

## Need for Settled Farming and Sustainable Agriculture in the North-Eastern Region of India

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**Abstract :** *The North-eastern region of India is a predominantly agricultural region. As tribal people make up the overwhelming majority of the population of the states of NE India, except for Assam, shifting agriculture (shifting cultivation) and forest resources play a major role in their economic life. The system of cultivation in this region is known as 'Jhuming' or 'Shifting cultivation'. Large area of land is destroyed every year for Jhum purposes and the region is under severe threat of soil erosion. The present study makes an attempt to reveal the need for settled farming and sustainable agriculture in the North-Eastern region of India by exploring the status of sustainable agriculture in N.E.R. and its consequences and highlighting the problems faced in the way of maintaining sustainable agriculture in N.E.R., and the various strategies to achieve sustainable agriculture in N.E.R. of India. It is revealed in the present study that 54.4% of the total geographical area of NE India is under forest cover and 14.5% of the total area is under cultivation. It is also revealed in the study that the total area of the N.E.R., used for practicing shifting cultivation or Jhuming is 277462.5 million hectares which causes a soil loss of 121.0 million tonnes annually. The study sorts out the problems confronting the people in the way of adopting settled farming and maintaining sustainable agriculture in the N.E.R., and lays down some strategies and alternatives for settled farming and sustainable agriculture in the region.*

### Introduction

The North-Eastern Region of India consists of eight hill states, viz., Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Of these, Assam is the least hilly since much of it lies in the plains of the Brahmaputra river system. Most of North-East India, however, consists of hills or mountains deeply dissected by rivers and streams due to uplifting of the land. Because of this terrain, travelling in this region of India is difficult and slow. This region is bounded by China, Bhutan, Bangladesh and Myanmar.

Tribal people make up the overwhelming majority of the population of these states, except for Assam, shifting agriculture (shifting cultivation) and forest resources play a major role in their economic life. Rising populations and desire for an improved standard of living in this region (where the incidence of poverty is high) have resulted in lack of sustainability of traditional practices in agriculture and forest use. Consequently, there is a need to search for alternative methods of agriculture and forest use and to evaluate their sustainability from an economic,

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social and biophysical point of view. This paper makes an attempt to reveal the need for sustainable agriculture in the North-Eastern Region (N.E.R.) of India by exploring the status of sustainable agriculture in N.E.R. and its consequences and highlighting the problems faced in the way of maintaining sustainable agriculture in N.E.R., and the various strategies to achieve sustainable agriculture in N.E.R. of India with the following objectives:-

1. To highlight the components of sustainable agriculture.
2. To highlight a rough idea about the status of sustainable agriculture in the North-Eastern Region of India and its consequences.
3. To highlight the problems faced in the way of maintaining sustainable agriculture in the North-Eastern Region of India.
4. To know various strategies and alternatives to achieve sustainable agriculture in the North-Eastern Region of India.

### **Definitions and concepts of sustainable agriculture**

"In simplest terms, sustainable agriculture is the production of food, fiber, or other plant or animal products using farming techniques that protect the environment, public health, human communities, and animal welfare. This form of agriculture enables us to produce healthful food without

compromising future generations' ability to do the same." (<http://www.sustainabletable.org/246/sustainable-agriculture-the-basics>)

"Sustainable agriculture is the efficient production of safe, high quality agricultural products, in a way that protects and improves the natural environment, the social and economic conditions of farmers, their employees and local communities, and safeguards the health and welfare of all farmed species" (<http://www.saiplatform.org/sustainable-agriculture/definition>)

U.S. House of Representative's conference report on the Food, Agriculture and Trade Act of 1990 (p. 1055) "Sustainable agriculture is an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

1. satisfy human food and fiber needs;
2. enhance environmental quality and the natural resource base upon which agricultural economy depends;
3. make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
4. sustain the economic viability of farm operations; and
5. enhance the quality of life for farmers and society as a whole."

