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FOOD AND NUTRITIONAL SECURITY IN NORTH EAST INDIA- SOME CONTEMPORARY ISSUES

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ABSTRACT

North Eastern Region comprises eight States of Indian Territory consisting of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura which have been gifted by the nature with tremendous biodiversity and widely varying agro-climatic condition forming 8% of the total land area and about 4% of total population of the country. More than 70 percent of total geographical area of NER is covered by hills and about 3 million hectare is estimated to be under soil erosion hazard as a result of practice of jhum cultivation. The region, by and large, is characterised by fragility, marginality, inaccessibility, culturally heterogeneity, ethnicity and rich biodiversity (ICAR, Vision, 2025). Rice is the major crop of the region accounting for about 89% of the area and 92% of the total food grains production and the region is deficient in food grains and the gap between demand and supply is widening. The production system is characterised by low cropping intensity, subsistence level and mono cropping. Land use pattern is relatively faulty for which annual loss of top soil is much higher and lack of water harvesting measures, only 0.88mhm out of 42.5mhm water is used. As a result, the stamp of backwardness has been attached to this region suffering food and nutritional security, while the country moves ahead from its target of production to food surplus in different phases of the post independence era. From the above background, this paper analysis the perspective of food security and examines the food policies adopted by the states of north east India for addressing the challenges faced by agriculture sector in order to ensure food security in the region.

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INTRODUCTION

Food is the most basic of human needs and is central to the discussion of human rights and social development. Ensuring food security ought to be an issue of great importance for a country like India where more than one-third of the population is estimated to be absolutely poor and one-half of all children malnourished in one way or another. Food security has been promoted by the United Nations Development Programme [UNDP] and analysts of hunger and famine as the most basic human need and as a central indicator of absolute poverty and physical well-being (Sen and Sengupta 1983). Food security refers not only to an adequate aggregate supply of food, but also means that "all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life" (FAO). In this sense, food security is a broad concept and implies not only producing sufficient food, but also making food accessible to the entire population throughout the year on a sustainable basis. Food security also connotes freedom from famine and chronic malnutrition and this requires provision of the means whereby all individuals or families can adequately meet their nutritional

needs on a daily and annual basis. Food security is a right of every citizen and not merely an aspiration. The ultimate objective of food security, therefore, is to guarantee food to every citizen irrespective of his or her ability to pay. Provision of food security is essential for maintaining peace and social harmony in a country (Acharya, 1998).

North Eastern Region (NER) comprises eight States of Indian Territory consisting of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura which have been gifted by the nature with tremendous biodiversity and widely varying agro-climatic condition forming 8% of the total land area and about 4% of total population of the country. More than 70 percent of total geographical area of NER is covered by hills and about 3 million hectare is estimated to be under soil erosion hazard as a result of practice of jhum cultivation. The region, by and large, is characterised by fragility, marginality, inaccessibility, culturally heterogeneity, ethnicity and rich biodiversity (ICAR, Vision, 2025). Rural population is around 80 percent. Traditionally, agriculture has been the mainstay of people of this region but the agro-based economy fails to flourish as it should have due to lack of

proper involvement and utilisation of technological aids¹. Mixed farming system is the order as most of the farmers want to produce his household food and nutritional need to minimise the dependency on external sources. The production system is characterised by low cropping intensity, subsistence level and mono cropping. Land use pattern is relatively faulty for which annual loss of top soil is much higher and lack of water harvesting measures, only 0.88mhm out of 42.5mhm water is used. As a result, the stamp of backwardness has been attached to this region suffering food and nutritional security, while the country moves ahead from its target of production to food surplus in different phases of the post independence era (Mandal, 2011). Keeping the above the facts the present study made an attempt to review the existing status, scope and prospects of food and nutritional security in North Eastern States of India. The paper is divided into six sections. Section one analyse the availability of food for food security in north east region, section two deals with economic and physical accessibility of food for nutritional security, section three examines the variation of poverty and health conditions among the north eastern States, section four assess the challenges and failures of food and nutritional security, section five discusses policy suggestions/governance for food security and in the final section contents concluding remarks.

Physical Availability of Food

There are three important dimensions of food security, viz. availability of food on a sustainable basis, accessibility of food, and utilization of the available food. Food availability is a necessary condition for food security. Due to changes in consumption patterns, demand for fruits, vegetables, dairy, meat, poultry, and fisheries has been increasing. There is need to increase crop diversification and improve allied activities. The persistence of rural poverty and food insecurity in the wake of satisfactory agricultural growth and pervasive government intervention in the agricultural development suggests the need for a thorough review of the current agricultural policies and systems, and the identification of new initiatives for improving production and productivity practices and performances.

