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ECONOMICS OF PRODUCTION OF IRRIGATED CROPS OF SUGARCANE, POTATO AND WHEAT IN SOME VILLAGES OF THE SONEPAT COMMUNITY PROJECT AREA, ROHTAK DISTRICT, PUNJAB

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An attempt was made to inquire into the economics of production of irrigated crops of sugarcane, potatoes and wheat, 22 in number: six of sugarcane, nine of potatoes and seven of wheat, in 16 villages on 18 cultivators' fields, selected at random, in the area of the erstwhile Sonepat Community Project in the Rohtak District of Punjab, in the years 1955-56 and 1956-57. This paper presents the summary and conclusions of the enquiry. The aggregate area of crops studied was 13.340 acres under sugarcane, 16.010 acres under potatoes and 53.104 acres under wheat. The cost of production in these studies included the value of the manual labour put in by the cultivator and his family, interest on working capital and rental value of owned land, but not the cost of management.

SUGARCANE

Upto the time of crushing, plant cane required 28 to 55 per cent more outlay than ratoon cane. The average cost of production of sugarcane, giving an average outturn of 73 34 maunds of *gur* (jaggery) and allied products per acre, came to Rs. 795 $\pm$ 166.74 (S. E.) per acre, 50 per cent of which had to be spent on manual labour, about 25 per cent on bullock labour, and the rest on the remaining items such as rent or rental value of land, seed, manure, etc.

It required on an average 211.16 man-days and 40 40 bullock (pair) days to carry to completion an acre of sugarcane, which cost respectively Rs. 399.00 and Rs. 202 51. The process of harvesting and crushing cane and making *gur*, etc., accounted for 63 5 per cent of the total outlay on manual labour and 51.6 per cent of the outlay on bullock labour. The next most expensive item of production was watering which accounted for 7.1 per cent of the total cost of manual labour and 27.5 per cent of that of bullock labour. The third most expensive item was hoeing which accounted for 12.1 per cent of the cost of manual labour. Harvesting and crushing cane and making *gur*, etc., from it accounted for 48.8 per cent of the total outlay on sugarcane, watering for 12.6 per cent and hoeing for 7 per cent.

An average outturn of 73 34 maunds of *gur* (and allied products) was obtained per acre from sugarcane in addition to tops (for fodder) and canes (for seed and chewing) and an average gross income of Rs. 993 66 $\pm$ 209 90 (S. E.) was obtained per acre from all of these products. The average profit per acre from sugarcane amounted to Rs. 197.80 $\pm$ 65 29 (S. E.) on an average, gross income was 125 per cent of expenditure, the profit thus being 25 per cent.

Business income, in the calculation of which family wages, interest on working capital and rental value of owned land were not debited to expenditure, came on an average to Rs. 525.58 per acre *vis-a-vis* profit of Rs. 197.80. Family

wages, constituting on the average 68.21 per cent of the total manual labour cost, made the greatest contribution towards this addition.

The cost of production of *gur* (jaggery) per maund on an average came to Rs. 8.32, that of *shakkar* to Rs. 8.38, that of *khand* to Rs. 20.17, and that of *rala* (molasses) to Rs. 6.74. As the coefficient of correlation between yield per acre and cost of production per maund in the case of sugarcane in these investigations was found to be very low and highly non-significant, *viz.*, — 0 092 ± 0 405, the above cost of production would hold even for (lesser) average production per acre of the tract whatever it may be. The average price per maund fetched by *gur* was Rs. 10.45, by *shakker* Rs. 11.25, by *khand* Rs. 25.00 and by *rala* Rs. 8.00. Profit per maund on an average in the case of *gur* came to Rs. 2.73, for *shakkar* to Rs. 2.87, for *khand* to Rs. 4.83 and for *rala* to Rs. 1.26. In percentage, profit for *gur* came to 25.60%, *i.e.*, almost the same figure as given by a comparison of total expenditure on production with gross income.

POTATOES

The average cost of production of potatoes, giving an average outturn of 197.57 maunds of tubers per acre, came to Rs. 889 92 ± 85 03 (S. E.), largest single share of which, *viz.*, 34 8 per cent, was accounted for by seed. Next came manual labour, bullock labour, manure, transport and marketing and rent or rental value of land in the order given which accounted for 22.3, 12.1, 10.0, 9.4 and 6.5 per cent, respectively, of expenditure, The rest of the items accounted for the remaining about 5 per cent of expenditure. Next to seed but relatively much smaller items of the cost of production were manuring (accounting for 11.1 per cent of it), cultivation and sowing (9.8 per cent), transport and marketing (9.4 per cent), watering (9.4 per cent), digging out tubers (6.6 per cent) and hoeing and earthing up (5.3 per cent).

