Ind. Jn. of Agri. Econ.
Vol. 62, No.1, Jan.-March 2007

Strategies for Agricultural Development in the North-East India: Challenges and Emerging Opportunities*

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I

AN OVERVIEW

The North-Eastern Region (NER) with a landmass of 2.6 million sq. km located strategically in the eastern part of the country, comprises seven States (popularly known as seven sisters) namely, in alphabetical order, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura including Sikkim. The region having more than 98 per cent international border (sharing international borders with Bhutan and China in the North, Myanmar in the East and Bangladesh in the South West) has several unique and unparalleled features; fertile land, abundant water resources, evergreen dense forests, high and dependable rainfall, mega biodiversity, flora and fauna and a mixture of socio-economic, political, ethnic and cultural diversity. The congenial temperate climate is favourable to agriculture, which is the major occupation of the people of the region. But, rather than converting these strengths optimally into opportunities, the weaknesses threaten the regional economies, which adversely affected the livelihood.

The population of the NER has quadrupled to 40 million during the past half century, which has rendered the land-man ratio increasingly adverse. The preponderance of the small and marginal farmers is the common feature of the agricultural economies of the NER. The bulging proportion of small and marginal farmers trapped in the traditional low input agricultural practices, is subjected to economically unviable production systems. In addition, low and uncertain agricultural productivity due to vulnerability to floods, soil erosion and heavy siltation, the worst form of 'hidden poverty', lack of market opportunities and

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*Lead paper presented at the 66th Annual Conference of the Indian Society of Agricultural Economics, held at ICAR Research Complex for the NEH Region, Shillong, Meghalaya on November 8-10, 2006.

It is a matter of great pleasure to me that the Indian Society of Agricultural Economics (ISAE), Mumbai, has given the privilege to write a lead paper under the theme *Agricultural Development in the North-East: Status, Assessment and Prospects*. I am grateful to S.S. Johl, President, ISAE, Mumbai, for the valuable comments and suggestions on the draft paper. I have been benefited from sharing the views and thoughts with several of my colleagues including A.K. Neog, Economic and Statistical Advisor, Ministry of Agriculture, Government of India, New Delhi, R.B. Barman, Executive Director, Reserve Bank of India, Mumbai, for his extremely useful comments and suggestions, P.K. Joshi, Director, and my fellow scientists at NCAP. P.S. Birthal was particularly helpful to me in sharing ideas and information. I am indebted to them. Usual disclaimers, however apply.

remoteness and isolation, also expose them to high production risk as well as income risk (Binswanger and Barah, 1980; Barah and Binswanger, 1982). Low usage of the growth augmenting inputs such as irrigation, fertilisers, protective measures against biotic and abiotic stress, low quality seed replacement contributed to the dismal performance. The resultant outcome is the vicious cycle of low-input, low-productivity and low income, a precursor to agrarian distress.

Apparently, the past model of regional economic development has failed resulting in lacklustre growth of the economies. The contribution of the largest agriculture and allied sector to the State Domestic Product remained meager.

Therefore revitalising economies by promoting growth and rebuilding the models for agricultural development is a great challenge. In view of the coexistence of diverse ethnicity, geo-physical, socio-economic and cultural factors, the issues of developmental deficiencies are more complicated and thus require more in-depth understanding and strategies for long term economic solution.

The primary aim of the paper is to diagnose the problems of regional agricultural economies in the changing scenario and to analyse future prospects, identify the sources of agricultural growth and the constraining factors, and suggest innovative people-centric policy interventions for agricultural development.

The paper uses a data set of agricultural production systems and other related factors pertaining to past one decade from various sources (such as NEC, NEDFi, Bureau of Economic and Statistics, Government of Assam, Centre for Monitoring Indian Economy and Horticulture Mission). Data set consists of area and production of various crops, livestock, fishery activities and other relevant variables. The inferences are drawn based on the analysis of growth and trends of various economic activities and thereafter few policy interventions are suggested. The data inadequacy and inconsistency, however, is a limitation.

The following section analyses the performances of agricultural economies of the NER at the disaggregate level of the constituent States. The route to transforming North East India is discussed in Section III with particular emphasis on cropping pattern, growth performance and input use pattern. The developmental paradox and challenges to agriculture is discussed in the fourth section. In identifying the constraints, the paper suggests the strategies and policy interventions in the subsequent section and the last section presents the main conclusions of the study.

II

NORTH-EAST INDIA: A DEVELOPMENTAL CHALLENGE

The on-going economic reform process has thrown up several opportunities as well as challenges. But, in order to capture the advantages of the untapped potential the States need to reorient their development strategy within the overall macro economic framework. This is essential to achieve the broader developmental goals

because the stronger States make a strong region and strong regions make a strong nation (Banerjee, 2006). Unfortunately most of the states in the northern region lag behind under the garb of resource constraint and infrastructure hiccups. Therefore, a conscientious development strategy is essential to synergise the lagging and leading sectors or accelerating the process of development, which is the need of the day.

Socio-Economic Profile

It is a matter of concern that the abundant resources, gamut of crop production possibilities, and rich biodiversity remained an unexploited storehouse of natural resources. Moreover, the traditional agricultural practices, lack of proper technology interventions and ineffective state policies have inhibited the agricultural growth, resulting in a clear developmental divide between the NER and the rest of the country. This complexity needs to be understood in proper perspectives.

While the share of agricultural sector to State Domestic Product (NSDP) varied from 16 per cent in Mizoram to 27 per cent in Assam during the TE 2003, the growth rates of state domestic product have been decelerating across the States. The decadal growth rate of the NSDP in two important states of Arunachal Pradesh and Assam during 1993-2003 was 2.4 per cent and 2.3 per cent respectively, which is far behind the national level (Table 1). However, Tripura, Nagaland, Manipur and Meghalaya have registered higher growth.

