CONTRIBUTION OF AREA AND YIELD OF TOTAL RICE PRODUCTION IN PAKISTAN - AN ANALYSIS

Khurshid Ali Qureshi, Buland Akhtar, Muhammad Aslam Chaudhry, Aman Ullah Khan & Altaf Hussain Saqib
University of Agriculture, Faisalabad

The area under rice has increased from 790,000 ha in 1948 to 2 million ha in 1978 and has almost remained stable around the same figure since then which is attributable mainly to the fact that rice crop consumes water quite intensively and area cannot be increased much due to limited additional water availability. The change in area was found negative during 1967/70-1971/74, while production changed by more than 15%. This change was brought about by increase in yield which occurred as a consequence of green revolution.

INTRODUCTION

Rice being one of the richest starchy foods, is a principal food crop of about half the world's population (Martin, 1986). In Pakistan, it is the most important kharif cereal. It occupies a significant position in agricultural economy of the country and is considered as the second staple food. Rising from a subsistence crop of traditional rice growing areas of the Punjab, Sindh and high altitude valleys in the north, it has emerged as a major export commodity now, contributing about 27% to the total foreign earnings of Pakistan (Anonymous, 1990). Presently, Pakistan enjoys a near monopoly status in the export of fine aromatic Basmati-rice which fetches a price three to four times that of the normal coarse varieties in the international markets.

About 92% of Pakistan's rice production is concentrated in the Punjab and Sindh provinces and nearly all the rice is grown on irrigated land. Punjab is the leading rice growing province with about 61% rice area and concentrates on Basmati-rice for export, while Sindh produces high yielding varieties and traditional varieties mostly for domestic consumption covering about 31% of total rice area. Of the remaining 8% area under rice, 5% lies in the North-West Frontier and 3% in the Balochistan provinces, respectively. On the whole, Basmati-rice accounts for about 52% of the total rice area (Anonymous, 1990).

Area under rice more than doubled from 1948 to 1978 and since then it has remained stable at around 2 million ha. During 1949-85, rice area has increased @ about 2% per annum. On overall basis, rice area increased from 790 thousand ha in 1947-48 to 2107 thousand ha in 1989-90 indicating 163.54% increase over the 44 years period. Production also indicated an increasing trend. It increased from 693 thousand tonnes in 1947-48 to 3220 thousand tonnes in 1989-90, depicting a huge increase of 364%. As for yield ha^{-1}, it increased from 877 kg in 1947-48 to 1528 kg in 1989-90, showing an increase of 73% (Anonymous, 1990).

MATERIALS AND METHODS

Area, production and yield data were taken from Economic Survey, 1990-91, Government of Pakistan, Finance Division, Economic Advisor's Wing, Islamabad. The following procedure was adopted for calcu-

lating contribution of area and yield to total production of rice (Andersen, 1982):

a. Period refers to a four year average: 1947-50. Area is the average area for years 1947, 1948, 1949 and 1950.

b. Percentage change in area is computed using the following formula:

$$\left[\frac{X_{t_1}}{X_{t_0}} - 1 \right] \times 100$$

where

X_{t_1} = Average area for time t_1 which is the period in column (2) in Table 1 given in the text.

X_{t_0} = Average area for time t_0 which is the period in column (1) in Table 1 given in the text.

c. Percentage change in production is computed using the same formula as in area except that average production is used instead of area.

d. Percentage contribution of area to change in total production is computed using the formula:

$$\frac{\Delta \text{Log } X}{\Delta \text{Log } P} \times 100$$

where log X = log area t_1 - log area t_0

Log P = Log production t_1 - Log production t_0

e. Computed using the formula in d/ but log of yield is used instead of log of area.

Table 1. Contribution of area and yield to total production of rice in Pakistan

Crop period a/		Percentage change in		Percentage contribution to change in total production	
t_0 (1)	t_1 (2)	Area b/ (3)	Production c/ (4)	Area d/	Yield e/
1947/1950	1951/1954	6.68	6.75	99	1
1951/1954	1955/1958	10.56	6.98	149	(-)49
1955/1958	1959/1962	14.88	22.34	69	31
1959/1962	1963/1966	13.77	20.17	70	30
1963/1966	1967/1970	12.05	55.66	26	74
1967/1970	1971/1974	0.78(-)	15.11	(-)6	106
1971/1974	1975/1978	22.00	23.67	94	6
1975/1978	1979/1982	7.28	13.36	56	44
1979/1982	1983/1986	0.06	(-)0.48	(-)13	113
1983/1986	1987/1990	3.75	(-)1.02	(-)358	458

RESULTS AND DISCUSSION

The percentage change in area and production during 1947/50-1951/54 was calculated to be 6.68 and 6.75, respectively. The contribution of area and yield to change in total production is calculated to be 99 and 1%, respectively. For the period 1951/54-1955/58, the change in area and production was found to be 10.56 and 6.98%, respectively. Percentage contribution of area and yield to change in total production came to be 149 and (-)49 respectively. During the period 1955/58-1959/62, the change in area and production was 14.88 and 22.34%, respectively while the contribution of area and yield to change in total production was calculated to be 69 and 31%. As regards the period 1959/1962-1963/1966, the percentage change in area and production was calculated to be 13.77 and 20.17 respectively. The percentage contribution of area and yield to change in total production worked out to be 70 and 30% respectively.

For the period 1963/66-1967/70, the change in area and production was found to be 12.05 and 55.66% respectively. The percentage contribution of area and yield to change in total production came to be 26 and 74 respectively. During the period 1967/70-1971/74, the change in area and production was (-)0.78 and 15.11% respectively, while the contribution of area and yield to change in total production was calculated to be (-)6 and 106%.

The onset of green revolution is traced to be the major factor in increasing yield unit^{-1} area during the above two time periods. It is how that the contribution of yield to total rice production during 1967/70-1971/74 increased tremendously. As regards the period 1971/74-1975/1978, percentage change in area and production of rice crop came to be 22.00 and 23.67 respectively. Area and yield contributed 94 and 6% respectively to the change in total production. The contribution of yield exhibited an excessive slump as a consequence of sudden changes in weather conditions and partly due to onslaught of insect pests and diseases.

During the period 1975/78-1979/1982, the change in area and production was found to be 7.28 and 13.36% respectively. Percentage contribution of area and yield to change in total production came to be 56 and 44% respectively. The change is largely ascribed to the spread and adoption of better varieties. With respect to the period 1979/82-1983/1986, the percentage change in area and production of rice crop came to be 0.06 and (-)0.48 respectively. As regards the change in total production, area contributed negatively while the effect of yield in changing total production was positive.

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