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PROSPECTS, PROBLEMS AND SCOPE OF MAIZE AND PULSES IN NORTH EASTERN HILL REGION OF INDIA

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ABSTRACT

Apart from the non-existence of economic rationality of cropping pattern and crop diversification, the biotic factors play a major role in limiting the production of maize and pulses in north eastern hill region. Technological stagnation is primarily responsible for the backwardness of these crops in the region. The socio-economic survey indicated that the slow growth of these crops is due to the fact that production did not rise in relation to rise in the support prices. Either price signal may not reach the farmers or the farmers do not respond to these signals probably due to absence of procure -ment system or other reasons.

INTRODUCTION

The production trend of maize and total pulses in north eastern hills (NEH) states during 1975-99 was studied. The paper mainly tries to focus the factors constraining for slow growth of maize and pulses in NEH states.

DATABASE AND METHODOLOGY

The study is based on secondary data collected from the various issues of Economic Survey of India, Basic Statistics of North East India, Fertilizer Statistics and Statitical Abstracts of respective states. Primary data were collected from 4 villages in Rongram Block of West Garo Hills and 6 villages were spread over in 6 circles in RiBhoi CDB of East Khasi hills. Compound growth rates of area, production and yield of maize and total pulses were calculated on the data from 1975-1997. Contribution of area, yield and interaction of maize and pulses was worked out following the method of Sharma (1977) :

Q + Ao. Y + Yo. A + A. Y, where Ao and Yo are area and yield per ha in base year respectively, and Q, Y and A are changes in production, yield/ha and area respectively between base year and tth year and average growth rate was calculated on the basis of (Yt - Yo/Yo x 100.

RESULTS AND DISCUSSION

Growth in production and productivity

Trends of growth for production of maize and pulses clearly indicate that foodgrain production in Manipur, Mizoram, Sikkim and Tripura increased significantly mostly due to improvement in productivity whereas in other states, it was due to only area expansion. In Meghalaya, there was slight improvement in both area and productivity.

Maize

Maize is one of the principal coarse cereals grown in NEH states. There has been a consistent increase in area under maize due to its extension of its cultivation. Maize farmers in NEH states by and

large adopted non-monetary inputs and only partly HYVs/hybrids. The farmers grow maize because the choice of alternative open to a farmer is extremely limited not only because of his resource base but is wary of gambling with the weather. Only two distinct cropping patterns are prevalent in Sikkim - maize and rice. Socio-economic survey revealed that maize and ginger intercropping proved advantageous because of difference in their crop growth and nutritional requirement

Compound growth rate of maize in different states from 1975-76 to 1997-98 indicated (Table 1) that the area expansion as well as yield increase caused the 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 yield of maize per ha was largely unstable with more than 600% variation in Manipur and about 103% in Tripura. The mean yield ranged between 2347 kg to 6420 kg. Variance and mean yield was highest for Manipur and lowest for Tripura.The coefficient of variation for yield per ha varied from 8.58% in Arunachal Pradesh to 32.0% in Nagaland (Table 2). The contribution of area was more than yield effect. The area effect contributed to production was 63, 70 and 49% in Arunachal Pradesh, Mizoram and Nagaland (Table 3).

Resource use efficiency and productivity

Cobb Douglas production function carried out to know the stage of technology adoption and also the factors determining farm productivity for maize production. (Table 4 and 5). The coefficient of multiple determination (R2) indicates the extent of variation in the dependent variable. The marginal value products (MVP) to factor cost ratio for human labour input for hill farms (3.73) was positive and significantly different from unity indicating sub-optimal use of this input. The ratio (1.19) was non- significant for bullock labour depicting optimal use of this resource. In case of valley farms, human labour, manure and fertilizer and plant protection chemicals were under-utilized as reflected by positive and higher MVP and factor cost ratio. This indicates that there is some degree of economic inefficiency in resource use in maize production. Farm credit and extension services could revive the inefficiency in the resource use and also enhance farm return.

Pulses

The production of total pulses in NEH states except Manipur increased significantly due to increase in both area and productivity. The productivity growth was highest n Sikkim (13.84%) and least in Meghalaya (0.74%). The average productivity of pulses is 520 kg/ha as against national average of 537 kg/ha (Table 2). There was wide variation both in mean yield and yield stability. The average yield/ha ranged from 383 kg (Manipur) to 888 kg (Arunachal Pradesh)The coefficient of variation for the mean yield ranged from 3.85% in Manipur to 85.2% in Mizoram.Contribution of enhancement of pulses production in NEH states mainly resulted from area expansion than yield effect (Table 3). Maximum contribution of area was in Manipur (95.5%) and maximum yield contribution (61.0%) was in Sikkim.

