

Growth of Rice Production in Different Districts of Manipur: a Decadal Analysis

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Introduction

Rice is the most important crop of India and the second most important crop in the world. India accounts for 24.5 per cent of the total production of rice in the world which is the second highest, the highest being China contributing about 36 per cent (Mishra, 2004). In Manipur, a state in north east India, agriculture is the backbone of the state's economy and main source of livelihood of the people with 69 per cent of the workforce depending on agriculture. Rice is the principal food crop of the state and almost 100 per cent of the population depends on rice for their staple food. Therefore, among the agricultural activities, cultivation of rice is the most important activity of the state. The present yield of rice is around 2 tonnes/ha which is quite satisfactory as compared to the all India level. But the actual yield potential of the state is around 4-6 tonnes/ha, which indicates a yield gap. It is important to know the growth in area, production and productivity of rice so as to formulate an appropriate plan for further improving the production and productivity. Therefore, the present study was taken up to analyze the trend of area, production and productivity of rice in different districts of Manipur for the period 1983 to 2003.

Methodology

Secondary data has been used for the present study. The time series data on area, production and yield of rice for different districts of Manipur for the period 1983-2003 were collected from publications of the government of Manipur and the Directorate of Economics and Statistics, Government of Manipur.

The whole period is divided into different periods on the basis of availability of data, convenience in analyzing and presentation. For finding the Compound Growth Rate (CGR) and Coefficient of Variation (CV) of area, production and yield, the district wise data has been divided into two periods viz., Period I (1983-92) and Period II (1993-2003).

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To measure the growth in area, productivity and production of rice, CGR was computed by the model (Hashmi and Singh, 1989),

$$Y = e\alpha + \beta t$$

which becomes a semilog after taking log.

$$\ln y = \alpha + \beta t$$

where, y = area (ha)/production(kg)/ yield(kg/ha) of rice

α = constant

β = Coefficient/ growth

t = Time variable ($t = 1, 2, \dots, n$)

For the present study, the variability in area, production and yield of rice was examined by CV, expressed in per cent, computed by using the formula (Siju and Kombairaju, 2001).

Standard Deviation (S.D)

$$CV = \frac{\text{Standard Deviation (S.D)}}{\text{Mean}} \times 100$$

Where, $S.D. = [\sum (X_i - \bar{X})^2 / N]$

N = total number of observations

X_i = area (ha), production (kg) or yield (kg/ha)

$\bar{X}$ = mean of distribution

Results and Discussion

Growth Trends in Area, Production and Yield

The result of the analysis of the Compound Growth Rate and Coefficient of variation of area, production and yield of rice in different districts of Manipur (Period I and Period II) and district wise total is given in Table 1 and Table 2 and discussed below:

Table 1. District wise Compound Growth Rates of Area, Production and Yield of Rice in Manipur

District	Area			Production			Yield		
	Period-I	Period-II	Overall	Period-I	Period-II	Overall	Period-I	Period-II	Overall
Senapati	0.01	0.16	1.12*	1.03	0.94	3.32***	1.01	0.78	2.20***
Tlong	2.34	0.09	-0.33	3.44	0.55	0.61	1.09	0.46	0.94
Ccpur	-0.06	3.21*	3.29***	0.68	3.93*	5.31***	0.74	0.73	2.02**
Ukhrul	0.20	1.00	-0.04	-0.55	1.77	0.41	-0.97	0.77	0.45
Chandel	0.22	0.40	0.06	1.05	2.34	1.09	0.83	1.94	1.02
Imphal	-1.19	1.68	-1.07	0.44	3.81	1.86*	1.62	2.13**	2.93***
Thoubal	-1.92	-3.18	-3.18***	-1.10	-5.19*	-1.21	0.83	-2.01	1.97*
Bishnupur	-1.42	1.23	-0.17	-1.25	1.87	2.51**	0.17	0.64	2.68

Note:

* 10 per cent level of significance

** 5 per cent level of significance

*** 1 per cent level of significance

Table 2. District wise Coefficient of Variation of Area, Production and Yield of Rice in Manipur

District	Area			Production			Yield		
	Period-I	Period-II	Overall	Period-I	Period-II	Overall	Period-I	Period-II	Overall
Senapati	13.05	12.32	14.55	9.67	9.37	23.44	11.95	7.36	16.51
Tlong	23.23	11.79	18.92	23.66	17.76	20.22	21.19	8.59	15.59
Ccpur	12.97	22.67	28.82	23.82	26.38	41.42	24.77	6.40	19.50
Ukhrul	15.01	13.92	14.20	24.80	18.12	20.96	17.28	8.56	13.15
Chandel	33.68	17.28	25.98	26.92	35.32	31.62	25.21	25.98	25.37
Imphal	7.96	22.07	17.16	15.38	25.97	24.53	16.08	9.30	20.59
Thoubal	20.95	20.71	27.27	23.28	28.18	25.30	21.27	15.25	22.68
Bishnupur	25.40	22.26	23.30	19.64	24.33	28.35	22.49	6.71	21.68

Period I**Senapati**

The growth rate of area, production and yield was found to be 0.01, 0.03 and 1.01 per cent, respectively. The positive growth in production might be due to the increase in the yield and area. The coefficient of variation was found to be 13.05, 9.67 and 11.95 per cent for area, production and yield, respectively.