TABLE 1. DECADAL COMPOUND GROWTH RATES OF STATE DOMESTIC PRODUCT AT 1993-94 PRICES

(per cent)

Year	1980s	1990s	1993-2003
(1)	(2)	(3)	(4)
Arunachal Pradesh	8.1	7.9	2.4
Assam	3.3	3.3	2.3
Manipur	4.8	5.4	6.2
Meghalaya	4.4	4.1	7.1
Nagaland	7.5	7.9	7.5
Tripura	5.1	7.7	10.0
All India (GDP)	3.8	5.9	6.8

*Data for Mizoram is not available.

The growth rate of agricultural sector during the period was much lower than expected at 0.4 and 1.3 per cent in Assam and Arunachal Pradesh respectively while the same in other constituent states however, is relatively better in statistical terms (Table 2). Ironically, the growth of per capita income has been at snail speed, hovering around 1 per cent, which is lower than the population growth, which hints at the "*locus-classicus*" of Malthusian dilemma.[1] In fact, the declining overall growth rates, since the 1980s is not all adequate to generate surpluses for investment and purchasing power, not to speak of providing additional employment potential.

TABLE 2. PERCENT SHARE OF THE MAJOR SECTORS TO STATE DOMESTIC PRODUCT, THE GROWTH RATES OF SDP, POPULATION AND PER CAPITA INCOME (1993-2003)

(1)	Arunachal (2)	Assam (3)	Manipur (4)	Meghalaya (5)	Mizoram (6)	Nagaland (7)	Tripura (8)
Per cent share of total SDP							
Agriculture	24.9	27.7	22.3	21.7	16.1	28.8	20.3
Agriculture and forestry	31.2	37.5	27.1	32.0	18.9	32.5	24.7
Secondary sector	24.9	20.8	23.4	23.5	16.0	13.3	24.3
Tertiary sector	45.4	47.6	49.5	52.8	65.2	54.2	51.9
Compound growth rate							
Agriculture (per cent)	1.3	0.4	3.5	6.0	N.A.	14.4	4.4
Population (per cent)	2.01	1.44	2.15	2.66	N.A.	5.22	1.10
Per capita income (per cent)	1.3	1.5	3.1	4.0	N.A.	1.9	7.9

The region is actually caught in the vicious cycle of low purchasing power leading to smaller market size and perpetuating poverty culminating at social unrest. The large income gap is also pushing the region to a position of the poorest in the country (Table 3). An examination of the rank of Human Poverty Index (HPI) succinctly shows that 6 out of 7 States in the NER lie amongst the group of the poorest States in the country (Table 4). The absolute number of population below the poverty line is 13.6 million, which accounts for 35 per cent of the total population, that is exactly 10 percentage points higher than the all India level in 2001. The situation is further exacerbated by rampant unemployment, at a rate of 4.6 per cent in Assam, which is double the all India rate. The same is also unfavourably high in the other States.

TABLE 3. PER CAPITA INCOME, ITS GAP AND GROWTH RATE DURING 1993-94 TO 2003-04 (AT 1993-94 PRICE)

State (1)	Average per capita income (Rs.) (2)	Income gap (per cent) (3)	Per capita income (CGR per cent) (4)
Arunachal Pradesh	8814	(-) 8.6	0.3
Assam	5909	(-)38.7	1.1
Manipur	6729	(-)30.2	4.4
Meghalaya	8434	(-)12.6	4.3
Mizoram	N.A.	-	N.A.
Nagaland	10245	6.2	2.2
Tripura	7745	(-)19.7	8.7
NER total	7979	(-)17.3	3.3
All-India	9645		4.1

Figures in parentheses indicate the gap in per capita income with respect to the all India level in per cent. N.A. denotes data not available, (-) negative sign indicates deficiency.

The Human Development Index (HDI) also shows abysmal picture in the North eastern India (Government of India, 2001). The values of HDI shows that four out of seven States in the NER lie among the last ten infrastructure deficient States in the country, having their relative rank at 28th in Arunachal Pradesh, 26th in Assam, 24th in Meghalaya and 20th in Tripura (Figure 1). The picture is slightly better in Mizoram and Manipur. Since, infrastructure is a pre-requisite to economic development, its deficiency, ipso facto, explains the backwardness of the region.