The primary objective of agricultural development is to satisfy the essential commodities needs of the society, but the same cannot be achieved at the cost of local environmental and the culture of the people. Indian economy is predominantly agrarian in nature and north east India is no exception from it. Food security is fundamentally about achieving reliable access to adequate, affordable and nutritious food supplies sufficient to avoid chronic hunger, crisis hunger and stunted development. Once basic caloric needs are met, the other stage of food concerns surfaces around safety and healthfulness. This safety dimension involves securing food supplies free from contamination, adulteration or food-borne diseases and healthy foods that reduce the influence of diet-based diseases and promote well-being.

Production, procurement and distribution are three pillars for food security and self sufficiency at State level. In the production front, during 1990s and the early 2000s the growth of agricultural production and productivity levels in India was decelerated as compared to 1980s and in recent years. The overall growth rate of crop production declined from 3.72 per cent to 2.29 percent and productivity from 2.99 per cent to 1.21 per cent per annum. Nevertheless, the scenario of north eastern states is no exception and this region produces a total of 6.5 million tonnes of food grains against a requirement of around 8.5 million tonnes. The deficiency is, therefore, around 2 million tonnes. Similarly, in spite of a desired aptitude towards animal husbandry practices, per capita availability of milk, meat, egg and fish per annum is only 31.53 litres, 9.36kg, 33.50 numbers and 4.12 kg, respectively (ICAR, 2010). In most of the NER States, there is a wider gap between productions and per capita per day deficit of food grains of the region varies from 11 grams in Tripura to 287 grams in Meghalaya in 2010. There is a clear indication that most of the NER States have been facing food insecurity with varying degrees as per its future trends of population with production and productivity trends is concerned. The compound growth rate variation of food grain production showed in the above Table 1 that the decadal changes are not significant and around three States are showing in negative trend. However, the region as a whole showed slight increase in food grain production can be termed as moderate if not high and more or less satisfactory for the region during the study period.

Economic and Physical Accessibility of Food

It is now a well-known fact that the nutrition plays an important role in physical efficiency of the people and act as a device to determine the food security in a country and in different parts of the country. One of the issues pertaining to the ongoing debate on food security is the per capita availability of food. The overall trend in per capita availability of food grains, though fluctuating has been marginally negative. It should be noted that while availability is concern, changing demand patterns, especially diversifying toward high-value commodities, have to be taken into account. The issue of food security is not so much about availability of food grains but the composition of the overall food basket as observed from changing consumption patterns. As economic growth picks up, it is common to observe a change in dietary patterns wherein people substitute cereals with high-value food.

The nutritional security is only achieved when secured access to food is coupled with sanitary environment adequate health services, and the knowledge and care needed to ensure the good health of all individual in a household. The availability of nutritional resources and the degree to which an individual has access to such resources are a function of how society is organised economically, politically, ideologically and administratively which are completely absent in north east region (NER). The National Nutrition Monitory Bureau (NNMB), National Family Health Survey (NFHS) and National Sample Survey provides data on nutritional status general as well as vulnerable groups using Gomez classification and bio-mass index (BMI) classification in the case of others. Data from NSS surveys show that per capital expenditure on food as well as expenditure on cereal in rural areas has higher in NER States that of urban areas. It is

¹ In North East Regions the Average landholding is 2.5ha compared to national average of 0.69ha. Although the landholding appears to be higher, the entire holding cannot be used for agricultural purposes due to topographical disadvantages.

Table 1. State wise production of total food grains in North east region (2000-01 to 2009-10) (in '000 Ton)

Year/State	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	CAGR
Arunachal Pradesh	217.4	242.3	244.5	226.9	240.9	245.7	248.5	255.8	308.9	3.99
Assam	4023	3894	4035	3618.2	3677.8	3060	3470	4143.0	4481.1	1.20
Manipur	400.5	343.7	391.9	447.8	398.5	398.5	421.8	415.0	338.9	-1.85
Meghalaya	224.7	227.1	233.8	225.2	183.1	231.5	231.8	236.3	239.1	0.69
Mizoram	126.3	129.1	139.4	124.6	129.8	56.3	19.1	58.9	62.4	-8.14
Nagaland	355.4	388	409.8	403.5	424.8	436.2	473.2	514.2	354.2	-0.02
Tripura	597.5	611.8	529.1	556.4	563.6	630	633.3	634.7	647.9	0.88
Sikkim	98.7	96.6	99.9	103.9	100.3	100.3	111.6	107.5	117.3	1.93
NER	6043.5	5932.6	6083.4	5706.5	5718.8	5158.5	5609.3	6365.4	6549.8	0.89
India	212851.2	174771.4	213189.4	198362.8	208601.6	217282.1	230775	234466.4	218107.7	0.25

Source: Ministry of Agriculture, Govt. of India.