Constraints for slow growth

Biotic factors play a major role in limiting the pulses production. The estimated loss due to disease was around 25% whereas the loss due to insect pests was up to 20% (Gupta et al, 1998;Azad Thakur et al, 1995). The socio-economic reason for low production of pulses in NEH states is due to low priority given by the farmers because of general consumer acceptance and non-vegetarian food habit (Sarma,1999). Rice bean assumes great promise which is an indigenous pulse crop of the region and has gained attention as a supplementary food crop (Sarma et al, 1994). However, despite the constraints, there is enough scope both for maize and pulses production in NEH region.

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Table 1. Trend in area, production and yield of Maize, pulses and oilseeds in NEH states in India during 1975-97

States	Maize			Total Pulses			
	A	P	Y	A	P	Y	A
Arunachal Pradesh	3.43	4.54	2.28	-2.84	-0.78	6.52	6.52
Manipur	-4.97	-2.03	3.1	-5.64	-5.9	-0.29	1.00
Meghalaya	0.27	3.25	2.97	3.58	2.08	0.74	1.22
Mizoram	3.15	7.13	3.85	12.41	25.12	9.86	10.85
Nagaland	4.80	7.254	2.30	6.16	9.92	3.56	14.85
Sikkim	1.64	3.83	2.20	2.90	3.78	1.34	1.18
Tripura	-	-	-	4.48	6.57	1.99	4.34
All India	0.23	2.51	2.28	-0.11	0.95	1.06	2.55

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, Dept. of Economics and Statistics, Govt. of India (various issues)

Table 2. Variation and fluctuation of average yield of maize, pulse and oilseeds in NEH region over twenty-three years (1975-1997)

States	Maize			Total Pulses		
	Average Yield (In kg/ha)	Standard Deviation	Coefficient of variation	Average Yield (In kg/ha)	Standard Deviation	Coefficient of variation
Arunachal Pradesh	1225	105.14	8.58	888	91.80	10.34
Manipur	2347	600.55	25.58	383	14.69	3.84
Meghalaya	1110	249.61	22.48	710	116.95	16.47
Mizoram	1404	449.16	31.99	836	711.65	85.16
Nagaland	823	206.58	25.10	720	212.72	29.56
Sikkim	1225	194.34	15.87	877	220.49	25.15
Tripura	642	102.63	15.99	487	72.72	14.93
Overall NEH	1254	221.21	17.64	520	224.14	43.14
All India	1337	242.27	18.12	537	53.20	9.91

Table 3. Contribution of Area, Yield and Interaction effects in increasing Pulses and oilseed Maize production in NE states during 1975-1997

State	Maize			Total Pulses		
	Area	Yield	Interaction	Area	Yield	Interaction
Arunachal Pradesh	63	21	16	32.20	35.82	31.98
Manipur	-141	111	-70	95.54	6.87	-2.41
Meghalaya	5	89	6	69.86	14.41	15.73
Mizoram	70	13	17	18.72	7.49	73.79
Nagaland	49	18	33	43.20	24.49	32.31
Sikkim	17.14	62.23	20.63	32.36	61.03	6.60
Tripura	-	-	-	57.30	23.50	19.21
All India	9	87	4	-21.36	123.47	-2.11

Table 4. Elasticity co-efficient and related production function statistics for maize crop in Manipur

Region	Interce Pt (a)	Human labour (X_1)	Bullock labour (X_2)	Manure and fertilizers (X^3)	Seed (X_4)	Plant protection chemicals (X^5)	Return to scale (Zb1)	R^2
Hill	-	1.4935**	0.1959*	-	-	-	1.6894**	0.86*
Region	2.0061	(6.72)	(1.92)					
Vallery	1.0257	0.69768	-	0.1579**	-	0.0610*	0.91658*	0.74*
Region		(2.16)		(2.85)	(1.88)			
Overall	-	0.7637**	0.2721**	0.1893**	-	0.1692*	1.2251**	0.85*
	0.6046	(4.12)	2.58)	(4.29)	(2.30)			

** Significant at 1 percent level of probability
* Significant at 5 percent level of probability
Figures in parentheses are "t" values

Table 5. Marginal value product (MVP_{Xi}) and marginal value product and factor cost ratios (MVP_{Xi} / P_{xi}) for maize crop in Manipur.

Region	Human labour (X_1)	Marginal Value Products (MVPs)			Plant protection chemicals (X_5)
		Bullock labour (X_2)	Manure & fertilizers (X_3)	Seed (X_4)	
Hill region	3.73	1.19			
	(3.73)	(1.19)			
Plain region	2.34	-	1.98	-	12.30
	(2.34)		(1.98)		(12.30)
Overall	2.25	1.65	2.20	- 3.64	
	(2.25)	(1.65)	(2.20)	(-3.64)	

Figures in parentheses are MVPXi to Factor cost ratios.