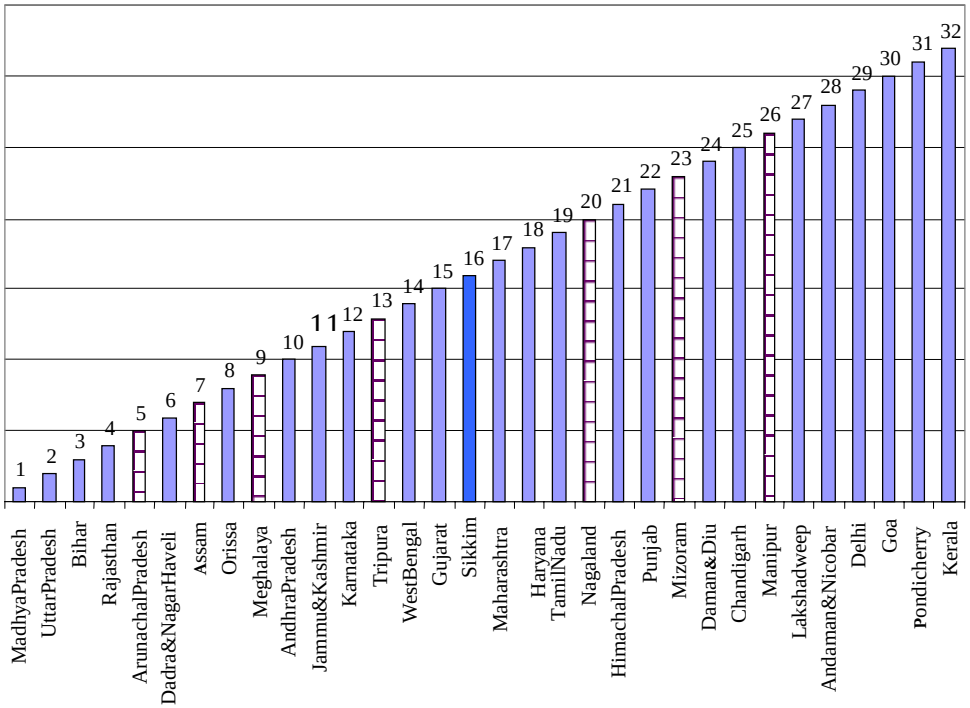

Figure 1. Relative Rank of Human Development Index for Various States in India 2001

TABLE 4. HUMAN DEVELOPMENT INDEX, HUMAN POVERTY INDEX AND UNEMPLOYMENT IN NER

States	Human Development Index 1991 (Rank)		Human Poverty Index 1991 (Rank)		No. of poor (lakh)	Incidence of unemployment (per cent)
	Rural	Combined	Rural	Combined	1999-2000	1999- 2000
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Arunachal Pradesh	28	29	30	30	3.98	0.9
Assam	26	26	25	27	94.55	4.6
Manipur	7	9	20	21	7.19	3.5
Meghalaya	24	24	31	28	8.23	0.9
Mizoram	10	7	18	14	1.85	2.0
Nagaland	13	11	21	22	5.49	3.5
Tripura	20	22	22	24	13.02	1.9
NE Total					136.36	2.59
All India values	0.34	0.381	44.81	39.36	2,602.50	2.3

Source: Government of India (2001), *National Human Development Indicators*, Planning Commission, New Delhi.

The question is whether with such an unfavourable situation, is the region capable within itself to improve the well-being of the mammoth 13.6 million population below the poverty line?

The issues related to the pattern of growth of food production, intra-regional food security, employment opportunities both in farm and non-farm sectors, pattern of growth of infrastructure, including marketing organisations need to be understood threadbare. The sources of future growth need to be identified while scoping revitalisation of agricultural diversification.

Transforming the North-East

In recent years, the central and state governments have undertaken several initiatives to stimulate regional economy and promote agricultural growth. A large number of studies have also dealt with the issues of agricultural development in the NER.[2] However, the answer to the question on developmental impact remained feeble and its gain unequal.

Low productivity and risky agricultural production environment are the primary causes of already deteriorated rural livelihood. Ironically, this has happened despite the existence of large number of production possibilities of a wide range of fruit and vegetables, flowers and herbs, spices and plantation crops (i.e., tea, coffee, rubber) in the region; much of these could be processed and gainfully traded in the rest of the country and worldwide.

The smaller size of total cultivable area prohibits horizontal expansion of agricultural production practices. It is found that the percentage of net sown area (per cent of geographical area) is as small as 2 per cent in Arunachal Pradesh and less than one-tenth of total area in Mizoram and Manipur while in Nagaland and Meghalaya it is 13 per cent each. At the regional level, Assam occupies the highest share accounting for 78 per cent of the total cultivable area. Among the crops, the cereals occupy, on an average, 74 per cent of the gross cropped area, which varies from 62 per cent in Manipur to 95 per cent in Nagaland. Rice is the major staple crop commonly grown in all the States (Table 5).

TABLE 5. PER CENT OF AREA UNDER VARIOUS CROPS IN NORTH EASTERN STATES (TE 1997-98)

Crop	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura	NE India
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rice	49.9	65.3	45.4	59.6	66.8	62.6	82.3	64.3
Cereals	73.0	68.1	62.2	74.4	66.7	95.5	83.7	70.5
Pulses	2.6	2.3	6.1	0.8	3.5	1.0	1.7	2.5
Oilseeds	10.9	8.3	5.4	5.3	7.0	0.2	0.5	7.3
Fibres	-	2.2	-	-	0.9	0.1	0.9	1.7
Fruits and vegetables	11.2	13.3	8.5	8.6	14.3	3.1	4.8	11.9
Sericulture	0.2	0.3	14.4	0.6	0.2	0.0	0.0	1.2
Nuts	0.0	2.4			0.8	0.0	6.0	1.8
Spices	1.8	2.2	2.4	10.4	6.6	0.0	1.5	2.4
Sugarcane	0.3	0.9	1.0		0.0	0.0	0.9	0.7
Total cropped area (' 000ha)	239	3860	347	174	116	216	303	5197

But the existing rice based production system failed to provide adequate household income support. On the whole, agriculture in the NER is characterised by

- The NER is extremely diverse: uneven land, high and variable rainfall pattern and ethnicity. Inter-state disparity in most economic indicators is highly conspicuous. Although the growth of output in the major states is at a snail pace, others perform better.
- Rice dominates agriculture, but the productivity is low and production risky.
- Further expansion of cultivable land is constrained by geo-physical limitation. The percentage of cultivated area is around a tenth of total geographical area in 5 out of 7 states.
- Various combinations of crop-livestock-fish-silk are followed in the region, but such diversification contributed negligibly.
- Preponderance of small and marginal (S&M) farmers is an important feature of the region. As against the proportion of S&M farmers of 59 per cent at All India, the same varies from 65 per cent in Arunachal Pradesh to 84 per cent in Manipur and Nagaland.
- On account of complete dependence on agriculture, its vulnerability to natural calamities such as floods, submergence as well as droughts has deteriorated the rural life and rural poverty has become rampant.