It required on an average 121.0 man-days and 21.7 bullock (pair) days to grow (*i.e.*, to carry to completion) an acre of potatoes, which cost respectively Rs. 199.0 and Rs. 107.3. Of all the operations, cultivation and sowing required the largest single amount of expenditure: 23.8 per cent of all manual labour and 37.2 per cent of all bullock labour; next came, watering which required 14.7 per cent share of manual labour and 50.1 per cent of bullock labour. In point of manual labour alone, digging out of tubers required the largest expense, followed by hoeing and earthing up.

An average outturn of 197.57 maunds of tubers was obtained per acre and the average gross income was Rs. 1360.68 ± 167.33 (S. E.) per acre. The average profit per acre from potatoes amounted to Rs. 470.76 ± 97.3 3 (S. E.). On an average, the gross income was 150 per cent of expenditure, the profit thus being 50 per cent.

Business income, in the calculation of which family wages, interest on working capital and rental value of owned land are not debited to expenditure, averaged Rs. 609.84 per acre as against the average profit of Rs. 470.76. Family wages constituting on an average 54.37 per cent of the total manual labour cost made the greatest contribution towards this addition.

The cost of production of potatoes was, on an average, Rs. 4.67 per maund. On the basis of an yield of 156 maunds per acre, which is the average yield of potatoes in the tract, instead of on the basis of the average yield of 197.57 maunds per acre obtained in these investigations, and with a correlation coefficient of -0.571 ± 0.225 found between yield per acre and cost of production per maund, the cost increased to Rs. 5.29 per maund. The average price per maund fetched by tubers was Rs. 7.00. Profit per maund, in case of potatoes, averaged to Rs. 2.33 per maund, which amounted to 50 per cent. On the basis of increased cost of production for average yields obtaining in the tract, the profit was only Rs. 1.71 per maund, or 32.3 per cent.

WHEAT

The average cost of production of wheat, giving an average outturn of 18.96 maunds of grain and 26.31 maunds of *bhusa* (straw) per acre, was Rs. 208.16 $\pm$ 24.45 (S. E.). Of this, about 32.2 per cent was spent on manual labour, 27.9 per cent on bullock labour, 20.1 per cent was accounted for by rent or rental value of land, 8.8 per cent by seed and the rest (about 11 per cent) by other items. The most expensive operations and items of production were: (i) harvesting, threshing and winnowing which accounted for about 28.6 per cent of the total cost, (ii) cultivation and sowing, including application of manure, which accounted for about 24 per cent of the total cost, and (iii) rent or rental value of land which accounted for about 20 per cent of the total cost of production.

It required on an average nearly 31 man-days and 13.6 bullock (pair) days to grow and gather an acre of wheat, which cost respectively Rs. 58.06 and Rs. 67.15. In respect of manual labour, largest single share was claimed by threshing (and winnowing) operations and the next largest by cultivation and sowing but, in respect of manual labour and bullock labour combined, "cultivation and sowing" occupied the top position, higher than the combined operations of threshing and winnowing. Next in importance was harvesting, which constituted about 28 per cent of the manual labour bill. As to the absolute share of various operations and items in the cost of production, cultivation and sowing, including application of manure, accounted for about 24 per cent, rent or rental value of land for 20.1 per cent, threshing and winnowing for about 19 per cent, harvesting for about 9 per cent, and other items for the rest 28 per cent.

An average outturn of 18.96 maunds of grain and 26.31 maunds of *bhusa* (crushed straw) was obtained per acre. Gross income from grain was, on an average, Rs. 276.42 per acre and from *bhusa* Rs. 76.38 per acre, yielding a combined gross income of Rs. 352.80 $\pm$ 34.41 (S. E.). The average profit per acre from wheat amounted to Rs. 144.64 $\pm$ 36.62. On an average, gross income was 170 per cent of expenditure, giving thereby a profit of 70 per cent.

Business income, in the calculation of which family wages, interest on working capital and rental value of owned land are not debited to expenditure, came on an average to Rs. 223.90 per acre *vis-a-vis* a profit of Rs. 157.73, an addition to the latter of Rs. 66.17 per acre, towards which family wages constituting 74 per cent of the total manual labour bill, contributed about two-thirds.

