Indian J. Hill Farmg. 14 (2) : 1 — 12 2001

TRANSITION IN AGRICULTURE OF NORTH EASTERN HILL STATES OF INDIA - IMPLICATIONS FOR DEVELOPMENT

S. B. Singhs, B. K. Sarma and K. K. Datta
ICAR Research Complex for NEH Region
Umroi road, Umiam - 793 103 (Meghalaya)

ABSTRACT

An analysis of transition in agriculture of north-eastern hill states, using secondary data collected from various Government publications revealed that still agriculture occupies a major share in net domestic product (NDP) and employment. The distribution of land holdings in the region is highly skewed which widens the inter-personal distribution of income. It suggests development of off-farm income and employment opportunities. The decreasing average size of holding resulted agriculture uneconomical and more intensive use of natural resorces. The minimally low net sown area and cropping intensity indicate potential scope for increasing area available for cultivation either through land development activities or improvement in rural infrastructure development. Maintenance of genetic diversity, development of cold and droght tolerance crops and high second round employment effect crops, high yielding technology for pules and oilseed and balanced development of all crops in harmony with nature are essential. High significant complementary relations exist among fertilizer use, area under HYVs and availability of irrigation infrastructure. Development of water harvesting techniques such as micro-watershed based farming system on hill areas can go a long way in increasing agricultural productivity in the region. There is also enough scope to narrow down the adoption gap in the use of fertilizers and the high yielding varieties through intensification of extension services and institutional support. Since investement in land infrastructure development is costlier, financing and credit policy of the institutions should be liberalized. These measures will facilitate an equitable growth and development of the region.

INTRODUCTION

Agriculture in India has made great strides, thanks to the agricultural technology being gradually introduced since the mid-1960s. It encompasses the use of high-yielding variety (HYV) seeds, chemicals, fertilizers, irrigation and plant protection measures along with the use of agricultural machinery and implements. The new technology has not been uniform among different states/regions, it has spread thoroughly in a few favourably endowed states like Punjab, Haryana and western Uttar Pradesh while the hill mountainous states of north

eastern hill (NEH) region and western Himalaya have lagged behind. The net result has been that regional imbalances in agricultural development have grown across states. This may not be entirely due to any policy neglect but could have arisen out of the inherent differences in resource endowments and the extent to which potential resources are being utilized and also, differences in the levels of infrastructure developments. Thus, to ensure overall rapid growth in the agricultural economy of the region, there is a need to examine the extent of regional variation in agricultural growth and to identify the factors associated with it.

METHODOLOGY

Time series data on various aspects of agriculture for the period 1975-76 to 1997-98 for the seven North-Eastern Hill States excluding Assam and all india level were collected from the various issues of Basic Statistics of North-East India, Fertilizer Statistics and Area and production of Principal Crops in India and Economic Survey of India. Specific period has been selected as the reorganization of north -eastern states were completed only in 1972 . appropriate statistical techniques were also used for the analysis of time series data. annual compound grouth rates of area, production and productivitywere calculated by using the following log linear function (Dandekar, 1980).

$Y = A (1+ r)^t$ ..... (1)

where,

Y = the value for which growth rate is to be calculated

t = time in years

r = growth rate,

Taking log both sides of equation (1)

$\log Y_t = \log A + t \log (1+ r)$,

putting $\log Y_t = Y$, $\log A = a$ and $\log (1+ r) = b$

$Y = a + bt$

$1 + r = \exp^b$

Therefore, $r = (\exp^b - 1) \times 100$

RESULTS AND DISCUSSION

Overall growth

Inthe process of economic development. it is expected that non -agricultural sector would grow faster than agricultural sector in terms of output and labour absorption. As shown in Table 1, this process has started though slow in the country as a whole as well as in NEH states. However, the share of agriculture in net domestic product (NDP) is higher in NEH states except Nagaland than that for all india. This is because of comparatively lower industrial growth in the NEH states. Table 1 further shows that the decline in the share of agriculture in NDP is higher than the decline in labour force in agriculture. This coupled with population growth has led to an increase in the number of workers per hectare of land in the country as well as for the NEH region.