Pervasive inter-regional disparity in performance implies that the gain due to development is unequal and discriminatory against the NER. Why have these existing resources and agricultural practices failed?

Rice Culture: Although, rice is the major staple crop in the region, its vulnerability to natural disasters like floods, submergence and even drought affected the production system drastically. However, notwithstanding the dismal performance, the farmers have shown dynamism. The recent change in cultivation practices in favour of summer (boro) rice in Assam is notable in this regard (Figure 2). In Assam, rice is grown in all the three seasons, viz., Autumn (*Ahu*), Winter (*kharif*) and Summer (*Boro*) rice. The major rice is the winter rice, which accounted for 71 per cent of the total rice area, while autumn accounted for 25 per cent and summer rice 4 per cent during the 1970s, but in the 1990s, both winter rice and autumn rice lost 4 per cent, while boro rice gained 7 per cent (Bhoumick *et al.,* 2005). The productivity of *boro* rice is more than that of winter rice, having about 30-40 per cent yield premium. It is also relatively a safer option as it is cultivated in the flood-free summer season. The emergence of this newer crop is not only an opportunity to enhance production, but also reduces the burden of production loss due to floods. This is a desirable change that could be emulated in other areas too.

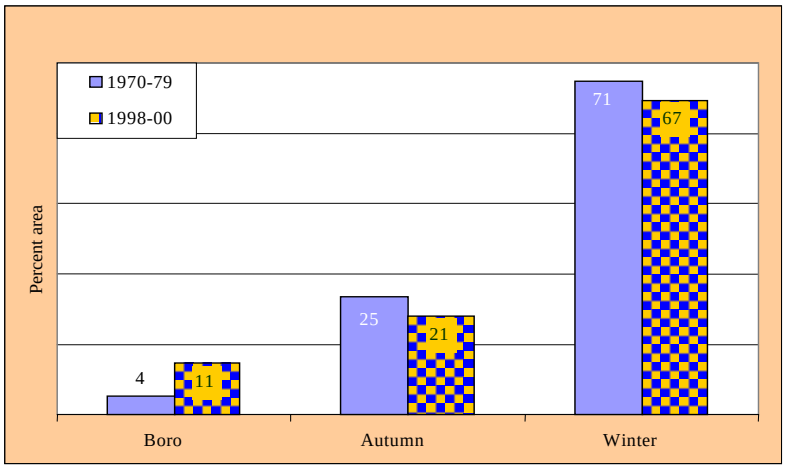

Figure 2. Change in Proportion of Various Rice Varieties during 1970s and 2000 in Assam (Per cent of Total Rice Area)

The region has some other uncommon features in agriculture too. These are:

1. Shifting cultivation (popularly known as jhum practice; a form of slash and burn system of cultivation) is yet a unique feature of agriculture in the hills covering nearly 2 million hectares, which accounts for about one-fourth of the total cropped area. Although, the jhum practice is criticised due to low productivity and environmental diseconomies, but it supports a huge population of a total of 4.43 lakh jhumia families. Being a socially preferred practice, instead of banning it, more research on improving the overall productivity of the jhum land will be a desirable policy option.

2. More than 67 per cent of the farmers in NER regularly practice multiple cropping in combination with dairy, fishery and poultry in their farms. The high value crops such as fruits and vegetables, oilseeds, pulses and spices are prominent. The area under fruits and vegetables accounts for 10 per cent area of total cropped area, the highest proportion in the country (Assam alone has 2.89 lakh hectares, 2001-02). Yet a huge potential remained untapped due to several constraints and institutional rigidity.

3. Crop Productivity: It is intriguing that despite the importance of agriculture, productivity of various crops has been substantially low, production is highly fluctuating and the post-harvest loss high (Figure 3). In comparison to all India level, the difference in yield is also very high in the NER.[3]

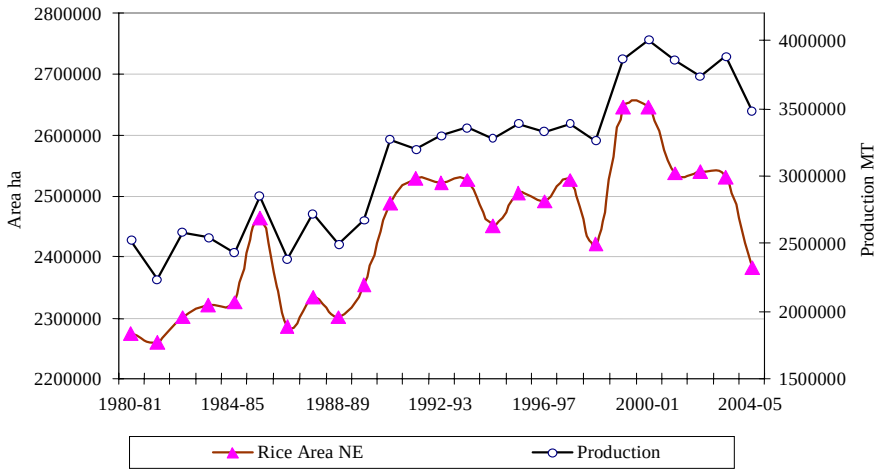

Figure 3. Trends in Area and Production of Rice in North East India

4. Table 6 shows that the average rice yield is 30 per cent less than that of all India yield. The same is as low as 49 per cent for maize, 37 per cent for vegetables and 34 per cent for fruits, while the yield of potato is just half the national average. It speaks of the need for productivity enhancing technology. It is intriguing that despite the importance of agriculture, not only productivity of various crops has been substantially low, and the post-harvest loss is also high (Hazarika, 2003).[4]