Table 2. Per capita unit intake of and Percentage share of food and cereals in total household consumer expenditure (2009-10) Per day MPCE_{MMRP}

State	Per capital Food grain p/day (gram) (exclude imports)	Expenditure on Food (%)		Expenditure on Cereals (%)		Rural Urban per capita per day intake of					
		Rural	Urban	Rural	Urban	Rural			Urban		
						calorie (Kcal)	protein (gm)	fat (gm)	calorie (Kcal)	protein (gm)	fat (gm)
Arunachal	612	57.8	13.8	51.7	9.2	2251	65.3	27.3	2159	61.4	35.5
Assam	144	64.4	20.7	52.9	12.8	2120	54.4	28.6	2176	58.8	36.9
Manipur	344	60.1	28.7	55.9	24.3	1993	50.4	16.2	1952	47.9	17.4
Meghalaya	221	54.6	14.0	42.4	11.3	1801	47.5	25.7	1701	44.6	23.9
Mizoram	157	57.7	13.3	50.4	9.4	2182	55.6	29.4	2240	59.8	41.9
Nagaland	490	57.8	19.5	48.5	14.9	1983	61.1	15.3	1968	61.9	18.6
Sikkim	528	53.5	10.5	47.1	10.4	2074	53.5	41.8	2109	55.7	36.3
Tripura	482	62.4	15.4	54.1	11.8	2384	63.6	30.2	2431	66.4	39.8
India	444	57.0	13.7	44.4	8.1	2147	59.3	43.1	2123	58.8	53.0

Source: NSS 66thRound, Nutritional Intake in India, Ministry of Statistics and Programme Implementation.

important to recognize that the pattern of income changes has direct reflection on nutritional and food security. If the people have enough income, they may not always choose to consume a nutritional and balanced diet at the least cost. Factors which help for diet diversification are monetization in the rural economy and changing the food habits may be responsible for the decline in the demand for food grains in recent years. In north eastern State region, where, rice and meat are the major food items in the consumption basket, the food security in terms of calories and nutrition are calculated on the basis of these two major items. Variation of per capita consumption of rice from one State to other varies substantially. Diversification of expenditure pattern of north east people clearly indicated that in the lower range of expenditure group, the percentage share on consumption expenditure is in favour for cereals. As the range of income pattern increases, the household level expenditure is more in favour of non-cereals items than expenditure on cereals. Table 2 indicates that many states from NER regions have been spending their expenditure on cereals lower level than national average and it much below in the states of Sikkim followed by Meghalaya while other state are little higher than national average during the year of 2009-10.

Per capita availability of food grains shows that wide variations among the States in which the availability of food grains per capita per day is high in Arunachal Pradesh followed by Sikkim and extreme low in Assam followed by Mizoram which excluding imports from other States. On the contrary to that, the percentage share of expenditure on food was very high in Assam followed by Tripura, and Manipur and it was lowest in Sikkim followed by Meghalaya. Whereas, in urban areas, Manipur has been dominating at the rate of 28.7 per cent of total expenditure on food items followed by Assam and lowest in Sikkim followed by Mizoram. On the other hand the per capital intake of calories among that States reveals that

none of the state has been meeting the minimum 2400 calorie norm and all states in NER are in insecure in terms of calories². It can also be said that majority of the poor who are insecure in their food are located in the north east region of the country despite that region being endowed with abundant natural resources. The data reveals that failure to access to food or calories is not due to failure of production but also due to distribution failure.

Nutritional Security, Poverty and Health Status

An interrelated and important aspect yet to be effectively addressed is nutritional security³. Despite intervention through several food-based social safety net programs, some of them running over decades, malnutrition levels continue to be

² If we follow the World Bank norms, those who earn less than US\$2 per day have to be considered poor or living in insecurity of the food, then mostly all the States of NER, needs to be categorized as poor states.