Sustainable agriculture can be defined in many ways as narrated above, but ultimately it seeks to sustain farmers, resources and communities by promoting farming practices and methods that are profitable, environmentally sound and good for communities. Sustainable agriculture fits into and complements modern agriculture. It rewards the true values of producers and their products. It draws and learns from organic farming. It works on farms and ranches large and small, harnessing new technologies and renewing the best practices of the past.

In short, Sustainable Agriculture is:

- \* Economically viable : If it is not profitable, it is not sustainable.
- \* Socially Supportive : The quality of life of farmers, farm families and farm communities is important.
- \* Ecologically Sound : We must preserve the resource base that sustains us all.

### **Components of sustainable agriculture**

Using the above-listed definitions and descriptions of agricultural sustainability, six components, viz., productivity, stability, efficiency, durability, compatibility and equity, are set out for consideration in order to make a comprehensive assessment of any agrological system.

### **Status of Shifting agriculture in the NE Region of India and its consequences**

The North-Eastern states have total geographical area of 2,55,090 sq. km., out of which 1,36,785 sq. km. or 54.4% is under forest cover. About 37,220 sq. km. area or 14.5% of the total area is under cultivation in the region. The region can broadly be divided into three physiographic zones as follows:-

1. hills and mountains of folded topography;
2. peninsular plateau; and
3. plain.

The following table shows the land utilization in the north-eastern region of India during the year 2005-06. From the table, it is learnt that Arunachal Pradesh has the largest area of land under forest, i.e., 92.92% of her total geographical area while Assam has the smallest area of land under forest, i.e., only 24.62% of her total geographical area in the north-eastern region of India.

Similarly regarding land not available for cultivation, Sikkim, having 34.34% of her total geographical area, contributes the largest area while Arunachal Pradesh, having 0.58 % of her total geographical area, contributes the smallest area in the region. Again, in the case of net sown area, we have found that the net sown area in Assam, being 35.34% of her total

geographical area, is the largest while the net sown area in Mizoram, being 4.29% of her total geographical area, is the smallest net sown area in the region.

Shifting cultivation, the predominantly form of agricultural prevalence in the region, is practiced in about 3869 sq. km. of area annually. As shifting cultivation plays a dominant role in the economic life of the people of N.E.R., the region is under severe threat of soil erosion. Appropriate estimated soil loss from shifting

cultivation in N.E.R. is shown below: (Area in Million Hectares/Tonnes)

Apart from shifting cultivation, minor and major land slips and landslides, agriculture on the slopes are another major contribution to the process of soil erosion and land degradation. On the other hand so far as food security is concerned, it is a matter of suspicion whether food security can be maintained along with sustainable agriculture. Regarding this, if we look at food production in the North-Eastern Region of India, we found that in

**Table 1. Land Utilization of Northeastern Region during 2005-06**  
(All figures are in percentage)

Sl. No.	States	Land Under Forest	Land available for cultivation	Net sown area
1	Assam	24.62	32.28	35.34
2	Manipur	86.82	1.38	11.44
3	Meghalaya	42.29	10.21	9.50
4	Mizoram	82.25	6.92	4.29
5	Nagaland	54.55	4.77	19.53
6	Sikkim	43.82	34.34	26.69
7	Tripura	57.77	12.27	29.16
8	Arunachal Pradesh	92.92	0.58	15.38

(Source: CMIE Report, January 2009)

**Table 2. Soil Loss from Shifting Cultivation in the Northeastern Region of India.**

Sl. No.	States	Jhum Area	Total Soil Loss
1	Arunachal Pradesh	35000.0	15.2
2	Assam	22819.0	9.9
3	Manipur	37113.4	16.3
4	Meghalaya	49074.1	21.3
5	Mizoram	35660.4	15.5
6	Nagaland	81153.8	35.5
7	Tripura	16641.8	7.3
	<b>Total</b>	<b>277462.5</b>	<b>121.0</b>

Source: Mishra, 1999

2000-2001 total food grains production in the N.E.R. was 5,875 million tonnes, about 3 percent of all India level. The share of the region's population in India is higher at about 4 percent than its 3 percent share of food grain production; the N.E.R. has a regional level deficit in food production and is dependent upon food grain from outside in India and abroad.