Agricultural growth-pace and composition

Before we analyze the pace and composition of agricultural growth, it should be appropriate

to study the changes in land distribution and utilization pattern, which in turn determine to a great extent, the growth in agriculture.

Changes in land distribution

The distribution of number of holdings and occupied by various size groups of holdings in the NEH states and all India are given in Table 2 which clearly shows that agrarian structure is still highly skewed in India as well as in the NEH states. It could be seen from the Table 2 that the number of holdings less than 2 ha. was highest in all India and NEH states except Nagaland where there is a uniform distribution of holdings. The number as well as area under the holdings less than 2 ha continued to be substantially high in Tripura than those in other states of the region, and thus leading to the lowest average size of holding. Nagaland had the highest average size of holding due to the highest proportion in area and number of holdings above 10 ha. The temporal changes in agrarian structure reveals two distinct patterns. Firstly, in the case of Manipur, there has been a sharp decline in the area as well as in the number of holdings below 2 ha, while the reverse holds true for the holdings above 4-10 ha. Consequently, average size of holding increased from 1.12 ha in 1976-77 to 2.3 ha in 1990-91. This could be because of selling of land by small and marginal farmers as they may seek gainful employment outside agriculture. Secondly, a decline in area and number of holdings of large farmers in Tripura, Sikkim and Nagaland imply that sub-division of holdings is stronger in these states. The similar sub-division of holding was observed for the country as a whole resulting moderate decline of the average size of holdings for both the country as well as NEH states.

Changes in land use pattern

The land use and cropping in NEH states and all India level collated in Table 3 indicate that the area put to agricultural use was significantly low in NEH states compared to all India level of 46.73%. It was highest in Tripura (22.90%) and lowest in Arunachal Pradesh (2.04%). It is due to inherent characteristics of terrain, fragility, inaccessibility of hilly ecosystem coupled with traditional land tenure system. There was moderate increase in net sown area in most of the NEH states during 1975-76 to 1995-96 although the all India level remained more or less stagnant. This shows that land was either made suitable for cultivation through land development activities or was considered suitable (exploitation motive) for cultivation in these states. The area under forests increased from low to moderate in NEH states and also, significantly higher than all India averages (21.98%). However, there is a sharp increase in area under forest in Nagaland during the period of study. The reverse was true in the case of area not available for cultivation. It could be further seen from Table 3 that the cropping pattern in NEH states except Sikkim remained highly specialized in foodgrains. In Arunachal Pradesh, Meghalaya, Mizoram, Nagaland and Tripura, pulses and oil seeds gained in area under rice, maize and total foodgrains. It is because of sharp increase in net sown area from 6.80% to 13.65%. Unlike other states, Sikkim experienced drastic decline in area under foodgrain crops, owing to diversification towards horiticultural crops including spices. There was a low to moderate increase in cropping intensity in most of the NEH states. But in Sikkim, the cropping intensity decreased from 106.3% in 1975 to 100% in 1995.

Growth in production and productivity

Since crop production is the main activity of agriculture in NEH states, the growth in production of major crops, as analysed in this section, should reflect the performance of agriculture in this region. Compound growth rate of major crops in different states of NEH region during 1975-76 to 1997-98 is presented in Table 4. In the case of rice, there was

significant growth in area in Arunachal Pradesh and Nagaland while the other states showed negative growth rates. It is because of the diversion of rice crop to other high value crops. Despite declining area under rice, the production of rice in NEH states except Meghalaya could increased significantly due to the improvement in productivity. In Meghalaya, the production of rice decreased by 0.16% per annum due to decline in both area and productivity. Mizoram experienced the highest growth rate of 7.5% per annum mostly by increasing productivity. However, in Arunachal Pradesh the increased production was mainly due to area expansion.