³ Nutritional status is typically described in terms of anthropometric indices, such as *underweight*, *stunting* and *wasting*. The terms underweight, stunting and wasting are measures of protein-energy undernutrition and are used to describe children who have a weight-for-age, height-for-age and weight-for-height measurement that is less than two standard deviations below the median value of the NFHS/WHO reference group. This is referred to as moderate malnutrition. Underweight is generally considered a composite measure of long and short-term nutritional status, while stunting reflects long-term nutritional status, and wasting is an indicator of acute short-term undernutrition. In addition, there are some indicators of micronutrient malnutrition. The most commons forms of micronutrient malnutrition referred to in this document are Vitamin A deficiency, iodine deficiency disorders and iron-deficiency anemia.

severe and persistent. There is an urgent need to envisage an integrated nutrition and health program for all vulnerable groups, focusing on the role of gender and governance. Poor nutritional outcomes of infants and children arise from the poor health status of women, overall poverty and lack of hygiene, and inadequate health facilities in north east region. In particular, women's access to clean drinking water, toilet facilities, and clean cooking fuel influence their health outcomes, which are critical for child health and nutrition. Over 30% of women do not have access to toilet facilities, 75% do not have safe and improved drinking water in their premises, and 35% do not have clean fuel for cooking and about 35.6% of women suffer from chronic energy deficiency, indicated by a body mass index below 18.5 (Jose and Navaneetham. 2010).

Table 3 reveals that the substantial variation across the states in NER in basic housing characteristics. The proportion of household with access to electricity, toilet facility is in better condition in the region than national average except Assam in electricity while more than one third of households obtain drinking water from an unimproved source in the all the major states. The smoke from solid fuels poses a health hazard when inhaled. However, the major proportion of households relying on solid fuels for cooking in which this region avails huge forestry resources. The highly ruralised States of North East Region have the very lowest proportion of households living in a pucca houses while major houses are in katcha and bamboo houses.

exclusion, degradation and discrimination, and political powerlessness and disarticulation. Poverty in India is officially measured in terms of calorie consumption. The poverty line is the monthly per capita expenditure in 2009-10 this corresponded to an average per capita expenditure of Rs 672.8 for rural areas and Rs 859.6 for urban areas per month. These expenditures correspond to a total household expenditure estimated as sufficient to provide 2400 calories daily in rural areas and 2100 calories daily in urban areas, plus some basic non-food items. The poverty estimates have been calculated on methodology suggested by the Tendulkar Committee with estimates from NSS 66th round of consumer expenditure based on 2009-10 prices among the NE states reveals that the State of Manipur is in highest level of poverty ratio followed by Assam in which highest number of persons in below poverty line whereas, Tripura is in lowest per capital consumption expenditure and Nagaland is in Highest in north eastern region States. On the other hand, malnutrition is however much more widespread than hunger. Over 220 million people in India were undernourished in 2009-10 with lack of inadequate access to enough food to meet their basic nutritional needs. National Family Health Survey (NFHS-3) of 2005-06 has shown that nutritional deficiency, anaemia and other health characteristics especially in children is still widely prevalent. India has 20 per cent of the world's children but 42.5 per cent of its malnourished children; 30 per cent children have birth weight less than 2.5 kg and 53 per cent children below 5 years are underweight.

Table 3. State wise Housing characteristics and Poverty levels in NER (%)

Year/State	Access With electricity	improved source of water	With toilet facility	Access to clean fuel for cooking	Living in pucca house	Person BPL (lakh)	Poverty Ratio	Monthly Per capita Rs.	
								R	U
Arunachal	76.9	85.0	80.6	67.7	20.8	3.5	25.9	773.7	926.4
Assam	38.1	72.4	76.4	75.8	19.8	116.4	37.9	691.7	871
Manipur	87.0	52.1	95.6	64.7	10.7	12.5	47.1	871	955
Meghalaya	70.4	63.1	71.3	72.2	35.1	4.9	17.1	689.9	989.8
Mizoram	92.3	85.0	98.0	34.1	22.9	2.3	21.1	850	939.3
Nagaland	82.9	62.8	85.6	76.0	20.7	4.1	20.9	1016.8	1147.6
Sikkim	92.1	77.6	89.0	52.4	51.0	0.8	13.1	728.9	1035.2
Tripura	68.8	76.1	96.7	80.4	12.1	6.3	17.4	663.4	782.2
India	67.9	87.9	44.6	70.8	45.9	3546.8	29.8	672.4	859.6

Source: NFHS-III survey- 2005-06, Ministry of Health and Family Welfare, GoI. and National Sample Survey(NSSO) 66th round, Nutrition Intake in India.