Therefore, if we are concerned with sustainable agriculture, then it is evident that sustainable agriculture is to some extent achieved by the north-east states as compared to some other states of India. Because the agricultural pattern in the North-Eastern Region of India is mechanised partially. But on the other side, natural calamities, shifting cultivation, faulty type of cultivation are also giving threat to sustainable agriculture in N.E.R. Hence it is a comprehensive matter to say how much sustainable agriculture exists in the region. Thus, the feasibility of prevalence of environmental degradation as well as ensuring food security, without compromising the natural resources will require efficient and proper management strategies.

The following problems are faced in the way of maintaining sustainable agriculture in the North-Eastern Region of India :-

**1. Shifting cultivation :** Due to predominance of shifting cultivation in the North-Eastern

Region of India, it is under severe threat of soil erosion which gives a threat to sustainable agriculture.

**2. Traditional land use system:**

The traditional land use system practised by the small and marginal farmers degrades the soil quality to a large extent, which also gives a threat to sustainable agriculture.

**3. Rapid increase in population growth :**

With the rapid increase in population and to meet the growing demand for food, more and more fertilizer and pesticides are applied in agriculture fields. This gives a threat to sustainable agriculture.

**4. Frequent Flood :** Flood that occurs frequently, especially in Assam increase salutation of the soil through water logging which is another responsible factor for soil degradation.

**5. Lack of awareness among the farmers :** Because of narrow outlook and unconsciousness of the farmers, they are not aware about the severe evil effects of environmental degradation.

#### **Strategies and alternatives for sustainable agriculture in the NE Region of India**

Maintenance of sustainability in agriculture is a great challenge not only for N.E.R., but also for the country as a whole. If serious efforts are made to adopt effective and

adequate strategies and some remunerative alternatives, the goal can be achieved to a large extent. A variety of philosophies, strategies and practices have contributed to this goal. Few of them can be enumerated as under:-

**1. Inputs management strategy:**

Many inputs and practices used by conventional farmers are threatening to sustainable agriculture. Inputs should be used in such a manner that it does not need high level material inputs. To be more sustainable over the long term, labour must be acknowledged and supported by Government policies, recognized as important constituents of Land Grant University and carefully considered when assessing the impact of new technologies and practices.

**2. Soil management strategy:**

For improving soil fertility, the following practices can be applied in agriculture fields:-

- i) Use of farm composting, mulches and green manure.
- ii) Use of intercropping, strip cropping and crop rotation.
- iii) Application of physical method such as contours bunds to minimize erosion especially on sloping lands.

**3. Water management strategy:**

An extensive water storage and transfer system should be established which helps crop production to expand to every

arid region. In drought-prone areas, limited surface water supplies should be prompted over draft of ground water.

**4. Energy management strategy:**

Modern agriculture heavily depends on non-renewable energy sources, especially petroleum. The continued use of these energy sources cannot be sustained indefinitely, yet to abruptly abandon our reliance on them would be economically catastrophic. However, a sudden cut off in energy would be equally disruptive. In sustainable agriculture system, there is reduced reliance on non-renewable energy sources and a substitution of renewable sources on labour to the extent, i.e., economically feasible.

Since agriculture-related activities are highly desired and cannot be checked overnight, therefore, along with the above strategies we may adopt some remunerative alternatives as soon as possible with the help and support of Government agencies. Cottage and Small-scale industries, animal based farming system, agriculture and allied activities are some other alternatives that should be practised in order to improve social economic status of farming community by preserving the national treasure of soil and nutrients. Few workable suggestions are made in this regards as follows:-



**(a) Poultry and livestock**

**farming:** Poultry farming and livestock farming are two primary ventures that have vast potential in the region, Tripura, Assam and plain regions of Manipur and Meghalaya can be converted to the poultry production area in the region. Duck can also be promoted for egg and meat purposes. There is an immense scope for livestock development in Mizoram, Meghalaya, Nagaland and other tribal-dominated areas.