The area expansion as well as yield increase caused maize output to grow significantly in Arunachal Pradesh, Mizoram, Nagaland and Sikkim. However, in Meghalaya the increase in production was significantly contributed by yield increase. The significant increase in yield of maize in Manipur (3.1%) could not offset the negative growth of area, thus declined the production by 2.0% per annum.

The production of total pulses in NEH states except Manipur increased significantly due to increase in both area and productivity. But, the reverse was true in Manipur where the production declined by 5.90% per annum. The growth in productivity was highest in Sikkim (13.84%) and least in Meghalaya (0.74%). Mizoram could increase the area under pulses by 12.41% per annum followed by Nagaland (6.16%), Meghalaya (3.58%) and Sikkim (2.90%).

In totality, the foodgrains production in Manipur, Mizoram, Sikkim and Tripura increased significantly mostly due to the improvement in productivity. Although there was moderate improvement in productivity in Arunachal Pradesh and Nagaland, the production increase was mostly by area expansion. But in Meghalaya, there was insignificant increase in production resulting from slight improvement in productivity and area. For all India average, productivity improvement offsets negative area expansion, thus increasing rice production by 2.60% per annum. Both area expansion and improvement in yield resulted significant growth of oilseeds production in Arunachal Pradesh, Mizoram, Nagaland and Tripura. However, Meghalaya and Sikkim showed low area expansion and yield improvement causing moderate increase in production. Area and yield grow more or less at the same rate in Meghalaya, Mizoram and Sikkim. The same trend followed in all India level. But increase in production in Arunachal Pradesh, Mizoram and Nagaland was mostly due to area expansion. In Manipur, positive growth in area could not offset negative growth in yield, thereby declined production by 0.32% per annum.

Determinants of agricultural growth

Infrastructural development and inputs used

Infrastructural developments and inputs used analysis in relation to output gains (Table 5), points out that the development of irrigation has been quite uneven across NEH states since organized efforts to harness the water resources started in the country. In the states of Manipur and Tripura where percentage of net irrigated area to net cultivated area was high, foodgrains productivity was also highest. But, due to stagnant growth in net irrigated area in these states there had been restricted expansion of area under goodgrains. In other states also, the growth of percentage of irrigated area to net cultivated area remained stagnant due to either increasing net cultivated area or low investment in irrigation development.

Fertilizer consumption per hectare was also higher in Manipur and Tripura, (84.5 kg and 31.3 kg respectively) while in other states it was abysmally low. It follows that fertilizer use

had almost a complementary relationship with the availability of irrigation facilities. All the NEH states had less fertilizer consumption than all India level of 97.5 kg/ha (Table 6).

In the higher growth states of Mizoram, Manipur, Sikkim and Tripura, the percentage area under high yielding varieties varied from 31.19 to 75.19. In the remaining states, it ranged from 17.84% (Arunachal Pradesh) to 29.13% (Meghalaya). Similarly, the average size of holding was also low in higher growth states. It shows high negative relationship between farm size and agricultural growth. The number of pump sets per unit area was negligible in NE states except Tripura (5.26 per '000 ha). There was significant growth in rural electrification in NE states, which varied from 46.3% in Arunachal Pradesh to 98% in Nagaland.

As shown by low tractor density per unit area in NEH states, agriculture in the NEH states is highly labour intensive. The existing sloppy and undulating terrain restrict the use of tractor in the region. However, Nagaland, Manipur and Mizoram have comparatively higher growth rate of tractorisation. Only 3 states, viz. Meghalaya, Mizoram and Nagaland showed higher per hectare credit availability than all India average of Rs. 1046. The use of pesticides in NEH states was declining between the year 1990-91 to 1995-96 and very low as compared to all India average of 0.43 kg per hectare. On an average, the effect of pesticides use on the agricultural growth was not significant as compared to other inputs.