Table 4 State wise Distribution of Health Status among the North East Region

Year/State	FR	CBR	NN	PNN	IM	CM	UFM	UND (%)	CU % (age<2)	WA	CA
Arunachal Pradesh	3.03	24.1	34.0	26.7	60.7	28.8	87.7	16.4	32.5	50.6	56.9
Assam	2.42	22.1	45.5	20.6	66.1	20.2	85.0	36.5	36.4	69.5	69.6
Manipur	2.83	25.0	18.7	11.1	29.7	12.6	41.9	14.8	22.1	35.7	41.1
Meghalaya	3.80	28.7	23.6	21.0	44.6	27.1	70.5	14.6	48.8	47.2	64.4
Mizoram	2.86	24.8	16.3	17.7	34.1	19.5	52.9	14.4	19.9	38.6	44.2
Nagaland	3.74	28.5	19.8	18.5	38.3	27.5	64.7	17.4	25.2	n.a	n.a
Sikkim	2.02	18.2	19.4	14.3	33.7	6.7	40.1	11.2	19.7	60.0	59.2
Tripura	2.22	21.9	33.1	18.3	51.5	8.2	59.2	36.9	39.6	65.1	62.9
India	2.68	23.1	39.0	18.0	57.0	18.4	74.3	35.6	42.5	55.3	69.5

Source: National Family Health Survey (NFHS-3) 2005-06 MoFW, GOI

Note: FR-Fertility Rate, CBR- Crude Birth Rate, NN-Neonatal Mortality, PNN- Post neonatal Mortality, IM- Infant Mortality rate, CM- Child Mortality Rate, UFM-Under Five Mortality, UND-Women with nutritional deficiency, CU-Children (weight for age) undernourished (%) WA-Women with anaemia (%) CA- Child with Anaemia (%)

Poverty is an extremely complex phenomenon, which manifests itself in a dense range of overlapping and interwoven economic, political and social deprivations. These include assetlessness, low income levels, hunger, poor health, insecurity, physical and psychological hardship, social

About half of the women in the age group of 15-49 years and three-fourth of the children have been found to be anaemic. Similarly in north east region major states have been facing the health hazards and nutritional deficiencies above the national average in major aspects and it may be relevant to

note that the prevalence of malnutrition and other deficiencies are not only on account of lack of access to food but has also to do with lack of safe drinking water, sanitation, environmental hygiene, primary health care and awareness. The problem of hunger, nutrition and food security is thus related to the whole process of development.

Challenges/ failures for food and nutritional security in NER States

Population Explosion and Immigration

The most important problem which creates hindrance on the way of food security and agricultural development is the problem of population explosion in the region. The total population of the region is about 45.6 million representing about 3.77 percent of India's total population in 2011. The region's growth rate of population is much higher than the national average. It is striking to note that India's total population increased at lower rate during the period of 1951 to 2011 whereas, for the north east region the respective growth rates are higher than national growth except 2011. At the same time the share of population of NER in comparison in India increased from 2.88 per cent to 3.77 per cent in 2011 (see Table A1). Undoubtedly the increasing population trend at alarming rate in the north east region is due to immigration from outside the country (Bangladesh and Nepal) as well as from within the country. This population explosion caused by immigration poses serious threat on the natural resources of the region and the availability of land for agricultural development as a result, the production and productivity of agriculture could not cope with the growing population and socio economic changes of the region for which the food grain production is short by 2 million tonnes of demand in this region.

Forestry and Method of cultivation

The north-east region in India is endowed by nature with abundant forest resources. Since the economy of some of the States in the region is still forest based or under transformation from forest to agriculture, the pressure on forest resources is increasing. Prevalence of shifting cultivation and a practice based on deforestation, free access of the individuals to forest for timber and fuel as source of income, prevalence of varied type of forest areas ownership in the region which does not allow the line department to function properly, lack of authority with state government to prevent deforestation and burning of forests, biotic interference of fire and free grazing, lack of organized plantation, haphazard or unorganized plantation and non-availability of advanced disease free nurseries are the main constraints in forestry sectors in the region.

