

AGRICULTURAL MANAGEMENT FOR SUSTENANCE WITH THE GROWING POPULATION IN BARPETA DISTRICT, ASSAM

¹Wangshimenla Jamir, ²Laitpharlang Cajee, ³Md. Anjar Ali,

¹Associate Professor, ²Associate Professor, ³Research Scholar

^{1&3}Geography Department,

Nagaland University, Lumami, Nagaland, ²North Eastern Hill University, Shillong

ABSTRACT

Agriculture is indispensable for getting food, without which survival is not possible. Agricultural management is urgently required to support the food security of growing population, optimization of resource use, output management, sustainable livelihood, enhance of farmer income, widening of market, value addition to national income and employment creation. But agricultural sector is facing multi-dimensional problem and has registered a gradual decline in contribution to GSDP in Assam. This region has great potentialities for agricultural development due to under development of modern technologies. Proper agricultural management and adaptation of modern technologies will facilitate in increasing agricultural production and productivity in Barpeta district. Agriculture and allied sector has the highest employer among all sectors recording 54.14% worker in Barpeta district, with cultivators accounting 36.53% and agricultural labours are 17.61% in 2011. The present study tries to understand the Agricultural management for sustenance with the growing population in Barpeta district, Assam.

Key words: Problem, prospect and sustainable development of Agricultural.

INTRODUCTION

Agriculture is the main source of livelihood for the people of developing countries of the world. Agriculture has employed more than 50% workforce and support livelihood for 75 percent population in Assam. The contribution of Agriculture and allied activities is 20.28 percent in 2014-15 in the GSDP of Assam. Agriculture is the dominant economic activity in Assam as the main source of earning livelihood. The development of agriculture is very slow in Assam. For the development of agriculture structural change is most important. It faces many difficulties like high growth rate of population, over pressure of population on land, poverty, lack of modern technology, erratic climatic condition, lack of skill labour etc. in Assam. Moreover, the physical factors like physiographic, soil, climate etc. are highly affecting the development of agriculture. Agricultural development represents increase of agricultural production and productivity through judicious use of cultivable land, irrigation, HYV seeds, fertilizer consumption, pesticide and insecticide, machineries, etc. Therefore, the agricultural management is urgently required to support the food security of growing population in developing countries of the world. The misuse of natural environment and non-judicious use of fertilizers, pesticides, insecticides, herbicides, etc. has created food poison and environmental degradation. So sustainable livelihood is urgently required to maintain good health and environmental conservation.

OBJECTIVES

1. To find out the problem of agricultural development.
2. To study the prospect of agricultural development.
3. To understand sustainable livelihood for growing population.

METHODOLOGY

Present study is based on both primary and secondary sources of information. Primary data were collected through purposive sampling method and sample villages were selected from side to side by considering the location, religion, pattern of agriculture and characteristic of the area during 2014-16. The secondary sources of information were collected from the relevant literature, articles of research journals, Government publications, websites, newspaper, etc.

1. PROBLEM OF AGRICULTURE

The agriculture sector has registered a gradual decline, its contribution to GSDP over the years towards the state economy. Agriculture of Barpeta district is facing various types of problems. The agricultural input and technology have not been developed though many changes have been taken place in Barpeta district. So agricultural development has remained stagnant. The problem of agriculture can be classified into two broad categories i.e. natural problems and socio-economic problems.