CONCLUSION AND POLICY IMPLICATIONS

As discussed above, land distribution is highly skewed in north-eastern states, which implied widening of interpersonal distribution of income. It suggests development of off farm income and employment opportunities. The decreasing average size of holding resulted agriculture uneconomical and more intensive use of natural resources. A review of land tenure system shows the lands mostly belong either to village chief or a particular community. In this regard suitable land reform policy may be formulated and implemented. It will scale up the farm size and productivity. The minimally low net sown area and cropping intensity indicate potential scope for increasing area available for cultivation either through land development activities or improvement in rural infrastructure development. As shown by cropping pattern, production is highly specialized dominated by paddy. It causes imbalance crop production, narrow-genetic base, and increased dependence on other parts of the country. Crop diversification based on comparative advantage and the food security need to mention. Maintenance of genetic diversity, development of cold and drought tolerance crops and high second round employment effect crops, high yielding technology for pulses and oilseed, balanced development of all crops in harmony with nature are felt needs. High significant complementary relations exist it will scale up the farm size and productivity, fertilizer use, area under HYVs and availability of irrigation infrastructure. Development of water harvesting techniques such as micro-watershed based farming system on hill areas can go a long way in increasing agricultural productivity in the region. There is also enough scope to narrow down the adoption gap in the use of fertilizers and the high yielding varieties through intensification of extension services and institutional support. Since investment in land infrastructure development is costlier, financing and credit policy of the institutions should be liberalized. These measures will facilitate an equitable growth and development of the region.

REFERENCE

Dandekar, V. M. (1980) : Introduction to Lonavla Seminar on Data Base Methodology for the Study of Growth Rates in Agriculture, *Indian Journal of Agricultural Economics*. 30 : 2, May-August, Mumbai.

Table 1. Share (%) of agriculture is net domestic product and employment in NEH states.

State	Net domestic product			Employment		
	1970–71	1990–91	1980–81	1970–71	1990–91	1980–81
Arunachal Pradesh	59.1	–	–	80.3	69.6	64.0
Manipur	48.0	44.7	44.5	67.0	64.2	62.5
Meghalaya	–	37.8	29.1	78.9	68.6	64.1
Mizoram	–	–	–	–	67.4	55.8
Nagaland	–	28.69	17.4	79.0	71.9	73.4
Sikkim	–	–	–	85.6	61.4	64.3
Tripura	70.0	45.6	38.7	74.3	61.8	57.6
All India	49.2	36.3	31.6	69.7	60.5	58.9

Source : CMIE Publications (various issues)

Table 2. Changes in agrarian structure in green revolution for NEH states and India

