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# How Profitable is Cultivation of Rainfed Crops? Some Insights from Cost of Cultivation Studies

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**Abstract**

It is believed that the irrigated crops generate more profit than that of the same crops cultivated under rainfed or less-irrigated condition. How far does this perception hold true at a time when the farmers across regions have been groaning of rising cost of cultivation and inadequate profit from crop cultivation? Using the cost of cultivation data published by the CACP for the period 1971-72 to 2010-11, this paper has studied the economics of five important crops, namely bajra, maize, gram, groundnut and cotton, grown under two distinct conditions, viz. irrigated and rainfed/less-irrigated, in different states of India. The study has shown that there is no marked difference in the profitability (at constant prices) of cereal crops (bajra and maize) cultivated under irrigated and rainfed conditions. Unlike cereal crops, gram has unbelievably turned out to be a profitable crop to the farmers in both the irrigated and rainfed conditions. In the case of groundnut crop, the rainfed state of Gujarat has outshined the irrigated Tamil Nadu state where farmers have suffered losses more number of times as compared to their counterparts in Gujarat during the study period. The cotton crop has proved to be a massively loss-making crop under rainfed condition, but quite profitable under irrigated condition. The study has also revealed that due to fast increase in the cost of cultivation, the profitability of the crops has been severely hit mostly during the agrarian crisis period (1995-96 to 2010-11).

**Key words:** Cost of cultivation, farm profitability, irrigated crops, rainfed crops

**JEL Classification:** Q11, Q12, Q13, Q15

## Introduction

There is a common perception that irrigated crops are more profitable than rainfed crops (Hussain and Hanjra, 2004). Recent evidence, however, shows that farmers are not able to recover the cost of their production of even the irrigated crops like paddy and sugarcane, not because of their low yields but due to increasing cost of production (Narayanamoorthy, 2006; 2007; 2012; 2013)[1]. If this is the case with irrigated crops, could the rainfed crops grown under scarce and uncertain rainfall be profitable? The main aim of this paper is to find the trends in profitability of important rainfed crops being grown in the irrigated and less-irrigated or rainfed regions of India. The rainfed regions are highly diverse in their production potential, ranging

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[1] The farmers of fertile and irrigated East Godavari and West Godavari districts of Andhra Pradesh in an unprecedented manner went on a crop holiday, refusing to cultivate paddy in about four lakh acres during the *kharif* season of 2011, citing poor remuneration. Sugarcane farmers across the country have been relentlessly agitating for a right price for their produce and a commensurate share of profits earned by the sugar mill owners. The agitation took a serious turn with the death of sugarcane farmers in police firing in the Sangli district of Maharashtra in 2012 (*see*, Narayanamoorthy and Alli, 2013).

from well-endowed resources[2] and good agricultural potential to poor resource endowments with restricted potential. Yet, rainfed regions account for 83 per cent of the country' pulses production, 70 per cent of the oilseeds production and 65 per cent of the cotton output (CRIDA, 2011).

Several studies in the past have reported that high-yielding varieties can contribute to a substantial rise in gross income per hectare in the rainfed regions (Kanitkar, 1960; Rastogi and Annamalai, 1981; Rastogi and Reddy, 1982; Rangaswamy, 1982; Bapna, *et al*., 1984). However, HYVs come at a price, escalating the cost of cultivation. These empirical findings need to be re-assessed to bring out the real picture at the ground level (Narayanamoorthy and Suresh, 2012). First, when the resource-poor rainfed farmers continue to face acute constraints of credit and insurance, and newly introduced HYVs could be beyond their reach. Second, farmers in the rainfed regions prefer to grow the traditional low-yielding varieties because these can better withstand rainfall shocks compared to HYVs (Kahlon and Sandhu, 1971; Sen and Bhattia, 2004; Bhalla and Singh, 2012). Then, how remunerative are rainfed crops in a situation of scanty rainfall and frequent droughts? Is the commonly held belief that the rainfed crops continue to remain in a state of perpetual stagnation true? In view of such questions it will be meaningful to compare the profitability of a rainfed crop under irrigated vis-à-vis less-irrigated conditions. In that attempt, the study has examined the profitability of important rainfed crops using data from cost of cultivation studies on five important rainfed crops for the period 1971-72 to 2010-11.

## Objectives

(i) To study the economics of cultivation of the same crop under two diverse environments, viz. irrigated and less-irrigated regions, and

(ii) To examine the trends in profitability of the crops under irrigated and less-irrigated conditions.

## Data and Methodology

The study has used the cost of cultivation data from 1971-72 to 2010-11 compiled from various publications of the Commission for Agricultural Costs and Prices (CACP). Five major rainfed crops, namely bajra, maize, gram, groundnut and cotton cultivated under irrigated and less-irrigated (or rainfed) conditions in the major growing states were selected to study the profitability. To find whether the profitability of these crops cultivated under irrigated conditions is in any way better than cultivated under less-irrigated conditions, two states were selected for each crop, one with better irrigation coverage and the other with extremely less-irrigation coverage (*see*, Table 1). The CACP uses different cost concepts (A1, A2, A2+FL, B1, B2, C1, C2, C2* and C3) for estimating costs and returns. In the present study, the cost C2 was considered for computing profitability. The cost C2 in CACP data covers all the variables and fixed costs. To see how the costs and returns have changed in real terms, these were deflated by the consumer price index for agricultural labourers (CPIAL) with 1986-87 base. The profit was computed as gross value of output minus cost C2.