Tamenglong

In period 1, the growth rate in production (3.44 per cent) was found to be higher than the growth rate in area (2.34 per cent) and yield (1.09 per cent). The higher rate of production may be attributed more to the increase in area since the increase in yield was found to be low. The coefficient of variation was found to be 23.23, 23.66 and 31.19 per cent for area, production and yield, respectively.

Churachandpur

The growth rate in area was found to be negative i.e. -0.06 per cent. But the growth rate in production (0.68 per cent) and yield (0.74 per cent) was found to be positive even though they are low. The increase in production might be due to the increase in yield since the amount of increase in the yield is larger than the amount of increase in area. The coefficient of variation was found to be 12.97, 23.82 and 24.77 per cent for area, production and yield, respectively.

Ukhrul

The growth rate in area was found to be positive (0.42 per cent) but the growth rate in production (-0.55 per cent) and yield (-0.97 per cent) was found to be negative. The negative growth rate in production may be due to the negative growth rate in yield which might be due to many factors such as insect pest infestation, natural calamities like floods, drought, etc. The coefficient of variation was found to be 15.01, 24.80 and 17.28 per cent, respectively.

Chandel

The growth rate in area, production and yield was found to be 0.22, 1.05 and 0.83 per cent, respectively. The increase in production might be due to the effect of increase in both area and yield. The coefficient of variation was found to be 33.68, 26.92 and 25.21 per cent for area, production and yield, respectively.

Thoubal

The growth rate in area and production was found to be negative with -1.92 and

-1.10 per cent, respectively. However the increase in yield was found to be positive (0.83 per cent). The negative growth rate in production may be due to higher negative growth rate in area than that of the positive growth rate in production . The coefficient of variation of area, production and yield were 20.95, 23.28 and 21.27 per cent, respectively.

Bishnupur

The growth rate in area and production was found to be negative with -1.42 and -1.25 per cent, respectively. The growth rate in yield was 0.17 per cent. The negative growth rate in production might be due to larger negative growth rate in area even though the growth rate of yield was positive. The coefficient of variation of area, production and yield were 25.40, 19.54 and 22.49 per cent, respectively.

Period II

Senapati

The growth rate of area, production and yield was found to be positive which were 0.16, 0.94 and 0.78 per cent, respectively. The coefficients of variation were 12.32, 9.37 and 7.36 per cent for area, production and yield, respectively.

Tamenglong

The growth rate of area (0.09 per cent), production (0.55 per cent) and yield (0.46 per cent) were found to be positive. Comparatively higher growth in production might be mainly attributed to the growth in yield. The coefficient of variation for area, production and yield were 11.79, 11.76 and 8.59 per cent, respectively.

Churachandpur

The growth rate in area (3.21 per cent) and production (3.93 per cent) were found to be significant. The growth rate of yield was 0.73 per cent. There was a large increase in area because of which the production might have increased. The coefficient of variation for area (22.67 per cent) and production (26.38 per cent) were found to be very high. The coefficient of variation of yield was 6.40 per cent.

Ukhrul

The growth rate of area, production and yield were 1.00, 1.77 and 0.77 per cent, respectively. They were all found to be positive. The coefficients of variation were 13.92, 18.12 and 8.56 per cent for area, production and yield, respectively.

Chandel

The growth rate of yield (1.94 per cent) was found to be high which might be the

main reason for high growth in production (2.84 per cent). The area increase was not very high and was 0.40 per cent. The coefficient of variation of production (35.32 per cent) was found to be higher as compared to area (17.28 per cent) and yield (25.98 per cent).

Imphal

The growth rate in yield (2.13 per cent) was found to be significant which might be the result of wide adoption of improved methods of rice production. The growth rate in production (3.81 per cent) and area (1.68 per cent) was positive but non-significant. The coefficient of variation was higher in production (25.97 per cent) and area (22.07 per cent) compared to yield (9.30 per cent).

Thoubal

The growth rate of area (-3.18 per cent), production (-5.19 per cent) and yield (-2.01 per cent) were found to be negative. The decline in production was found to be significant which might be the result of decline in yield and area. The coefficient of variation of area, production and yield were 20.71, 28.17 and 15.25 per cent respectively.

Bishnupur

The growth rate of area (1.23 per cent), production (1.87 per cent) and yield (0.64 per cent) were found to be positive. The increase in area mainly affects the increase in yield. The coefficient of variation was high for production (24.33 per cent) and area (22.26 per cent) but was low for the yield (6.71 per cent).

