce in Bengal. This test failed due to not being scheduled sowing the seeds and lack of proper maintenance.[15]

Between 1889 and 1898 in this farm, long experiments were conducted with barley and oats. Oats were not cultivated in either Calcutta or adjacent areas. So, for the first two year Oats were experimentaly cultivated in three plots to see whether the cultivation was possible in this region, and the result was very satisfactory. From 1892, comparisons of various types of manures were examined on oats, where saltpeter gave the best outturn, Dung and castor cake, bonemeal also gave good results. Later in 1894, the experimental cultivation of Australian and cape variety of Oats was started on the farm by Nitya Gopal Mukherjee with the help of Agri and horticultural society.[16] This experiment was failed because the cost of maintenance was huge. But overall the oats farming proved to be profitable for the farm, because the oats hay was purchased every year by Belgharia Veterinary Hospital as animal feed.[17] Mainly three experiments were done with Barley, they were, applying various manures on barley, experimental cultivation of different varieties and cultivation with irrigation water.

However, this experiments did not go through at regular intervals, so no experiments could achieve success in this case.[18]

The experiment on maize started in this farm from 1892 onwards by the order of govt of India. There were mainly two types of experiment conducted on maize. Firstly, maizes were experimentaly cultivated to see whether the cultivation was possible in this region, and the result was satisfactory. Secondly, comparative experiment of cuts the top of the crop before it was quite mature and allowing the tops to remain on the plants until the grain is quite ripe. In this case, second one was proved more productive.[19]

The experiment on cabbge started in this farm from 1891 onwards and the result was all right. Mainly, various types of manures were tested on cabbage under the supervision of N.G. Mukherjee. In this case, It has been found that the cabbage manured with crude saltpetre matured about fortnight earlier than cabages manured with castor cake. This farm was also distributed saltpetre among the local farmers and they also spoke about the same result.[20]

The cultivation of tobacco was undertaken for the first time in the sibpur farm from 1892 with the two fold object of gaining experience in the cultivation and of noting the respective merits of well known native and foreign variety. Total eight variety of tobacco were cultivated in this farm, four of them were local varity,named- matihar, baroda, Rangpur and hungli and four foreign varieties were Havana, kentucky, Virginia and landreath.[21] The foreign varieties were obtain through the agri and horticultural society. All the varieties were manured before planting with nitrous, saltpetre and sulphate of potash. After long three years of experiment, experts said thatall the four native varieties grew well and gave a good outturn. Among the foreigners the Havana appears to have a milder and sweeter flavour than any of the others.[22]

The first experiment on cotton started at Sibpur Farm in 1891. There were mainly two types of experiment conducted on cotton. Firstly, comparative cultivation between Native garo hills variety and imported american variety.[23] Experiment showed thatamerican variety grew well in the beginning, but the plants became sickly and gave little outturn, but the garo hills variety grew well and gave good outturn. The second experiment was done in 1896-1897, under the supervision of botanis Dr. Pain and Dr. watt. In this case,botanical investigations were carried out on 44 variety of Bengal cotton.[24]

Experiments with Manures and Implements:

The work of preserving manure and preparing pestcides began on the farm from 1892 onwards. In 1892, by the initiative of Bhopal Chandra Bose, a puccka brick preserver was built near cattle-shed to preserve the cattle dung and urine. At the end of the month, manures was prepared from this. In 1896, a separate room was set up for the preservation of manure. In that room, the cattle dung and urine, tank weeds, dry leaves, old and useless seeds were kept seperately in six containers for prepare the natural manure in the future.

From 1892, experiment of preparing pestiside by using of nim pata, ash, sand, tarpine oil, camphor started at sibpur farm. This experiment of preparing pestiside was successful. The result shows that above mentioned mixture was abled to protect seeds from insects. In 1895, a new pestiside was prepared by using of kerosine, milk and water and it was applied on the worm affected wheat.[25] This experiment was very successful and later this pesticide also applied on potato and sugarcane.

In the first ten years of shibpur farm, extensive research has been done on agricultural implements. In 1889, on this farm, Mr. Sen was prepared a rod Iron plough, which was better known as shibpur plough.[26]This plough was suitable for deep ploughing in a tough terrain. In 1890s, almost every contemporary experimental farm of India bought this plough for experiment and this plough was also exhibited in different agricultural fair. Its price was 4rs in 1892 and 7.50 in 1902. Regular experiments were made to improve the quality of the plow. The plough was one of the main sources of income of sibpur farm. However, the weight of the sibpur plough was excessive which have been difficult for the cattle to carry. The price of this plough was also high, due to this, it did not compete with the watt plough.[27] The farm supervisor N.G. Mukherjee prepared a drilling machine for sowing seeds, it gave good results. Agricultural equipments like, American ho, Behia Sugar Mill, Barakar Water lift machine, Éclair vaporizer was alsp experimentally used in this farm.

At the beginning of the article it has been said that the main purpose of the farm was to help the agricultural education of the Sibpur engineering college. According to the Voelcars proposal of 1898 the classes on agricultural education were started in the college and bengal provincial agricultural department handed over the farm to engineering college.[28]

Table-1

Expendeiture and Income

Year	Expenditure	Income
1891-1892	2789	1357
1892-1893	2979	1300
1893-1894	2433	1013
1894-1895	2590	981
1895-1896	3229	1265
1896-1897	3917	1005
1897-1898	3159	1100
1898-1899	3497	1204
1899-1900	3452	744
1900-1901	3064	753
1901-1902	3495	1640
1902-1903	3505	1518

Sources: WBSA, Annual Report of Department of Land Records and Agriculture, Relevant Years.

Like other contemporary farms also in sibpur we see that miscellaneous expenses like salary of Oversiar, building construction cost, labour cost etc. were more than the expenses of agricultural research. In the case of sibpur, with other expenses, the municipality tax has been added. A detailed account is given above.

The experimental activity was mainly carried out at shibpur farm during first ten years since establishement. After the undertaking by engineering college, this farm has lost its experimental charecterstics and became a demostrative farm where the students of agricultural education can transform their theoretical knowledge into practical field. However, in this time, by the initiative of Babu Kalidas Ray, various crops like, mulabarry,tobacco, lentils were brought from the Agri and Horticultural Society for cultivation, although farm lost its experimental character. On the other hand, an experimental farm should not be built on fertile land, as it makes difficult to test the manures there. This same disadvantage faced with the shibpur farm. However, in the first ten years, the experimental activities of this farm, such as the invention of shibpur plough, tobacco cultivation, manure preservation, experiment on Jute, Oats, joint experiment with local farmers, seed distribution, experiment on various agricltural eqipments, etc. had trigged the agricultural science of India. As well as gave a new direction to the agricultural science of Bengal.

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