State	Year	No. of holdings (000)					Area in (000)					A. Size of
		0-2	2-4	4-10	Above 10	Total	0-2	2-4	4-10	Above 10	Total	Holding (ha)
Arunachal Pradesh	1976-77	–	–	–	–	–	–	–	–	–	–	4.27
	1990-91	–	–	–	–	–	–	–	–	–	–	–
3.71												
Manipur	1976-77	119.6	20	2.1	Neg.	141.7	99	48.8	9.9	0.5	158.2	1.12
		(84.40)	(14.11)	(1.48)		(100.0)	(62.58)	(30.85)	(6.26)	(0.32)	(100.0)	
	1990-91	118	21	3	Neg.	142	105	117	71	1	302	2.13
		(83.10)	(14.79)	(2.11)		(100.0)	(34.77)	(38.74)	(23.51)	(0.33)	(100.0)	
Meghalaya	1976-77	110.2	45.2	13.8	1	170.2	98.6	114.5	69.1	13.4	295.6	1.74
		(64.75)	(26.56)	(8.11)	(0.95)	(100.0)	(33.36)	(38.73)	(23.38)	(4.53)	(100.0)	
	1990-91	110	46	13	1	171	100	117	71	13	302	1.77
		(64.33)	(26.90)	(7.60)	(0.59)	(100.0)	(33.11)	(38.74)	(23.51)	(4.30)	(100.0)	
Mizoram	1976-77	–	–	–	–	–	–	–	–	–	–	1.48
	1990-91	–	–	–	–	–	–	–	–	–	–	1.37
Nagaland	197677	24.5	20	33.7	25.3	103.3	28.6	60.1	228.3	468.6	785.6	7.61
		(23.72)	(19.36)	(32.62)	(24.49)	(100.0)	(3.64)	(7.65)	(29.06)	(59.65)	(100.0)	
	1990-91	34	26	47	33	142	39	76	298	556	968	6.82
		(23.94)	(18.31)	(33.10)	(23.24)	(100.0)	(4.03)	(7.85)	(30.79)	(57.44)	(100.0)	
Sikkim	1976-77	18.5	7.4	4.3	0.9	31.1	16.9	21	25.2	16.6	79.7	2.56
		(59.49)	(23.79)	(13.83)	(2.89)	(100.0)	(21.20)	(26.35)	(31.62)	(20.83)	(100.0)	
	1990-91	37	9	5	1	53	30	27	31	22	111	2.09
		(69.81)	(16.98)	(9.43)	(1.89)	(100.0)	(27.03)	(24.32)	(27.93)	(19.82)	(100.0)	
Tripura	1976-77	205	32.9	8.1	0.6	246.6	152.3	88.1	43.5	25.3	309.2	1.25
		(83.130)	(13.34)	(3.28)	(0.24)	(100.0)	(49.26)	(28.49)	(14.07)	(8.18)	(100.0)	
	1990-91	286	28	4.0	Neg.	318	193	77	18	20	308	0.97
		(89.94)	(8.81)	(1.26)		(100.0)	(62.66)	(25.00)	(5.84)	(6.49)	(100.0)	
All India	1976-77	59251.3	11666.1	8212.5	2439	81568.9	38414.1	32427.8	49628.4	42874	163344.3	2.00
		(72.64)	(143.30)	(10.07)	(2.99)	(100.0)	(23.52)	(19.85)	(30.38)	(26.25)	(100.0)	
	1990-91	83481	13923	7580	1654	106637	53721	38375	44752	28659	165507	1.55
		(78.29)	(13.06)	(7.11)	(1.55)	(100.0)	(32.46)	(23.19)	(27.04)	(17.32)	(100.0)	

*Figures in parentheses indicate percentage to total

Source : Fertilizer statistics, Fertilizer Association of India (various issues - 1997 to 1992)