TABLE 6. YIELD OF IMPORTANT CROPS IN NORTH-EAST INDIA

(kg/ha)

	Yield (TE 1991)		Difference in yield (per cent)	Yield (TE 2003)		Difference in yield (per cent)
	North east	India	1991	North east	India	2003
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice	1328	1745	-31	1532	1996	-30
Maize	1179	1509	-28	1278	1909	-49
Wheat	1336	2265	-70	1274	2700	-112
Pulses	453	554	-22	544	565	-4
Oilseeds	580	664	-14	605	724	-20
Sugarcane	39185	65699	-68	38451	63451	-65
Potato	7352	15955	-117	8513	18346	-116
Vegetable	7038	4153	41	10956	15037	-37
Fruits	7646	9961	-30	8828	11823	-34

The analysis clearly brings out that some of the factors affecting yield include: poor adoption of modern variety, inadequate to almost negligible use of chemical fertiliser, lack of controlled irrigation, highly rain-dependent, poor seed replacement and vulnerability to landslides and erosions. The market failure and poor price mechanism are also the discouraging factors leading to distress sale.

5. As compared to rest of the country, the record of crop diversification is favourable in the NER. The fruits and vegetables occupy the second place with 10 per cent area share next to rice (Assam occupies 2.89 lakh hectares in 2001-02). followed by oilseeds (6 per cent), while the share of pulses and spices is 2 per cent each. Interestingly not only the area allocation is higher, the proportion of the households growing fruit and vegetables is also substantial (as much as 67 per cent of the households grow vegetables). It proves that given the appropriate strategy, the overall improvement of crop diversification could be easily achieved in the NER. The area under oilseeds, spices and nuts is also growing fast. The important cash crops include coconut, arecanut, sugarcane, tea and coffee, rubber and sericulture, silk cocoon etc.[5]

6. Tea is another important crop grown on nearly half a million hectares. Tea has been a corporate crop, until recently when the government implemented the schemes of promotion of small growers tea cultivation and granted its access to farmers.

Notwithstanding a large stock of high value crops, the region failed to reap the benefits as the problems of inefficient market system, transportation, power, infrastructure, finance and services in rural areas, need to be overcome for wider income impact.

III

PATTERN OF GROWTH

The pattern of growth in agriculture has been lacklustre in the region and the inter-state variation substantial. The estimated compound growth rates shows deceleration of growth of area, production and yield of rice in recent period, is further disappointing (Table 7). The most worrisome aspect is that not only the per capita income, but the growth of agricultural productivity is also lower than that of population. The growth rates of other crops are of mixed nature, however.

TABLE 7. GROWTH RATES OF RICE PRODUCTION 1990-2003

(per cent)

(1)	Area (2)	Production (3)	Yield (4)
Arunachal Pradesh	0.34	7.69	0.51
Assam	0.21	1.76	1.54
Manipur	0.11	0.94	0.83
Meghalaya	0.14	5.30	3.90
Mizoram	-3.05	0.61	3.80
Nagaland	1.97	3.92	1.91
Tripura	-0.15	2.26	2.42

Table 8 summarises the pattern of growth of value of output of livestock and horticulture crops which is revealing. As many as 31 agricultural activities show positive growth rates while 8 shows negative in Arunachal Pradesh. In Assam, 41 shows positive and 8 shows negative growth, 21 positive and 12 negative in Manipur,

32 positive and 4 negative in Meghalaya, 13 positive and 11 negative in Mizoram, 21 positive and 4 negative in Nagaland, and 6 activities show positive and 13 negative in Tripura. This indicates the existence of vast possibilities of choosing among the promising enterprises having high value potential and growth prospects.

TABLE 8. NUMBER OF CROPS AND CROP GROUPS SHOWING POSITIVE OR NEGATIVE GROWTH PERFORMANCE OF THE VALUE OF THEIR OUTPUT IN NER

State (1)	Growth pattern (2)	Foodgrains (3)	Oilseeds (4)	Spices, fruits and vegetables (5)	Fibres (6)	Livestock, sericulture (7)	Others (8)	Total (9)
Arunachal Pradesh	+ve growth	13	4	8		8		31
	-ve growth	2	1	3		2		8
Assam	+ve growth	10	4	13	-	7	7	41
	-ve growth	2	1	-	3	2		8
Manipur	+ve growth	7	N.A.	10		4		21
	-ve growth	2	3	3		4		12
Meghalaya	+ve growth	10	3	10		6	3	32
	-ve growth	2	-	2		-		4
Mizoram	+ve growth	7	N.A.	4	-	5	1	13
	-ve growth	2	2	3	4	-		11
Nagaland	+ve growth	8	3	6	-	6	-	21
	-ve growth	1	-	-	1	-	1	4
Tripura	+ve growth	1	N.A.	3	-	2		6
	-ve growth	5	4	2	2	-		13

Foodgrains include all cereals and all pulses; Livestock, sericulture and honey include all livestock and livestock products, silk, cocoon and honey; Fibres include jute, mesta, Cotton, sunhemp etc.; Spices, fruits and vegetables include dry fruits, chillies, ginger, turmeric, condiment and other spices, kitchen garden etc.; Others include tea, rubber, sugarcane, arecanut, coconut, Floriculture, other Horticulture.

Input Usage

The stability at a low level is a peculiarity of agriculture in the region, which is usually attributed to the adherence to traditional methods of cultivation and low input use.