- 1.1. Soil:** Soil is prerequisite for agriculture and suitable soil is most important for agricultural development. Poor soil means larger inputs and lower outputs. In Barpeta district about 11.25% areas are sandy soil and 24.83% are sandy loam soils. These soils highly consume water and fertilizers, due to under development of irrigation facilities and poor inputs of fertilizer the productivity of these soil are very low.
- 1.2. Weather:** Weather is an important factor for agricultural development in Barpeta district. The agricultural production has been greatly affected due to change of weather. The uncertainty and unequal distribution of rainfall in whole year is one of the major problems of agricultural development in Barpeta district due to over dependent on rain water. The normal rainfall in the district is 2127 mm and each month should receive 177.25 mm of rainfall but from June to September it receives 1792 mm rainfall. During October to December it receive 15 mm rainfall whereas January to March receive 6 mm only, April to May receive 474 mm rainfall. This causes flood and drought as a regular phenomenon in the district.
- 1.3. Flood:** Flood is a natural hazard of Barpeta district as well as Assam after the earthquake of 1950 due to upliftment of bedstead in Brahmaputra River. Barpeta district is one of the major flood affected district of Assam. Chronicle flood affected the area of Barpeta district is 31000 hectares (DAO, Barpeta). Every year large number of agricultural land, standing crop and fertile soils are wash away or submerged by the unfertile sandy soils etc. in the study area.
- 1.4. Drought:** Barpeta district is seasonal drought prone region. Barpeta district receives lowest rainfall in winter season and post monsoon season. During winter season it receives 11.6 mm and post monsoon season receives 17.2 mm rainfall which effects badly on the agricultural growth. Irrigation facilities are very poor in the study area where some crops get damaged due to insufficient of water.
- 1.5. Land Erosion:** The highly productive and fertile soils of Barpeta are now facing a serious problem of soil erosion like other parts of the state. During 1960 to 2014, moreover 30 thousand families were directly affected by the riverbank erosion in Barpeta district and 41% affected families were displaced and shifted their first residence during 1975 to 1985 in Barpeta district. Many of them became landless and homeless. Loss of homesteads forces people have move to new places without any option and put them in disastrous situations (Rahman, 2010).
- 1.6. Infrastructural Development:** Barpeta district has very poor road network which effects in inputs and outputs from farms to consumers. Railways facilities covers the northern part of Barpeta district with total length of 47 km only which is not sufficient for socioeconomic development of a region. The fastest mode of transportation is air ways but the study area do not have this facilities.
In Barpeta district, due to lack of infrastructural development perishable goods like vegetables get damaged in place of production. There is no sufficient food processing industries and storage facilities in Barpeta. Inefficient drying yards cannot dry crops during the time of rainy and flood season and crops are damaged during postharvest period.
- 1.7. Population pressure:** The most important factor responsible for agricultural development is over population pressure on land. According to 2001 census, the density of population is 521 per sq. km and which increased to 632 per sq. km in 2011 with a steady growth of population in Barpeta district. The decadal growth rate of population is 21.40% during 2001 to 2011 in Barpeta district. The population pressure has created a number of problems like fragmentation and subdivision of land holdings, supply of modern practices and services has fallen short for requirements. It has created the problem of unemployment and disguised unemployment.
- 1.8. Small and fragmented landholding:** The Food and Agriculture Organization (FAO) of United Nations estimates that in forthcoming decades, cropland will continue to be lost due to industrial and urban development, along with reclamation of wetlands and conversion of forest to cultivation, resulting in the loss of biodiversity and increased soil erosion. Population is increasing with demand for food and pressure on land resources which results in defragmented of land holding.
Small and fragmentation of holdings lead to great waste of time, labour, difficult in utilization of irrigation facilities and other modern inputs, wastage of crops in the absence of fencing. In Barpeta, marginal land holders are highest with 57.09% followed by semi medium land holder 35.16% and small landholding 26.61% and medium land holder 14.26% of land in the district. The percentage of large land holder is lowest 0.04% and are holding 0.57% land in 2011.
- 1.9. Poverty sickness:** The development of agriculture is highly affected by the poverty sickness of cultivator in India as well as Barpeta district. In Barpeta district 80.06% household has less than 5000 monthly income against the state 76.89% population

in 2011. On the other hand 12.21% household has 5000-10000 monthly income and 7.71% household has 10000 in 2011 (Socio-economic Census, 2011). In sample villages more than 52% families has less than 5000 monthly income and 37.82% people has 5000-15000 monthly income and 10.18% household has above 15000 monthly income only (Source: Primary Data, 2014-16).

1.10. Scarcity of labour: The shares of main and marginal workers are 36.53% cultivators and agricultural labours are 17.61% in Barpeta district in 2011. In Barpeta district more than 71.27% people faces scarcity of labour at the time of crop sowing and post harvesting period and 12% people faces scarcity of labour for cultivation among the sample villages (Source: Primary Data, 2014-16). The main cause of lack of agricultural labour is migration of labour from village to urban areas.

2. PROSPECTS OF AGRICULTURE

Agriculture faces verities of challenge during the time of operation. Agricultural production and productivity can be increased through the judicious use of land, labour and farmers involvement with improvement of seeds, fertilizers, irrigation, method of practicing and technological transformation in Barpeta District. The strategies for agricultural development can be classified as General, Pre harvest or Operational and Post harvesting strategy.