Table 3. Changes in land use and cropping pattern in NEH states

	Arunachal Pradesh		Manipur		Meghalaya		Mizoram		Nagaland		Sikkim		Tripura		All India	
	1975	1995	1975	1995	1975	1995	1975	1995	1975	1995	1975*	1995	1975	1995	1975	1995
Land use pattern (percent)																
Forest	91.33	93.79	27.23	27.23	36.59	41.81	61.99	76.53	17.42	55.82	37.11	36.20	59.92	57.77	21.98	22.57
Area not available for cultivation	0.66	0.87	65.36	65.36	13.74	10.26	10.04	10.10	75.74	3.69	39.08	38.03	5.05	12.68	12.97	13.57
Permanent Pasters, grazing Land and misc	–	–	–	–	0.76	0.76	0.19	0.19	–	–	14.43	9.72	2.86	–	4.15	3.63
Cultivable wasteland	2.64	–	–	–	20.14	21.20	3.52	3.54	–	4.79	0.140	0.141	0.67	0.95	5.71	4.63
Others	0.33	0.80	1.09	1.09	6.40	7.23	0.14	0.14	–	8.41	0.56	0.70	7.92	2.57	1.31	1.14
Current fallow	0.34	0.51	–	–	2.45	2.95	8.71	8.76	–	7.37	–	0.56	0.48	0.38	4.09	4.53
Fallow other than current fallow	2.09	0.66	–	–	12.18	7.36	12.32	7.76	–	6.27	0.140	1.27	0.20	0.95	3.13	3.28
Net sown area	2.04	3.37	6.33	6.33	7.74	9.19	3.09	5.22	6.80	13.65	8.54	13.38	22.90	26.41	46.73	46.65
Cropping pattern (per cent)																
Rice	52.0	49.18	84.38	86.76	51.38	42.59	72.94	62.57	58.33	63.60	16.59	5.6	80.27	60.52	22.91	23.27
Maize	14.85	14.14	5.19	2.20	7.98	6.96	5.44	7.71	9.21	13.16	33.96	27.8	Neg.	0.47	3.50	3.38
Total foodgrains	78.62	75.12	92.52	88.74	96.46	53.73	78.97	73.76	88.42	90.0	72.42	53.66	82.05	63.62	74.39	66.50
Total pulses	Neg.	2.66	2.71	Neg.	0.74	1.30	0.59	3.67	3.42	7.19	5.38	4.12	1.26	2.16	14.19	12.25
Total Oilseeds	Neg.	9.88	2.0	1.7	3.5	3.72	–	6.15	1.84	12.5	6.92	6.76	1.85	2.42	9.82	13.94
Sugarcane	–	–	2.19	0.99	0.09	0.004	2.94	0.83	2.37	1.10	–	–	0.56	0.38	1.60	2.22
Cotton	–	–	0.05	0.06	3.69	3.04	1.6	1.01	–	0.09	–	–	0.56	0.35	4.27	4.85
Croping Intensity	113.0	131.9	145.0	176.0	116.7	119.9	106.3	100.0	1009.9	108.1	105.8	149.5	155.4	153.8	121.2	131.2

*Relates to 1980

Source : Fertilizer statistics, Fertilizer Association of India (various issues)
Basic Statistics of NEH Region, NEC, Shillong (various issues)
Statistical Abstracts, Govt of India, CSO, Dept. of Statistics (Various issues)

Table 4. Trend in area, production and yield of crops in NEH states

(area = 000ha, prodn = 000 tones, yield = t/ha)

Year	Rice			Maize			Total Pulses			Total Foodgrains			Total Oilseeds		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Arunachal Pradesh															
1975	67.6	59.9	8.96	19.3	22.1	11.5	5.4**	4.2	7.6	102.2	91.6	9.0	0.1	0.1	10.0
1997	120	129.5	10.80	34.5	50.0	14.5	6.5	6.6	10.2	183.3	209.8	11.5	24.1	23.0	9.5
C.g.r.	2.84	3.25	0.40	3.43	4.54	2.28	–	–	–	3.04	3.82	0.74	6.52	8.63	2.17
Manipur															
1975	177.2	276.4	15.6	10.9	23.6	21.7	5.7	2.3	4.0	194.3	303.1	15.6	4.2	1.7	4.1
1997	157.9	351.7	22.3	4.0	13.0	32.5	4.1***	1.6	3.9	161.5	364.8	22.6	3.1	1.5	4.9
C.g.r	–0.46	1.64	2.11	–4.97	–2.03	3.1	–5.64	–5.9	–0.29	–0.73	1.45	2.18	1.00	–0.32	–1.36
Meghalaya															
1975	104.3	119.3	11.4	16.2	11.3	7.0	1.5	1.0	6.7	125.4	135.3	10.8	7.1	3.6	5.1
1997	105.2	150.1	14.3	17.2	24.9	14.5	3.2	2.5	7.7	132.7	186.6	14.1	9.2	6.0	6.5
C.g.r	–0.02	–0.16	–0.13	0.27	3.25	2.97	3.58	2.08	0.74	0.10	0.43	0.14	1.22	1.70	0.40
Mizoram															
1975	49.6	39.0	7.9	3.7	5.7	15.4	0.4	0.2	5.0	53.7	44.9	8.4	1.8	0.6	3.3
1997	68.2	110.6	16.2	8.4	15.9	19.0	4.0	6.7	17.5	80.4	128.6	16.0	6.7	9.1	13.5
C.g.r	0.01	7.5	5.49	3.15	7.13	3.85	12.41	25.12	9.86	1.26	6.62	5.4	10.85	21.03	9.15
Nagaland															
1975	66.5	66.5	10.0	10.5	6.3	6.0	3.9	2.0	5.1	100.8	88.6	8.8	2.1	0.9	9.3
1997	145.0	187.0	12.9	30.0	30.0	10.0	16.4	12.6	7.7	205.2	239.3	11.7	28.5	24.8	8.7
C.g.r.	3.30	5.2	1.85	4.80	7.24	2.30	6.16	9.92	3.56	3.65	5.54	1.83	14.85	17.94	2.70