- *High-yielding varieties* (HYV): Barring Tripura (having about 90 per cent HYV area), the adoption of modern rice varieties is extremely low, varying from 23 per cent in Arunachal Pradesh to about 50 per cent of total rice area in Assam. Seed replacement rate is very low too.
- *Fertiliser use:* Fertiliser application is also almost negligible, as it ranges from as low as 2 kg/ha in Arunachal Pradesh to 63 kg/ha in Tripura.
- *Irrigation:* Irrigation facility in the region is very poor, perhaps the lowest in the country. The total gross irrigated area is barely 0.56 million hectares in the NER, which is approximately 10 per cent of the total gross cropped area. As the major/medium irrigation projects did not succeed in the past, the utilisation and

development of ground water is most desirable in the valley plains. The hilly terrains at the same time require innovative water harvesting methods to capture the monsoon water for post-monsoon period (Barah, 1996). Rooftop and bamboo pipe water harvesting systems are popular in the hills.

- *Size of Operational Holdings:* Shrinking farm size is a critical factor affecting the livelihood of rural households. The average size of operational holdings is smaller ranging from 0.60 hectares in Tripura to 1.33 ha in Meghlaya as compared to 1.42 ha at all India level in 1995-96. The per cent of small and marginal farmers in Tripura was phenomenally high at 95 per cent of the total number of farmers, while the same was 83 per cent in Assam and 82 per cent each in Manipur and Mizoram.

Under the circumstances, innovative strategy for improving input usage is indeed a sine-qua-non for productivity growth and in increasing agricultural production. The NER must unleash a dynamic growth process for the agricultural sector basically consistent with its natural path of "easy go" type. Actually, the complete dependence on crop based agriculture has failed to generate the desired level of production and household income. Even for food production with the exception of Assam, the entire region is food deficit[6], posing a regional food security question. As the purchasing power of the farmers is poor, adoption of softer options like installation of shallow tube wells, community managed lift irrigation (CMLI), use of organic manure, etc., are relevant. The rural institutions such as the field management committee (FMC) may play a crucial role in accelerating adoption process (Barah, 2006).

Moreover, the inability to build a strong foundation by the high potential horticulture, fisheries, poultry and dairying sector, has worsened the chance of income insecurity. This would require quantum jump in investment on agro-processing for pineapples, mangoes, turmeric, tamarind, ginger, fruits and vegetables, aromatic, medicinal plants and herbs, sericulture and floriculture to enhance income and employment. The processed agro-products apparently have captive growing domestic and international markets.

IV

PARADOX OF DEVELOPMENT

Utilising abundant natural resources (land, water, forest, biodiversity, fossil fuel and minerals), congenial climate and rich human capital and converting the inherent weaknesses to opportunities in the NER is a challenge. Because, in reality, the agricultural economies have been falling back to the vicious cycle of low productivity, unemployment, low income and limping poverty giving rise to growing social threat perceptions. This has also perpetuated sheer wastage of resources and agri products. These fruits and vegetables, ginger, turmeric, garlic, other innovative crops such as orchids, passion fruits, pachauli, aromatic and medicinal plants are already a part of the existing diversified portfolio, yet due to lack of agro-processing and marketing facility, the producers have failed to reap their benefits.

V

CONSTRAINTS TO AGRICULTURAL DEVELOPMENT

In spite of numerous advantages in the region, the livelihood of the people has been affected by a number of constraints. Apart from technology, policy constraints are critical to sustainable development:

- *Demand Driven Technology:* In view of low adoption of growth augmenting modern inputs and practices, proper understanding of the gaps in technology adaptability and development of farmer-friendly technology for the diverse ecological situations, is required. For example, the farmers in the hilly terrains require a suitable strategy for improving terrace farming including the jhum, which is different from the usual practice followed in the valley plains.
- *Realising the Potential*: The results of SWOT analysis support short-term policy strategies such as promotion of innovative cropping practices, assured input support system and output disposal, should be prioritised, while infrastructure and development of small farmer-oriented technology, etc. are long term in nature.
- *Impact Evaluation:* Investments are flowing into the region through developmental schemes in the recent years. But, many of them failed in the past due to lack of proper monitoring and accountability. Therefore effective evaluation and assessment of impact of the on-going schemes is essential to identify the best agricultural practices and strict accountability at all levels. Independent evaluation of the schemes help in deriving good lessons, guide the future developmental initiatives and failures corrected.
- *Institutional Reforms:* Institutional innovation is a new vista for accelerating agricultural development. The mega institutions existing in the region (like field management committees, village panchayat, Goan *Burha* etc.) has shown their crucial role as a developmental delivery agent. Given the rich human capital, such innovative institutions could play a useful role in the technology management, advancement and knowledge transfer.
- *Market system:* Lack of effective market network is the major retrograde factor, which caused erosion to profitability of agriculture. While more of regulated markets are needed; governments should encourage the local entrepreneurship and develop efficient market intelligence system.

VI

POLICY PERSPECTIVES

Despite the abundant natural resources, congenial climate and rich human capital, the NER has failed to reap the benefits of huge opportunities for societal welfare. In effect, the agricultural economies are falling back to the vicious cycle of low

productivity, unemployment, low income and poverty and continue to limp, and this has increased the social threat perceptions.

A basic question is posed repeatedly about what ails the socio-economic development in the NER? The answer does not lie on a solution to a single factor but on a complex set comprising socio-economic, geo-political, biophysical, technological and governance. Therefore, a synergy is needed among the inter-disciplinary research community, policy planners and implementers, along with civil society to deal with the multifaceted situation. It is felt that the region needs appropriate policy and investment to boost the development process. This necessitates forming a policy dialogue forum for suggesting effective policy communication by involving the stakeholders. The forum should help formulate actionable plans and develop mechanism to monitor the progress on regular intervals. Rebuilding the image of the North East and concomitant corrections through effective public–private participation is required urgently to attract entrepreneurs and capital.