- 2.1. Production and productivity:** Raising productivity per unit of land will be the main engine for agricultural growth. The productivity of rice and wheat is very low in India with compare to other countries of the world. The productivity of paddy is 3.99 tons per hectare in India which is 12.03 tons per hectare in Australia in 2010. The use of modern inputs in agriculture can raise productivity with reducing agricultural risk. Productivity of crops can increase by rational use of high yield varieties, fertilizers, liming, irrigation, pesticides, herbicides, increasing cropping intensity, crop rotation, crop combination etc.
- 2.2. Control of flood:** Control of flood is most important for agricultural and socio-economic development in Barpeta district. Immediate and short-term measures are implemented by the state Water Resources Department. But till date, no long-term measures have been implemented to mitigate the flood and erosion problems of the state. Various programs like river bed digging, porcupine system, river channelize or any other scientific measurement to stop flood may be implemented in Barpeta district.
- 2.3. Control of river erosion and rehabilitation of river eroded family:** Anti-erosion program like river bed digging, porcupine system, river channelize or any other scientific measure of erosion have to be implemented to stop river bank erosion. Especially digging the bed of river Brahmaputra to allow passing huge volume of water through one major channel is most important measures of bank erosion. This deep channel can be used as national and international water ways. In the study area the Brahmaputra river and tributaries carries a huge volume of water in rainy season from the hilly state of North East India and river bank erosion take place intensification.
- 2.4. Adaptation of flood and drought friendly strategy:** People of the study area should adopt flood and drought friendly strategies. Farmer can cultivate water resistant paddy and short periodic paddy in flood affected areas or using other water resistance crops like jute, mesta etc. The choice of crop cultivation and identification of worst areas affected by flood is based on the place based tacit knowledge. Deep water or floating varieties of rice has the capacity to elongate their submerged stem internodes by 25 cm per day at rapidity with a slow-rising flood in a seasonal wetland. Moreover drought-tolerant verities of crops are crucial to reduce the impact of drought and these verities should extensively adopt in the state.
- 2.5. Development of irrigation facilities:** Irrigation is an important device in modern agriculture due to uncertainty of rainfall and seasonal variation of rainfall in Barpeta district. Irrigation enable farmer to take up multiple cropping and facilitates for increasing agricultural land due to the uncertainty of rainfall and dry in winter season in Barpeta. The development of irrigation is most important for expansion of agriculture. Underground water and perennial rivers are available to generate deep well and cannel irrigation facility. In rainy season's rainfall water are abundant which we can use for irrigational purpose by water harvesting.
- 2.6. Promoting agricultural diversification to higher-value commodities:** Encouraging farmers to diversify higher value commodities will be a significant factor for higher agricultural growth, particularly in rain-fed areas where poverty is high. Some agricultural sub-sectors have high potential for expansion, especially fishing, dairy and vegetable farming in Barpeta district. Milk production is constrained by the poor genetic quality of cows, inadequate nutrients, inaccessible veterinary care and other factors. If these dairy farming are transformed to the high verities of genetics will more productive. Bajali and Gobardhana development blocks are well known for dairy production in Assam. Fishing is a major sector of income generation in low laying area where waterlogging are abundant. The study area is low laying area and sufficient rainfall receives during monsoon and is most suitable for the fishing. The income of vegetable farming is very high and people can extensively adopt vegetable farming in raised area during rainy season through HYV, irrigation, green house, etc.