Overall Period (1983-2003)

Senapati

The growth rate of area (1.12 per cent), production (3.32 per cent) and yield (2.20 per cent) were found to be positive and significant. The significant increase in area and yield might be due to coverage of larger area under irrigation and use of advanced methods of cultivation which led to the increase in production. The coefficient of variation of area, production and yield were found to be 14.55, 23.44 and 16.51 per cent, respectively.

Tamenglong

The growth rate of area (-0.33 per cent) was negative but production (0.61 per cent) and yield (0.94 per cent) were found to be positive. The increase in yield might be due to use of advanced technologies which led to the increase in production. The coefficient of variation of area, production and yield were 18.92, 20.22 and 15.59 per cent, respectively.

Churachandpur

The growth rate of area (3.29 per cent), production (5.31 per cent) and yield (2.02 per cent) were found to be significant and positive. The reason for significant growth rate of area and yield might be due to bringing larger area under cultivation by extending irrigation facilities, government subsidies, etc. and use of improved methods of cultivation. Thus, it led to the increase in production. The coefficient of variation of production (41.42 per cent) was found to be very high. The coefficient of variation of area and yield was 28.82 per cent and 19.50 per cent respectively.

Ukhrul

The growth rate in area (-0.04 per cent) was found to be negative which might be due to high cost of cultivation, going for other crops etc. However, the growth rate of yield (0.45 per cent) was found to be positive which might be the reason for positive growth rate in production (0.41 per cent). The coefficient of variation of area, production and yield were 14.20, 20.96 and 13.15 per cent, respectively.

Chandel

The growth rate of area, production and yield were 0.06, 1.09 and 1.02 per cent, respectively. The coefficient of variation of area (25.98 per cent), production (31.62) and yield (25.37 per cent) were found to be high.

Imphal

The growth rate in area (-1.07 per cent) was found to be negative whereas the growth rate in production (1.86 per cent) and yield (2.93 per cent) were found to be positive and significant. Imphal being the centre of the state, it might be inferred that the decrease in growth rate in area was mainly due to increase in the migration from other parts of the state thereby increasing the residential area and decreasing the area under cultivation and/or people giving up farming and going for other jobs. The increase in the yield might be because of adoption of advanced methods of cultivation, which thus led to the increase in production. The coefficient of variation of area, production and yield were 17.16, 24.58 and 20.59 per cent, respectively.

Thoubal

The growth rate in area (-3.18 per cent) was found to be negative and significant. The growth rate in yield (1.97 per cent) was found to be positive and significant but production (-1.21 per cent) was found to be negative which might be due to large and significant decline in area. The coefficient of variation of area (27.27 per cent), production (25.30 per cent) and yield (22.68 per cent) were found to be high.

Bishnupur

The growth rate in area (-0.17 per cent) was found to be negative. However, the increase in production (2.51 per cent) was found to be positive and significant which might be attributed to the significant and positive growth in yield (2.68 per cent). The coefficient of variation of production (28.35 per cent) was found to be very high. The coefficient of variation of area and yield were 23.30 and 21.68 per cent, respectively.

Conclusion

Rice is the principal food of the state and occupied 72.46 per cent (2002-03) of the total cultivated area but the rice area showed a declining trend during the period in which the analysis was carried out. Among the districts, only Senapati, Churachandpur and Chandel showed an increasing trend and the other districts showed a declining trend of rice area. Productivity reported an increasing trend in all the districts. The highest and a significant growth in yield was reported in the district of Imphal.

Production increased in all the districts except Thoubal which reported a declining trend. The decline in area was very high in Thoubal which might be the reason for production decline even though the yield reported a positive trend. Similar findings was also reported by Hashmi and Singh (1989) in Uttar Pradesh that area under rice is decreasing, but production and productivity of rice has been making a good progress.

The maximum variability in area was reported in the district of Churachandpur where the growth rate in area was the highest which might be due to the increase in area under shifting cultivation which has been increasing lately. Better implementation of Land Reforms may help in supervision of the area under cultivation. The highest variability in production and yield was reported in the districts of Bishnupur and Thoubal, respectively, which can be attributed to the fact that both the districts being plain areas and near to Imphal town, new methods of package of practices and inputs must have been easy to reach. The minimum variability in area and yield was reported in the district of Ukhrul and the lowest variability in production was reported in the district of Tamenglong.

With the increase in population it is usual for the area under cultivation to decrease. It will be more worthwhile to emphasize on the use of improved technologies and modern methods of production. In period I the growth rate in productivity was high in all the districts as compared to period II. This may be clearly attributed to the effect of the green revolution in period I. However in period II the technologies seem to have become stagnant and hence the growth rate may have slowed down. More extensive research and development of technologies viable to the area is needed in order to realize the

potential of the area. Imparting up-to-date information, education and training on new methods of cultivation, development of infrastructure for production and marketing is needed. Above all, participation of the farmers in various rural development programs should be encouraged.

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