1. The NER is the symbol of a typical rainfed production system, which adversely affected the regional economy. In a situation of extreme diversities as illustrated, the paper argues for regionally differentiated strategies for development of agriculture and allied sectors. It has been observed that on account of geo-physical limitation hindering expansion of cultivable area in many States, the vertical intensification of farming system is relevant. In the rice dominated areas, improved rice plus strategy (rather than rice-alone), is suggested. The flood escaping production system is required, in flood prone areas, where boro rice is a promising crop enterprise. High value crops (such as kala joha, pachauli, passion-fruits etc.), numerous aromatic and medicinal plants can be practiced with low-cost and resource conserving practices (Zero-tillage, System of Rice Intensification, etc.), to meet the growing domestic as well as international demand. In areas where crop production is restricted by smaller size of cultivable area, but there are ample scope for allied activities, another strategy like *agricultural plus* is required. That is, crop production should coexist with livestock, plantation, floriculture, medicinal crops and sericulture systems. The hilly terrains suit crop diversification with high value horticulture crops accompanied by livestock and sericulture. The shifting cultivation, which has been an age-old method of cultivation practiced in such areas, requires innovative strategy for improving productivity of rice and other crops, flowers like orchids and livestock. In brief, the following state-wise strategies are suggested:

(i) Assam, Tripura: Rice-plus Strategy- Crop with livestock, fishery, piggery, forestry and other horticulture crops combination). The flood escaping production system such as *boro* rice is a promising crop enterprise and suitable in these areas. High value crops (such as kala joha, pachauli, passion-fruits etc.), and low-cost and resource conserving practices (Zero-tillage, System of Rice Intensification etc.) and numerous aromatic and medicinal plants have good potential to meet the growing domestic as well as international demand.

(ii) Agriculture-plus strategy for Arunachal Pradesh, Manipur: - In order to fully exploit the potential of crops, forestry and livestock, for achieving the goals of future development, agricultural plus strategy is suggested. This is a type of integrated farming system, which should accommodate crop as well as non-crop enterprises. The hilly terrains and slopes could be used for plantation crops such as horticultural fruits crops, flower, rubber and forestry along with some livestock to supplement food production and gainful income. The mix cropping of rice with other crops, horticulture, floriculture (orchids, geranium, gerbera etc.) and fruits and nuts could also fit in various locations.

(iii) Mizoram, Meghalaya and Nagaland: In the terrace farming areas and hill slopes in these states - crop diversification with high value horticulture crops, require policy interventions to promote the food grain production accompanied by livestock and sericulture. The rice, maize, oilseeds, floriculture, fruits and horticulture plantation along with livestock could be the best alternative options.

(iv) Manipur, Mizoram, Nagaland and Meghalaya: The shifting cultivation is traditionally practiced in these areas which requires Jhum improvisation programme targeting productivity enhancement of rice and other crops, vegetables, flower like orchids and livestock.

2. Rather than neglecting, the existing low input agriculture should be converted to opportunity as they are environmentally benign. Given the required interventions, market for organic product may be explored.
3. Agro-processing sector hitherto is a neglected area but it has high potential to add value and reduce post-harvest losses. By encouraging fresh initiatives in agro-processing, packaging and exploring of newer marketing avenues, the region can take advantages of high potential cross-border trade with the surrounding countries. The on-going liberalisation of trade and commerce has provided favourable environment to enhance regional trade. In the present mode of public-private partnership in establishing the so called Special Economic Zone (SEZ), the NER should initiate the strategy to attract private investment including FDI in such activity, where it has advantages particularly for tea, coffee, fossil fuels and minerals and aromatic and medicinal products.
4. The innovation on energising and sensitising the rural institutions is yet another new thrust. Capacity building through wide scale knowledge initiatives, contract farming, reviving/revitalising the village institutions such as Field Management Committees and traditional village panchayats/councils is important. These institutions being the valuable social capital have the potential to become agents for knowledge dissemination and improving rural leadership. This is relevant as the financial institutions such as NABARD, NEDFI, SIDBI, IDBI, etc., may use community-based institutional collaterals for effective credit delivery.
5. Research and Development strategies: Continuous R&D support system is *sine qua non* for generating small and marginal farmers' friendly new agricultural technology. The increasing preponderance of small and marginal farmers, which

has already crossed the 80 per cent mark is the raison d'etre for developing such technology. Therefore, there is need for boosting R&D investment in agriculture, which already is a low key area in the region.

6. Regional Database: Data base is a serious constraint to effective policy analysis in the agricultural economy in the region. Therefore, agricultural database must be streamlined properly on a priority basis by taking the help of electronic revolution. Basic tool of e-governance is necessary in this regard.
7. Networking of Social Scientists and Institutions: The paper emphasises the need for a strong and continuous capacity building process for the stakeholders in collaborative network mode by involving and pooling the local expertise This is also in line with the theme of the Approach Paper to the Eleventh Five Year Plan, i.e., "*Towards Faster and More Inclusive Growth*" (Government of India, 2005).
8. The study also argues for a strong and vibrant market system for agricultural produce through efficient networking with the rest of the country assume paramount importance. Integration and reorganisation of two-way marketing structures that exist in the region should be activated for societal benefit. The reform agenda must recognise four important components of the envisaged market, while formulating the integrated system. These market segments are as follows which put the resources and activities in respective segments.