On the other hand, the north eastern region is dominated by the tribal population, the reference may be made to the tribal method of cultivation and more than 80 percent of cultivation under shifting or jhuming adopted in the ancient farming system, which was once considered as a farmer friendly practice has now become an ecological menace. The population pressure on forest resources is relatively less but while looking at the structure of the economy and utilization of forest resources the impact of the pressure gets multiplied in the region. Rapid deforestation over the years 2005-09 due to shifting cultivation practices in the region has reduced the total

forest cover amounting to 1326 sq.km (see Table A.2.). An inevitable consequence of deforestation is increased run off rain water precipitation and extensive soil erosion resulting in unacceptable deterioration of top soil

Climatic Constraints

The altitudinal differences coupled with varied Physiography contributes to climatic variations in the north eastern region of India. The climate in the region varies from sub-tropical to alpine. Despite diverse physiographic characteristics of the region, sub-regional variations in the average seasonal temperature are not striking. Bulk of the annual rainfall in the region (64%) is received during June–September period. Average annual rainfall in the region is about 2490 mm with highest rainfall of 12,500 mm in the world in the Cherrapunji Mawsynram. The region, due to heavy rainfall, has very high humidity varying from 62% to 91% in rainy season and 42% to 65% in other seasons. Extreme weather events and climatic anomalies have major impacts on crop productivity and food security in North east region. Losses in production happen due to untimely rains, frost and hails etc. during crop season.

Misuse of Natural Resources

The North Eastern region is endowed with rich natural resources of soil, water and vegetation. The region has a total geographical area of 255,090 km² out of which 136785 km² or 54.4% is under forest cover. About 37220 km² or 14.5% of the total area is under cultivation in the region. Total waste land estimated in the region is 29008 km². About 30% of the total geographical area has been classified as waste land. The inaccessibility in deep afforested areas and rugged terrain provided the locals as well as businessman the best opportunities for exploiting the natural resources unabated; mainly forest resources. The resources sustainability too has reached to a highly vulnerable state, resulting from huge scale destruction of forests and degradation of steep hill slopes, extinction of a large species of vegetation and animals besides other related ills. Gross inappropriate use and indiscriminate exploitation of resources has resulted in excessive soil erosion, excessive to heavy nutrient loss through leaching and environmental degradation in the hills and silting of river beds in plain areas causing menacing floods, loss of property and life each year.

Land Distribution and Tenurial System

Land use pattern is relatively faulty for which annual loss of top soil is much higher (46 tonnes/ha) than all India average of 16 ton/ha and ineffective water harvesting measures, only 0.88 mhm out of 42.5 mhm water is used. The land tenurial system prevalent in the region is very peculiar. Land ownership by the village chief, community ownership and individual land ownership prevailing land tenure systems in the region often act as a disincentive for agricultural development and maintenance of land for cultivation. In the first category of land ownership with village chief, the farmers only have cultivation right over the land and, therefore, do not feel a sense of belongingness. This discourages the farmers to use inputs for getting the optimum yields. The right for distribution of land for cultivation is usually vested with the village chief or headman and the village council. However, the distribution of the land is done according to need and

availability of family labour in the household. Shifting cultivation in its pure form is practiced on community land.

Institutional Backwardness

Lack of proper markets, absence of storage and agro-processing activities, lack of finance, lack of organized sector to encourage horticulture and floriculture, lack of proper planting material suited to different agro-climatic situations, poor post harvest management, non-availability of desired expert advice to the farmers on the matters of right plantation and management practices, high losses of soils due to erosion, leaching of nutrients and resultantly low productivity of soil are the main constraints for agricultural development in the region. Lack of proper facilities of disease control, lack of infrastructure for fish processing, lack of technical know-how with the farmers for fisheries, and non-availability of feeds, shortage of labour for livestock management, no efforts on genetic improvement, low breeding efficiency in cattle, non-availability of vaccines, lack of trained manpower, lack of policy frame work for channelization of production-processing-marketing components, contamination of vaccinated animals with non-vaccinated due to porous borders and unchecked movement and intermixing are the main bottlenecks for livestock industry in the region.

Socio-economic and Technological Fatigue

The N.E. India has diverse ethnic groups and social systems bound with customs and traditions. These factors clearly differentiate the type of economic activities and the economic status of the population, which inhibit the adoption of modern methods. Very low levels of chemical fertilizer/ pesticide/ herbicide/ insecticides consumption in the region with defective distribution system and stands at around 11 kg/ha ranging from as low as 2.7 kg/ha in Arunachal Pradesh to a high of around 72 kg/ha in Manipur. Poor transport and communication, system and inadequate institutional credit and poor economic condition of the farmers has led to reduced purchasing power and thus affected the food security and nutritional availability

Policy /Governance of food and nutritional security

The challenge before the country today is providing food security and enhancing the quality of life of all citizens by making available employment, enhanced income and better livelihood opportunities. The north eastern regions of the country, in particular, are characterized by high incidence of poverty, social and economic inequities which are largely the consequence of regional and other imbalances in the overall milieu of the people inhabiting the area. The enormous potential of the region in agriculture, horticulture, animal husbandry and fisheries is contrasted by the low levels of productivity in the region which are generally below the national average in many States.