Year	Rice			Maize			Total Pulses			Total Foodgrains			Total Oilseeds		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Sikkim															
1975	15.1	12.0	8.0	30.9	30.5	9.9	4.9	3.9	8.0	65.9	63.7	9.7	6.3	4.3	6.8
1997	8.0	15.0	18.2	39.5	55.7	14.1	6.7	5.9	8.8	76.2	103.4	13.6	9.6	7.6	7/9
C.g.r	–5.03	0.50	5.67	1.64	3.83	2.20	2.90	3.78	1.34	0.86	3.24	2.37	1.18	1.70	0.50
Tripura															
1975	300.2	366.5	12.2	2.0	1.2	6.0*	4.7	1.7	3.6	306.9	373.1	12.2	6.9	3.3	4.8
1997	257.8	535.8	20.8	2.0	1.8	9.0	9.2	5.3	5.8	271.0	547.4	20.2	10.3	8.3	8.1
C.g.r	–0.08	1.84	2.83	–	–	–	4.48	6.57	1.99	–0.73	1.93	2.67	4.34	6.72	2.28
All India															
1975	39475	48470	12.4	6031	7256	12.0	24452	13039	5.3	128181	121034	9.4	16922	10607	6.3
1997	43420	82300	19.0	6305	10852	17.2	22847	13070	5.7	124068	192434	15.5	26013	22015	8.5
C.g.r	0.47	3.02	2.53	0.23	2.51	2.28	–0.11	0.95	1.06	–0.17	2.60	2.78	2.55	5.03	2.42

C.g.r = Compound growth rate

*** Relates to 1983

** Relates to 1990

* Relates t0 1992

Source : Fertilizer statistics, Fertilizer Association of India (various issues)

Basic Statistics of NEH Region, NEC, Shillong (various issues)

Statistical Abstracts, Govt. of India, CSO, Dept. of Statistics (Various issues)

Area and production of Principal Crops in India, Dirtt. of Economics and Statistics, Govt. of India (various issues)