- 2.7. **Pest, insect and weed management:** In agriculture, systematic pest, insect and weed managements are usually required to decrease agricultural losses. The pest and diseases are controlled by use of pesticides and insecticides. The weeds are generally cleaned by the labour in the study area which is more expensive. Herbicides are less expensive than the labour. Through awareness generation on use of insecticides, pesticides and herbicides may decrease the crop damages in Barpeta district.
- 2.8. **Landholding size:** In Barpeta district, distribution of land holding size is not equal among the farmers. Marginal operation holder is 57.09% followed by small operational holder 23.22% and large operation holder is 0.04% in 2010-11. The small land holding size has badly influence in cropping pattern and use of modern technology in agricultural field. The problem can be managed through forming farmer SHG with participatory approach and community action on cluster basis.
- 2.9. **Construction of Drying Yards in Villages:** Drying yards are most essential in study area. Kharif crops harvesting period is rainy at this time crops are damaged due to lack of drying yards in Barpeta. Most of the places of study areas are flooded area and cultivators drying places are submerged during this period. The drying yards is most essential in the study area due to more low lying area and chronic floods. Farmer can also construct drying yard in a participatory approach and government should take some schemes for construction of drying yards extensively.
- 2.10. **Agricultural awareness:** Agricultural awareness provides information of new adaptation, funding to producers, agribusiness and management of agriculture. In Barpeta district, most of cultivators are illiterate and do not have basic knowledge of modern adaptation. So extensive village level awareness program will bring a revolutionary change of agriculture in Barpeta.
- 2.11. **Modern technology for crop harvesting:** Modern post crop harvesting technology will help to reduce post crop losses. These technologies will help to solve the problem of crops cutting, drying, packaging at the time of peak season and extreme weather when labours are not abundant.
- 2.12. **Food Processing Industries:** Food processing industries are most important to reduce wastage of crops at peak time of production and to development of economic condition of farmer. Processing of food eliminates wastage of agricultural produce to a greater extent. Food processing is gaining momentum as food processing industries ensure steady and better price to the farming community as well as availability of the commodities in processed form to the consumer throughout the year. Cultivation of good quality processable agricultural products stand to gain better returns and employment opportunity.
- 2.13. **Development of Infrastructure:** Transportation is most important for agricultural development. The transport facilities are prerequisites for transportation of modern input to farm, produce of farm to place of storage and farm produce to market. The railways has connected the northern part of Barpeta district which should further extend to the southern side of Barpeta district. The rural roads should develop to connect between main roads and markets with the fields. The storage facilities and drying yards should increase in Barpeta district.
- Farm mechanization is most important to increase agricultural productivity. The farm mechanization includes tractor, power tiller, reaper, pump sets, power drawn implements (cultivator/leveler), manual operated implements (Paddle Thresher), power thresher, rotavator, strip till drill, sprayer, self-propel reaper etc.
- 2.14. **Agricultural Insurance:** Agricultural insurance is a technique by which farmers can stabilize on farm income and investment and guard against disastrous effect of losses due to natural hazards or low market price. In the study area crop insurance are urgently need due to frequent natural calamities like flood, drought, pest and insects effect.
- 2.15. **Market system:** Efficient regulated agricultural market is most important to strength the farmer economic condition and overall agricultural development. An efficient marketing system facilitates for optimization of resource use, output management, enhance farmer incomes, widening of markets, growth of agro-based industry, addition to national income through value addition, employment creation, proper infrastructural development, free grading facilities for agricultural commodities and issuing pledge loan during distress sale. Barpeta district has two regulated market, i.e. Bahari and Howly regulated market.
- 2.16. **Green house farming:** Green house technology is a technique of providing favorable environment for plant growth. It is used to protect the plants from the adverse climatic conditions such as flood, drought, wind, cold, precipitation, excessive radiation, extreme temperature, insects and diseases. In green house condition yield may be 10-12 times higher than that of outdoor cultivation depending upon the type of greenhouse, type of crop and environmental control facilities. It is very effective at the time of extreme weather conditions like flood, winter, drought for off-season production of vegetable, fruit and floricultural crops in Barpeta district.

3. SUSTAINABLE DEVELOPMENT OF AGRICULTURE

Sustainable agriculture is eco-friendly farming and has been defined as an integrated system of plant and animal production practices. In recent decades steady increase of population has increased the practice of agricultural land conversion to meet demand for food and has increased adverse effects on the environment. The declaration for Healthy Food

and Agriculture, (November 3, 2013), "We, the undersigned, believe that a healthy food system is necessary to meet the urgent challenges of our time. Behind us stands a half-century of industrial food production, underwritten by cheap fossil fuels, abundant land and water resources, and a drive to maximize the global harvest of cheap calories. Ahead lie rising energy and food costs, a changing climate, declining water supplies, a growing population, and the paradox of widespread hunger and obesity". The misuse of natural resources and non-judicial use of pesticides, insecticides, herbicides, deforestation etc. has created food poison and environmental degradation. So, sustainable agriculture is urgently needed in recent times.

- 3.5.** Organic farming is a sustainable agriculture that has a lower impact on the environment. The principle of organic farming is to satisfy human food and fiber needs, to enhance environmental quality and natural resource, to make most efficient use of non-renewable resources and integrate, to sustain the economic viability of farm operations, to enhance the quality of life for farmers and society as a whole.

