APPROPRIATE MECHANIZATION FOR SUSTAINABLE AGRICULTURE IN NORTH EAST INDIA

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ABSTRACT

A case study was carried out during 1994-99 in north east India and it was found that introduction of appropriate mechanization to various types of land could provide sustainability to agriculture. The small tractor (20 hp), power tillers and bullocks were found suitable for foot hill land, whereas medium size tractor (35 hp) for plain valley and river bank. He-buffaloes were found suitable for waterlogged areas and swamps. The human labour was found to be an appropriate source of farm power for hill slope. The large size tractor (45 hp) could do subsoiling and uprooting of old tea bushes and medium size tractor (35 hp) performed all transport operations on tea gardens.

The soil of this region has been classified into red loamy soils, red and yellow soils, laterite soils, brown hill soils and old and new alluvial soils. The soils of Assam have been derived from two major types of parent materials-residual and transported. The soils of north­ern part of Brahmaputra valley are formed on alluvium transported from Himalaya by river Brahmaputra and its tributaries on northern side. Similarly, alluvium brought down by tribu­taries on southern part of river Brahmaputra form soils of southern part of Brahmaputra valley. The soils of Barak valley are not very much different from those southern part of Brahmaputra valley. Being formed from sand­stone, shale and sandy shale of surrounding hilly areas, flat lands of this valley are deep (Borthakur, 1992).

The food crops such as cereals, pulses and oil seeds are grown in region although rice is the most important crop. Rice, maize, wheat, finger millet, fox tail millet etc. are among cereals grown. The pulses grown in region include black gram, green gram, pea, pigeon pea(arhar), etc. Among oil seeds are mustard(both rai and toria), sesame, soybean and groundnut,. The cash crops include jute, potato, sugarcane and tea (Borthakur, 1992).
Thus, the region is full of natural resources needed for growing almost all crops. However, indigenous technology has to be geared to provide sustainability to agriculture. For that, it is necessary to have a comprehensive idea of status of agriculture, its problem and potentials, before a scientific endeavour can be made for improvement of agriculture. Hence, a case study was carried out during 1994-99 in north eastern region and its findings are presented in this paper.

It is true that introduction of farm equipment is a costly affair, but appropriate mechanization provides timeliness to almost all the farm practices, it performs all difficult operations and removes drudgery causing to human labour. It commands large area under farming and thereby raises yield. The appropriate mechanization has helped in introducing GREEN REVOLUTION in country and it can provide sustainability to north east agriculture too. The land available in this region for agriculture could be classified (I) foot hills (II) plain valley and river bank (III) water logged areas and swamps (IV) hill slope and (V) tea garden land, for introducing suitable source of farm power to each one.

The region is full of foot hill land in all states. It is having gentle slope. The plots located in foot hill area are much smaller in size and therefore, medium and large size tractors will be uneconomical to use due to high loss of time in turning and in negotiating field interruptions and bunds. However, small tractors (20 hp), power tillers and bullocks could be utilized in such fields economically and these sources would certainly provide sustainability to agriculture. The productivity of these sources of farm power could be enhanced by introducing matching implements of optimum size. Yadav and Behera (1996) found that power tillers were utilized in such areas for 1405 hours in a year.

The tractor hiring would be a boon for farmers of north eastern region and annual utilization of tractors may go upto 1200-1600 hours on tractor hiring centres located in plain areas (Yadav, 1997). The rivers coming down from high mountains have formed plain land, where a medium size tractor (35 hp) would find a place. It was found during the survey in north east India that farmer’s plots located in plain valley and river bank are larger in size than that of plots located in foot hill land. The paddy is main crop grown in these plots. The medium size tractor along with matching implements would provide timeliness to farm operations in these areas. The field coverage by a medium size tractor will be optimum and field losses minimum.

There are water logged areas and swamps in plenty in Manipur and Assam, though all the north eastern states are having such areas. The plots located in these areas remain cut off from villages and main roads during rainy season, when rivers and streams start flowing. The tractor and power tiller could not reach there for cultivation. However, he-buffaloes are considered to be an appropriate source of farm power for cultivation. They would provide sustainability to agriculture of these areas. The water hyacinth, weeds, grasses, etc. grown in water logged areas will provide feed to these animals. Yadav (1998) found that a pair of he-buffaloes could command 4 ha land under cultivation in such areas.

The hill slopes are used for shifting cultivation. Which is primitive farming and it causes soil erosion and consumes very high energy. However, settled farming with ergonomically designed tools and implements, keeping in view physical strength and body dimensions of human labour, including women, would check soil erosion, enhance yield and thereby provide sustainability to agriculture. Yadav (1998) found that it would increase productivity of human labour particularly women.
workers, whose involvement is 55 per cent in hill agriculture.

The high land, free from water-logging is used for tea cultivation. Brahmaputra valley and Barak valley, both are full of tea gardens where medium size tractors (35 hp) are utilized for performing operations such as harrowing, cultivation, carrying tea leaves from various sections of plantation to factory, hauling water tanker, carrying fire woods, etc. The higher size tractors (45 hp) are found suitable for uprooting tea bushes, while replanting the garden and subsoiling. Yadav (1999) found that sustainability to tea production would be provided by exploiting locally available resources and by introducing appropriate mechanization. In tea plantations, about 80 per cent of work force consists of women workers and therefore, hand tools, implements, etc. need improvement keeping in view their physical strength and body dimensions.

The technology suggested in this paper is within the reach of farmers of north eastern region and the same is economically viable. Hence, it should be adopted for having sustainability in agriculture.

REFERENCES