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RESEARCH NOTES

CONTRIBUTION OF HYVS TO CEREAL OUTPUT, YIELD AND AREA IN GUJARAT*

Several micro level studies have substantiated the yield-raising characteristics of new seed varieties (HYVs).[1] They suggest that output per unit of land is higher on the farms which apply HYVs than on those which apply traditional seed varieties. At the same time, some of these studies have also indicated that the yield potential of HYVs has not yet been fully exploited because of the gap between the recommended and the actual application of certain crucial inputs. Wide variations in the extent of adoption across different farm sizes are also highlighted by few of these studies. It could therefore be stated that at the aggregate level the use of HYVs may or even may not prove yield (output or area)-increasing.

Studies are conducted at the macro level to examine the impact of HYVs on yield level (as well as on output and area). These studies attempted to measure the magnitude of change in terms of growth rate of yield with the advent of HYVs. Based on time-series data, these studies tried to test the hypothesis that the growth rate of yield will be higher for the period after its introduction.[2] These studies have shown that considerable improvement has been recorded only in respect of wheat output. Sen observes with Indian data for the period 1949-50 to 1970-71:[3] "On the whole, the effects of the green revolution on the output and yield of foodgrain crops have been mixed, spectacular for wheat, some improve-

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3. *op. cit.*

ment for bajri and maize and no improvement at all for jowar and rice. In sum, the extent of green revolution in India has been small, both in terms of area covered and impact on output. The future scope too is severely limited." At the macro level thus the yield-raising characteristics of HYV have not been realised fully.

At attempt is made in this paper to measure the contribution of HYVs to output, yield and area in Gujarat State. This is done for bajri, jowar, maize, paddy, wheat and total foodgrains. For this purpose, a comparison of growth rates for output, yield and area of the above-mentioned crops is made (*i*) between period I (1951-52 to 1965-66) and period II (1966-67 to 1977-78) and (*ii*) between period I and period III (1951-52 to 1977-78). While doing this exercise, it is assumed that the growth rates of gross irrigated area, fertilizer use and crop intensity are

GROWTH RATES OF OUTPUT-YIELD-AREA OF MAJOR CEREALS AND TOTAL FOODGRAINS IN GUJARAT

(*per cent*)

Crop	Period	Output	Yield	Area
Bajri	1951-53 to 1963-65 (I)	2.49	6.68	—3.88
	1966-68 to 1975-77 (II)	—0.28	1.37	—1.85
	1951-53 to 1975-77 (III)	4.80	5.15	—0.36
Jowar	1951-53 to 1963-65 (I)	1.37	2.64	—1.24
	1966-68 to 1975-77 (II)	2.90	7.12	—4.02
	1951-53 to 1975-77 (III)	1.48	3.17	—1.68
Maize	1951-53 to 1963-65 (I)	6.25	4.33	1.77
	1966-68 to 1975-77 (II)	1.46	1.12	0.26
	1951 53 to 1975-77 (III)	2.94	1.19	1.74
Paddy	1951-53 to 1963-65 (I)	4.81	3.51	1.39
	1966-68 to 1975-77 (II)	0.99	2.35	—1.63
	1951 53 to 1975-77 (III)	1.61	2.17	—0.61
Wheat	1951-53 to 1963-65 (I)	3.63	3.09	0.01
	1966-68 to 1975-77 (II)	6.51	6.86	2.67
	1951-53 to 1975-77 (III)	6.75	5.83	1.26
Total foodgrains	1951-53 to 1963-65 (I)	2.93	3 99	—1.81
	1966-68 to 1975-77 (II)	1.96	4.08	—1.19
	1951-53 to 1975-77 (III)	3.13	3.47	—0.76

likely to contribute to the growth of output per acre in the same way as in the pre-technology (HYV) period. The index numbers based on the triennium ending 1961-62 as 100 of the output (yield and area) of the cereals under study for the period 1951-52 to 1977-78 are used after adjusting for cyclical variations by taking three-yearly moving average.[4] Semi-log trend equation $Y = ab^t$ is fitted to output (yield and area).[5]

It is noticed that output expanded faster in period II as compared to period I with respect to wheat and jowar only (Table I). A comparison between the output growth rates of period I and period III reveals that the output growth rates of wheat, bajri, jowar and total foodgrains have improved for the latter period which may partly be attributed to the adoption of HYV seeds. The yield growth rates in period II are higher than those in period I for wheat, jowar and total foodgrains. The growth rate of wheat and jowar yield is found to be rising in period III over period I; for all the remaining crops it is declining. The growth rates of area in both period II and period III over period I have increased for bajri, wheat and total foodgrains.

It emerges from this exercise that the influence of HYV seed varieties on output, yield and area for major five cereals is mixed at the State level. The contribution of HYVs to output, yield and area growth for wheat is remarkable. The adoption of HYVs has helped to accelerate the growth rate for output and yield for jowar for the period under study. In the case of bajri and total foodgrains, the increase in growth rate for output and area in period III over period I indicates that the adoption of HYVs on larger area has been instrumental in stepping up the output growth substantially. It is, however, really curious to find that there is no improvement in the rate of growth of yield in bajri despite the fact that its acreage under HYV happens to be quite substantial in the State. The reason as to why the yield of wheat has increased substantially, but same is not the case with bajri, is a matter for further investigation.

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Note:—Y = adjusted three-years' moving average index number of output (yield and area), t = time (1. 2. .... 25).

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