Table 5. Infrastructural development and input use in NEH states

	A. Pradesh		Manipur		Meghalaya		Mizoram		Nagaland		sikkim		Tripura		All India	
	1975	1995	1975	1995	1975	1995	1975	1995	1975	1995	1975	1995	1975	1995	1975	1995
Net Irrigated Area (000 ha)	23	36*	65	65*	43	45*	8	8*	37	61*	–	16*	30	35*	35149	51210
% of Net Cultivated Area	20	24	46.4	46.4	24.7	22.39	12.3	12.3	32.74	32.28	–	16.84	12.5	12.64	24.8	36.04
Fertilizer Consumption (Kg/ha)	N.A.	2.05*	10.29	84.5*	9.71	13.54	N.A	7.15	0.97	2.47	N.A	11.05	1.21	31.3	20.43	97.5
Area Under H. Y. V (000 ha)	–	33	40	80	13	60	–	34	5	40	–	33	106	203	31888	72119
% of Net Cultivated Area	–	17.84	28.57	57.14	7.41	29.13	–	31.19	4.42	19.05	–	34.74	44.17	75.19	22.51	50.70
Average Size of Operational holding (ha)	4.27	3.71	1.12	2.13	1.74	1.77	1.48	1.37	7.61	6.82	2.56	2.09	1.25	0.97	2.00	1.55
No. of Pumpsets/Tube Wells	Nil	Nil	Nil	45	18	65	Nil	Nil	1	172	Nil	Nil	126	1422	3034191	8992102
No. of Pumpsets/Net Cultivated Area (No/000ha)	–	–	–	0.32	0.10	0.32	–	–	0.01	0.91	–	–	0.52	5.26	21.75	63.2
% of Village Electrified	2.1	46.3	12.06	74.3	7.38	46.7	2.18	63.4	20.75	98.0	11.65	92.0	6.14	60.2	6.68	83.2
No. of Tractors/ 000 ha		0.94		3.27	–	1.79		2.11	–	7.51	–	–	–	0.38	–	8.72
Credit Availability (Rs/ha)	–	419	–	605	–	1222		1305	–	1251	–	–	–	780	–	1046
Consumption of Pesticides (Kg/Net c. area)	0.24	0.11	0.36	0.29	0.09	0.10	0.27	0.19	0.10	0.04	0.31	0.27	0.50	0.09	0.50	0.43

*Relates to 1995; ** Relates to 1992; *** Relates to 1990

Source : Fertilizer statistics, Fertilizer Association of India (various issues)
Basic Statistics of NEH Region, NEC, Shillong (various issues);
Statistical Abstracts, Govt. of India, CSO, Dept. of Statistics (various issues)

Table 6. Tread in fertilizer consumption in NEH states (consumption in '000 tonnes)

State	1975-76	1980-81	1985-90	1990-95	1996-97	c.g.r.
Arunachal Pradesh						
N	0.06	0.06	0.10	0.15	0.32	10.9
P_2O_5	0.01	0.01	0.05	0.09	0.13	17.8
Total	0.08	0.09	0.18	0.27	0.55	12.25
Manipur						
N	1.00	2.28	3.90	8.66	11.39	10.41
P_2O_5	0.30	0.56	0.80	4.37	1.25	9.14
Total	1.34	3.00	4.89	13.52	13.18	9.90
Meghalaya						
N	1.20	1.22	1.60	1.79	2.20	2.50
P_2O_5	0.40	0.55	1.30	0.64	1.05	4.20
Total	1.69	2.50	3.07	2.61	3.43	3.06
Mizoram						
N	0.03	0.02	0.05	2.61	0.23	16.04
P_2O_5	0.06	0.03	0.03	0.36	0.10	12.95
Total	0.10	0.07	0.08	0.90	0.39	14.74
Nagaland						
N	0.07	0.06	0.18	0.42	0.41	8.33
P_2O_5	0.03	0.01	0.06	0.28	0.35	15.77
Total	0.11	0.08	0.25	0.87	0.85	10.89
Sikkim						
N	0.06	0.33	0.62	0.58	0.55	10.92
P_2O_5	0.09	0.23	0.51	0.35	0.18	9.66
Total	1.00	0.73	1.17	1.13	0.75	9.85
Tripura						
N	0.20	1.39	3.50	6.00	5.41	14.74
P_2O_5	0.04	10.35	1.00	1.58	1.88	20.38
Total	0.29	2.13	4.22	8.43	8.72	15.71
All India						
N	2148.6	3678.1	5660.8	7997.2	10301.8	7.33
P_2O_5	466.8	1213.6	2005.2	3221.0	2976.8	8.26
Total	2893.7	5515.6	8474.1	12546.2	14308.1	7.36

Source : Fertilizer Statistics, FAI (various issues)