**(b) Dairy farming:** Though dairy farming is practised in the North-Eastern Region of India, it is on a minor scale especially by the migrated labourers from the neighbouring states. Sheep and goats are also seen but due to high humidity probably they are not able to withstand the climate pressures. The region due to high rainfall offers great potentials for fodder product around the year for dairy cattle.

**(c) Tea plantation and tea industry:** N.E.R. is the world largest tea growing region having 16% share and is the largest producer and exporter of tea in India (share 55%). Tea plants, being perennial in nature, can withstand high intensity rainfall and provide the cover to the exposed land surface in torn helping to check the soil erosion to a large extent.

Tea growing is being expanded to non-traditional areas of N.E. region such as Mizoram, etc. Tea growing areas need a boost in the region for resource sustainability and profitability.

**(d) Cash crops and plantation crops:**

The tropical, sub-tropical and temperate climate of the north-eastern region of India is conducive for growing cash crops and plantation crops like ginger, squash, banana, pineapple and many other cash crops.

**(e) Horticultural crops:** The tropical, sub-tropical and temperate climate in plain areas, plateau and high hills of the N.E.R. offers excellent conditions for development of tropical and temperate horticultural crops production. The region's congenial climate is also suitable for large-scale production of Oil Palm, etc.

**(f) Cultivation of medicinal and aromatic plants:** There is a huge biospecies having medicinal plants and aromatic properties in the North-Eastern Himalayan region. Opportunities can be explored to start the cultivation of such plants species, which are perennial in nature and do not require disturbing of the land beneath due to weeding.

**(g) Cottage and small-scale industries:** As one of the chronic problems, faced in

agriculture, is excessive pressure of population on land, it is imperative to develop cottage and small-scale industries in the rural areas for immediate relief and amicable solution of the problem.

### **Suggestions**

- (i) All states in the North-Eastern Region of India are predominantly agricultural states. The main occupation of rural people in these eight states - agriculture, engages about 70 % of the population. The system of cultivation in this region is an age-old primitive method known as 'Jhuming' or 'Shifting cultivation'. Large area of land is destroyed every year for jhum purposes. Since majority of the people are related to shifting cultivation in this region as stated above and whereas it cannot be eliminated completely, therefore, policies should be made to improve the shifting cultivation so that adverse effect can be minimized.
- (ii) Credit Institution should be more effective so that people can go for various alternatives. The development of transport and communication facilities at a faster rate is also urgently required in this region.
- (iii) Building up mass awareness among the people and proper motivation to the concerned through dialogues, meeting, seminar, workshop, conference and publicity in electronic media for whole-hearted participation is the need of the hour.
- (iv) Research for optimum utilization of resources, production of value-added products of value-added produces, improve technology for various agriculture activities, improvement of various indigenous methodology of production are also very much essential.
- (v) Efforts should be made to generate more and more energy - both conventional and non-conventional in this region by exploiting her vast power potential.
- (vi) More training programmes for skill development should be launched targeting the rural youths of NE.R. Industrial training institutes should be established in each and every sub-division.
- (vii) Marketing facilities should be developed so as to enable the farmers and cultivators of this region to sell their products at remunerative prices.
- (viii) Last, but not the least, rapid increase in population including infiltration from Bangladesh, Myanmar and other neighbouring countries must be checked both for food security and economic use of existing resources so that resources can be reserved for future generation as far as possible.



### **Conclusion**

It is important to point out that marching towards sustainable agriculture and achieving sustainable development in agriculture in the north-eastern region of India is the responsibility of all participants in the system including

farmers, labourers, policy makers, researchers, retailers and consumers. Each group has its own part to play, its own unique contribution to make to strengthen the sustainable agriculture community.

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