Organic manures are essential for keeping good health of soil for sustainable development. Extensive use of organic fertilizer like vermicompost, cow dung, burning firewood, etc. will help for the development of sustainable agriculture in the study area. Crop rotation can also increase soil fertility which can decrease the effect of pest and disease. Vermicompost are started in BARPETA district by the women Shelf Help Group. Awareness generation on organic farming will facilitate for sustainable agriculture. The use of pesticides, insecticides and herbicides can be reduced by traditional methods.

- 3.6. Crop rotation:** Crop rotation is most important adaptation for soil health protection. It is practice of growing a series of dissimilar types of crops in the same plot of land in sequential seasons. Crop rotation helps to balance the nutrient demands of various crops to avoid depletion of soil nutrient. Traditional component of crop rotation is the replenishment of nitrogen through the use of legumes and green manure in sequence with cereals and other crops. Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants. In the study area Rabi crops like rape and mustards, pulses and other species of small rooted plant can help to create soil nitrogen level. These crop roots are able to produce nitrogen and reduce use of fertilizer for next Kharif crops. The Kharif crops like jute, mesta etc. can increase soil nutrition level. Through massive public awareness on crop rotation may reduce depletion of soil health in BARPETA.

4. FINDING

- 4.1. Agriculture and allied sector is highest employer among all other sectors and has employed 54.14% worker of BARPETA district in

which cultivators are 36.53% and agricultural labours are 17.61% in 2011.

- 4.2. The major natural problems of agriculture are soil health, uncertainty of rainfall, flood, drought etc. in BARPETA district.
- 4.3. Socio-economic problems are major determinant of agricultural development in BARPETA. These are population pressure, small and fragmented landholdings, landholding system, poverty sickness, poor inputs and lack of mechanization, scarcity of capital, low consumption of chemical fertilizer, indebtedness of farmer, inadequate research, etc.
- 4.4. The population pressure has created a number of problems like fragmentation and subdivision of land holdings which hampered on supply of modern practices.
- 4.5. Among sample villages, farmers has 60.52% own lands, share cropping land 35.33% and contractual land 4.15% for cultivation.
- 4.6. Among sample villages more than 52% families has less than 5000 monthly income and 37.82% people have 5000-15000 monthly income and 10.18% household has above 15000 monthly income.
- 4.7. Agricultural production can be increased through judicious use of land, labour with improvement of seeds, fertilizer, irrigation and technological transformation in BARPETA District.
- 4.8. The modern agricultural technology will reduce the problem of water, scarcity of labour and effect of pest, disease and weed.
- 4.9. The main measures for flood control is taken up like construction of embankments, anti-erosion wall, river channelization with pro siltation devices, raised platform, flood forecasting and warning, flood zoning etc.
- 4.10. Encouraging farmers to diversify to higher value commodities will be a significant factor for higher agricultural growth, particularly in rain-fed areas, where poverty is high.
- 4.11. Crop rotation can improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.
- 4.12. The adaptation of organic farming will enhance food values, good soil health and balance natural resource.

CONCLUSION

BARPETA district has great potentiality for agricultural development due to under development of modern technologies. The agricultural scenario reflects slow rate of growth, inadequate production, lack of technological adaptation including improved seeds,

fertilizers, irrigation, pesticides, etc. in the study area. The proper agricultural management and adaptation of modern technologies will facilitate to increase agricultural production and productivity in Barpeta district. Agricultural development is possible with the judicious use of land, labour and farmer involvement with adaptation of modern inputs like seeds, fertilizers, irrigation, green house and technological transformation in Barpeta district. Sustainable agriculture is urgently required for good health of human, soil health, environmental protection. Extensive use of organic fertilizer like vermicompost, cow dung, burning firewood, etc. will help for the development of sustainable agriculture in Barpeta district.

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The Authors:

1. Dr. Wangshimenla Jamir
Associate Professor
Department of Geography
Nagaland University, Lumami- 798627
Zunheboto, Nagaland
2. Dr. Laitpharlang Cajee
Associate Professor
Department of Geography
NEHU, Shillong -793022,
Meghalaya
3. Md. Anjar Ali
Research Scholar
Department of Geography
Nagaland University, Lumami- 798627
Zunheboto, Nagaland