The cost of production of wheat grain and wheat *bhusa* (by the "apportionment of cost" method) averaged to Rs. 8.54 and Rs. 1.73, respectively, per maund. By the "subtraction" method, which can give only the cost of production of grain, the average cost was only Rs. 6.93 per maund of grain, *i.e.*, about 20 per cent lower. As the coefficient of correlation between yield per acre and cost of production per maund in the case of wheat in these investigations was found to be low and highly non-significant, *viz.*, 0.191 ± 0.364, the above cost of production per maund would hold even for (lesser) average production per acre of the tract. The average price per maund fetched by wheat grain was Rs. 14.49 and that by *bhusa* Rs. 2.92. Profit per maund on the average in the case of wheat grain (by the "apportionment of cost" method) was Rs. 5.95 and in the case of wheat *bhusa* Rs. 1.19. Converted into percentages, these figures give an average profit of about 70 per cent each for grain and *bhusa*, *i.e.*, the same figure which was arrived at by comparing total cost and gross income. With the cost of production per maund worked out by the "subtraction" method, profit on wheat grain amounted to 109.1 per cent.

CONCLUSION

In regard to expenditure per acre which had to be incurred on the raising of the three crops, it stood in the ascending order of wheat (Rs. 208/-), sugarcane (Rs. 796/-, more than 3.75 times that of wheat,) and potatoes (Rs. 890/-, about 4.28 times that of wheat).

As regards gross income per acre derived from the cultivation of these three crops, it stood in the same ascending order of wheat (Rs. 353/-), sugarcane (Rs. 994/-, 2.8 times that of wheat), and potatoes (Rs. 1361, about 3.9 times that of wheat).

With regard to profit per acre in respect of the three crops, it stood in the same ascending order, *viz.*, wheat (Rs. 145/-), sugarcane (Rs. 198/-) and potatoes (Rs. 471/-, 3.25 times that of wheat and about 2.4 times that of sugarcane).

It may be noted that while the gross income per acre from sugarcane amounted to 2.8 times that of wheat, the profit per acre (net income) from sugarcane amounted to only (198/145=) 1.37 times that of wheat. This is because of the fact that much increased expenditure had to be incurred on sugarcane cultivation. It may also be noted that profit (net income) from an acre of potatoes is the same as the profit from (471/145=) 3.25 acres of wheat or profit from (471/198=) 2·38 acres of sugarcane.

Thus potato stands highest in every respect and wheat the lowest. However in the matter of expenditure per acre, wheat has some advantage in that of these three crops it requires the least amount of capital for cultivation. But in one respect wheat stands highest, namely, in profit on percentage basis (70%). Sugarcane stands undoubtedly lowest (25%) in this respect.

Average man-day wages varied from Rs. 1.19 to Rs. 2.01, with an overall average of Rs. 1.82, in sugarcane ; in potatoes from Rs. 1.42 to Rs. 2.05, with

an overall average of Rs. 1.63 ; and in wheat from Rs. 1.41 to Rs. 2.09, with an overall average of Rs. 1.87. Average man-day wages for the three crops amounted to Rs. 1.77.

In sugarcane, family wages constituted 68.21% of the total manual labour cost ; in potatoes 54.37% ; and in wheat 74.% ; the overall average being 65.53%, *i.e.*, about two-thirds of the whole.

The co-efficient of variation in respect of expenditure per acre was greatest in sugarcane (51.33±14.84%), and next greatest in wheat (32.04 ± 8.57%) and least in potatoes (29.62 % ± 7.00%), but none of the differences between either two were statistically significant.

The co-efficient of variation in respect of gross income per acre was greatest in sugarcane (50.77 ± 14.38%), second greatest in potatoes (36.89 ± 8.70%) and the least in wheat (25.85 ± 6.91%), but none of the differences between either two were statistically significant.

From the fact that the cultivation of wheat has given 70 per cent profit in these studies, it should not be assumed that for the farmer wheat can be a great source of earning income to meet his ever-growing cash needs. The surplus of it available for sale from the produce of his small holding is generally small and if that small surplus is sold even at 170 per cent of its cost of production, the net cash which a farmer gets from its sale yet remains small, because of small gross income from wheat.

Recomendation : Wherever irrigation may be available, farmers will be well advised to devote an acre or two to potatoes. That will considerably add to their earnings from farming.