Public Distribution System and Integrated Child Development Services

Public distribution system has been one of the most important elements for safety net for food and nutritional security in north east region. Since a large proportion of population continues to be poor, food security concerns are of great importance in this region and the government and planning

commission should identify the population with food insecurity through effective implementation of public distribution system supplying essential food and nutritional distribution. Similarly, the Integrated Child Development Services (ICDS) is another important national programme that addresses the needs of children under the age of six years. It seeks to provide young children with an integrated package of services such as supplementary nutrition, health care and pre-school education. The programme also extends to pregnant women, nursing mothers and adolescent girls to overcome food insecurity and nutritional deficiency.

Water and technological advancement

Integrated watershed management approach is the best solution for the problems related with sustainability of production systems and food and nutritional security of the people of the region. Some of empirical studies of ICAR from this regions reveals that watershed based farming system is more remunerative and help in conservation of soil and water. Water scarcity problem particularly during winter shall be countered through the development of cost effective rain/roof water harvesting modules and it has to be popularized in all the States. Rain fed agriculture is mostly practiced in the region following old traditional cultivation methods. Average consumption of fertilizers, pesticides, insecticides and other chemicals are relatively lower as compared to other regions. However, adequate and judicious use for fertilizer/nutrients for getting optimum yields should be popularized to replenish the soil resources and it would be good to supplement nutrient with organic/biological resources. Use of high yielding varieties, advance tools and farm machinery suitable for hilly terrains and improved post harvest techniques of various crops and better management practices will help to increase productivity and food security. Land tenure system which results into poor management of the soil health is another issue that needs to be addressed through the involvement of state governments.

Environmental Safeguards

Major environmental constraints limiting agricultural productivity are the acid soils, low phosphorous availability, low zinc and high concentration of iron and aluminium. Any attempt to increase production and productivity shall have to be adequately supported through appropriate amelioration of these constraints. One of the viable options to counter soil acidity is the application of lime and other soil conservation measures like bench terraces, counter bounding, grassed water ways etc. Another important environmental constraint is the high incidence of pest and diseases due to heavy rain fall and high humidity.

Forest development and Organic farming practices

The forests are dwindling at a rate of 0.7% annually in the region owing to shifting cultivation. The practice has caused enormous deforestation and land and environmental degradation in the region. Therefore, a general awareness needs to be created among the cultivators about the natural hazards associated with shifting cultivation. The uncommon opportunity of the region in organic food production shall be converted into strength through development of organic food production process initially in select crops/animals with a view to enlisting the region in the organic food production map of

the world. Technology for production of export oriented organic glutinous rice, baby corn and vegetable crops shall be generated and tested. Similarly, organic production of fruit and spicy crops like passion fruit, kiwi fruit, orange, pineapple, turmeric, ginger and large cardamom shall be supported in different altitudinal locations.

Post Harvest handling of the produce

Post harvest losses of almost all the farm produce in the region is very high due to near zero facility for their handling, processing, value addition, packaging and even organized marketing. It is an irony that though the region produces best quality of turmeric, ginger, pineapple, orange, litchi, plumb etc., there is no processing unit for any of these crops. Due to inaccessibility and transportation bottleneck restricting timely linkage between production site and the market, post harvest losses particularly for fruits and vegetable crops becomes very high ranging between 30 and 60%. Adequate measures therefore are very essential to reduce these losses which, if achieved, would add towards production enhancement. The transport and communication system is poorly developed. As a result majority of the areas in the region still remain inaccessible.

Research and Extension

In order to address the constraints like cold/heat tolerance, flood tolerance, disease and pest resistant varieties with higher production potential, adequate support through research shall be provided in the form of developing resistant/tolerant varieties, weather-based disease and pest forecasting models and molecular disease diagnostic systems for both crop and animals. Production constraint due to lack of improved farm tools and machineries shall be addressed through the development of improved tools and machineries by blending traditional and modern knowledge.