	Inside resources	Outside resources
Inside Market	Sustenance requirements, agricultural produce, forests, water, land, indigenous handicrafts etc	Technology, industrial and engineering products, textiles, vegetables, fish, eggs, wheat, rice, fruits, silk, skilled man-power etc.
Outside Market	Natural resources including crude oil, natural gas, minerals, silk, agro-products, tea, coffee, rubber, citronella, etc.	Several intermediary goods and industries etc.,

These forms of market systems are already in existence in the region for longer time, albeit, unfortunately, their benefit percolation to the common people is almost non-existent.

A strong private-public partnership in market reform and promoting agro-processing and value addition to agricultural produce is suggested.

Finally, there is enough evidence indicating that several policy deficiencies have retarded the process of economic development in the NER. One such prominent deficiencies is the application of standard All India norm for gauging the resource requirements in many developmental schemes. By equating and extending the all-India norms and patterns of administration and planning (say the common norm of per capita plan outlay and subventions as the basis of development plans has misled the planning process in the NER) in toto, instead of helping development, has proved futile. It is also generally felt that the mismatch of the problems and the solutions also further deprive the common people. Therefore, more emphasis is needed on regional friendly strategies to reach out to the common people, recognise the potential and revitalize the development of the NER. Demand strategy is required to meet the local

needs and aspiration and utilize the local resources and human capital. In the general parlor, it is known as bottom-up rather than the top-down approach which is in vogue.

In the reform and liberalised environment, this distant outpost region should not lose the opportunities, but rebuild and reap the advantages of emerging international trade and commerce with the Southeast and East Asia, which is a new opportunity for the region. The restoration of border trade with Myanmar, Bangladesh and China, has opened up ample scope and opportunities, which however, heralds a new chapter. The newer and exciting concepts have been emerging such as the South Asia Development Triangle, with Nepal, Bhutan and Bangladesh, an extension of this to a larger growth quadrant of Myanmar, Thailand, Laos and Southwest China and the proposed Trans-Asian Highway and Railway. Realisation of these opportunities obviously requires efficient preparedness supported by in-depth studies of the ground realities and to utilise the strengths unutilised so far.

While the newer ideas are nurtured and exploited, the NER must gear up to capture the unparallel advantages that exist in the region and must be able to grow at its own but rejuvenated pace. Re-establishing the notion that the people should be equal partners in the process of culturally friendly, equitable and sustainable development is essential too. Therefore, it is clear that the overall development rather than piecemeal, is essential to make a dent in the regional economy and the income level.

NOTES

1. The Malthusian Dilemma. The most famous and perhaps most influential model of world population growth was proposed by Thomas Malthus, an English clergyman, over two centuries ago. Malthus argued that human populations grow *geometrically* or *exponentially*-that is, by doubling every few generations. In contrast, he contended that food resources could only increase *arithmetically* or in *additive* increments, such as 4-5-6-7. Malthus believed that, at these differing rates of growth, a population would eventually outstrip its supply of food. At that point, *positive checks* on population growth - *famine, disease, and war* - would come into play and bring the population back into balance with its food resources.

2. Among these initiatives include: the establishment of North Eastern Council (NEC), which is integrated to the central Ministry of Development of North Eastern Region (DONER), a special North East India fund has been created by involving various ministries of the central government, a high level committee on “Transforming The Northeast, Tackling Backlogs In Basic Minimum Services and Infrastructural Needs” and on “Remedying Agriculture in the Backward areas”. The financial agencies like the NABARD (2004) also emphasised efficient management of the rural credit. Among the Central and State governments schemes the million well schemes under watershed development, Samridh Kisan Yojana (SKY), ARIASP, Macro Management of Agriculture and Technology Mission for Horticulture in the NER are important. Important studies include Baishya *et al*., 1997, Barah, 1993, 2005, 2006; Bordoloi and Neog, 2005; Barah, 2006; Barah and Neog 1997, Barah and Birthal, 2006; Birthal 2006, Banerjee, 2004, Government of Assam, 2003; Passah, 2006, Baruah, 2005, Dev and Datta Ray, 2006, NAAS, 2006. See for a historical account of the NEC in Passah *et al.*, 2002; 2006.

3. Yield gap is calculated roughly as per cent shortfall or difference between the actual yield and the national average yield for each of the States.

4. Post harvest loss was reported to vary from 10 per cent in pineapple, 8 per cent in ginger, 13 per cent in orange and 24 per cent in tomato.

5. Cereals: Rice (Autumn rice, Summer rice, Winter rice and Jhum rice), Wheat, Maize.

- Pulses: Lentil, Gram, Greengram, Blackgram, Tur and Other pulses;
- Oilseeds: Linseed, Sesamum, Niger, Castor, Rapeseed & Mustard and other oilseeds;
- Vegetables: Potato, Onion, Sweet Potato, Tapioca, beans and Rabi vegetables;
- Fruits: Lemon, Litchi, Mango, Guava, Jackfruit, Papaya, Pears, Pineapple, Ornage, Banana;
- Fibres: Jute, Mesta, Cotton and other fibres;
- Spices: Chillies, Coriander, Garlic, Ginger, Turmeric, Black pepper and Other spices;
- Others: Cocoanut, Arecanut, Sugarcane, Tea and coffee, Rubber and Sericulture, silk cocoon;
- Floriculture: A variety of flowers are available viz., Orchids, Cymbidium, Gladiolus bulb, Chrysenthemum, Anthurium, Lotus, Marigold, Hibiscus, Geranium, Gerbera and aromatic and medicinal plants (aromatic rice Kalajoha, traditional medicinal plants, Pachaouli, Passionfruits, citronella, lemongrass agarwood, eucalyptus oil)

6. Assam is marginally surplus in rice since past 2 years.

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