Strengthening knowledge base of women involved in agriculture

In the North Eastern region, women work force in agriculture and animal husbandry constitute 48.1% against 33% in the country. However, advanced knowledge is normally given to the men work force for which the knowledge is left unutilized. By 2012, knowledge base of the women work force is planned to be increased through training and various other human resource development programmes. Research is also planned to be reoriented for addressing the women related problems in agriculture and allied sector with a view to increasing overall production by increasing the efficiency of women partners.

Conclusion

Reducing the number of undernourished, hungry and poor people on a sustained basis must be the foremost issue and challenge in India and agriculture is one of the dominant sectors and the main source of income and employment for the rural population. North East region is lagging much behind as for as the requirements are concerned. Ironically the region has got ample resource potential not only to become self reliant but also a surplus region by proper utilization of its resources. It is however, the other side of the picture which has a darker side in the form of all ills in utilization, conservation and management of the precious natural resources which not

only has so far deprived the region from becoming self sufficient but also put the resources in jeopardy. The overall food production in this region has outpaced the population growth and the average food consumption has been increasing on one side and on the other hand, the production growth has been decelerating and stagnating which divulge adversely impact on food and nutritional security. It can be concluded from the above discussion that if the region has to become a food self sufficient instead of a deficit one and the long term sustainability of the resources for utilization of the future generations are the goals, a strategic plan has to be implemented despite many constraints by meticulously redesigning the whole process of agricultural production and distribution.

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Appendix Tables

Table A.1. Population Trend in North East Region (in 000)

Year/State	1951	1961	1971	1981	1991	2001	2011
Arunachal Pradesh	---	337	468	632	865	1091	1383
Assam	8020	10837	14625	18041	22414	26638	31169
Manipur	578	780	1073	1421	1837	2389	2722
Meghalaya	606	769	1012	1336	1775	2306	2964
Mizoram	196	266	332	494	690	891	1091
Nagaland	213	369	516	775	1210	1989	1981
Tripura	639	1142	1556	2053	2757	3191	3679
Sikkim	131	162	210	316	406	541	608
NER	10383	14662	19792	25068	31954	39036	45597
India	361088	439235	548160	683329	846303	1027015	1210193
Decadal G.R of India	--	21.64	24.79	24.65	23.85	21.3	17.83
Decadal G.R of NER	--	41.21	34.99	26.66	27.47	22.16	16.81
p.c. of NER w.r.to India	2.88	3.34	3.61	3.67	3.78	3.80	3.77

Source: Census of India-Variou Issues

Table A.2. Forest cover in NER of India (Area in Sq. Km)

Year/State	Geographical Area	2004-05		2009-10	
		Forest Cover	% of Forest in their GA	Forest Cover	% of Forest in their GA
Arunachal Pradesh	83743	67905	81.09	67353	80.42
Assam	78438	27791	35.43	27692	35.30
Manipur	22327	17125	76.70	17280	77.39
Meghalaya	22429	17169	76.55	17321	77.22
Mizoram	21081	18684	88.63	19240	91.26
Nagaland	16579	13732	82.83	13464	81.21
Tripura	10486	8214	78.33	8073	76.99
Sikkim	7096	3625	51.08	3357	47.31
India	3287263	677090	20.59	690899	21.01

Source : Forest Survey of India 2005 and 2009

Table A.3. Per capita Net State Domestic Product (At current prices)

Year/State	Per Capita NSDP (Current Prices)						% Growth over previous year				
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2005-06	2006-07	2007-08	2008-09	2009-10
Arunachal Pradesh	27719	29473	31840	36697	43445	51405	6.33	8.03	15.26	18.39	18.32
Assam	16782	18396	19737	21290	24195	27197	9.62	7.29	7.87	13.64	12.41
Manipur	18640	20395	21419	23093	24773	27332	9.42	5.02	7.82	7.27	10.33
Meghalaya	24086	26284	30952	34321	40628	43555	9.13	17.76	10.88	18.38	7.20
Mizoram	24662	26698	28764	32488	38582	45982	8.26	7.74	12.95	18.76	19.18
Nagaland	30271	33792	36568	39985	45353	NA	11.63	8.21	9.35	13.43	NA
Sikkim	26693	30256	32203	36452	46989	68731	13.35	6.44	13.20	28.91	46.27
Tripura	24394	26668	29081	31111	33350	35799	9.32	9.05	6.98	7.20	7.34
India	24143	27123	31198	35820	40605	46492	12.34	15.02	14.82	13.36	14.50

Source: Central Statistical Organisation