## Results and Discussion

There is a general perception that cultivation of crops with irrigation facilities or in the irrigated regions is more profitable than in the rainfed regions. This needs to be investigated empirically because of the fast changing agricultural and economic environment in the country. In this section trends in profitability have been analysed of five major crops; each being grown in two different environments, viz. irrigated and less-irrigated conditions. An attempt has been made to see how many times these crops were profitable during the period 1970-71 to 2010-11. Considering that the agrarian crisis, started after the mid-1990s, might have manifested in the reduced profitability, it is also attempted to find out whether any difference exists in the profitability of crops before and after 1995-96.

### Pearl Millet

Pearl millet (bajra), the poor man's staple food, is a warm weather crop which occupies about eight per cent of the total area under foodgrains (GoI, 2012). Unlike many other coarse grains that have lost area, pearl millet has experienced a small increase in its area, from 9.02 Mha in 1950-51 to 9.61 Mha in 2010-11.

[2] According to Kerr (1996), the resource-rich rainfed areas are potentially highly productive and have already experienced widespread adoption of improved seeds, while the resource-poor rainfed areas are those where productivity growth has lagged behind and there is widespread poverty and degradation of natural resources.

**Table 1. Crops and states selected for the study**

| Crop | States selected for study | Category of state selected | Area (in Mha) under cultivation in TE 2010-11 | Percentage of irrigation coverage of the selected crop in TE 2010-11 |
|---|---|---|---|---|
| Pearl millet | Gujarat | Irrigated | 0.75 | 22.17 |
| | Rajasthan | Rainfed | 5.28 | 4.33 |
| Maize | Andhra Pradesh | Irrigated | 0.79 | 47.70 |
| | Rajasthan | Rainfed | 1.10 | 1.30 |
| Gram | Madhya Pradesh | Irrigated | 3.01 | 49.70 |
| | Uttar Pradesh | Rainfed | 0.58 | 14.93 |
| Groundnut | Tamil Nadu | Irrigated | 0.43 | 36.37 |
| | Gujarat | Rainfed | 1.85 | 11.47 |
| Cotton | Gujarat | Irrigated | 2.48 | 57.37 |
| | Maharashtra | Rainfed | 3.53 | 2.70 |

*Sources*: GoI (2010; 2011; 2012).

**Table 2. Profitability in bajra cultivated in irrigated (Gujarat) and less-irrigated (Rajasthan) states of India**

(₹/ha at 1986-87 prices)

| Year | Cost C2 | | VOP | | Profit | |
|---|---|---|---|---|---|---|
| | Gujarat | Rajasthan | Gujarat | Rajasthan | Gujarat | Rajasthan |
| TE 1973-74 | 1843 | 747 | 1631 | 700 | -212 | -47 |
| TE 1983-84 | 2811 | 822 | 2705 | 699 | -106 | -123 |
| TE 1993-94 | 2890 | 1150 | 2839 | 774 | -51 | -376 |
| TE 2003-04 | 3577 | 2021 | 2589 | 1225 | -988 | -796 |
| TE 2010-11 | 4141 | 2204 | 4006 | 1424 | -135 | -780 |
| Range | 1500 to 4700 | 500 to 2500 | 1500 to 4100 | 500 to 1500 | -20 to -1500 | -30 to -1100 |
| CV | 26.28 | 45.55 | 28.30 | 36.55 | 150.21 | 99.21 |

*Source*: Computed using data from CACP (various years).
*Note*: Due to non-availability of data for some years, data from the nearest point were used in the analysis.

Rajasthan, Uttar Pradesh and Gujarat are the three leading producer states of bajra sharing 57 per cent, 10 per cent and 9 per cent of their respective total area. Among these, we selected Rajasthan because of its lower irrigation coverage (4.51%) and Gujarat for its higher irrigation coverage (22.17%). The analysis has shown that at no point of time (triennium averages) during 1971-72 to 2010-11, bajra was profitable even under the irrigated conditions (Table 2) primarily because of a substantial rise in the cost C2, from ₹ 1843/ha in TE 1973-74 to ₹ 4141/ha in TE 2010-11. The bajra crop grown under the rainfed conditions in Rajasthan is also seen to be yielding negative returns. This clearly shows the economic un-viability of bajra in both irrigated and less-irrigated states.

In the past 27 years (Table 3) for which the data were available, the irrigated bajra was profitable in only six years (22.2%). The rainfed cultivators were in a equally pitiable situation with profits being observed in only three out of 33 years (9.1%).

## Maize or Corn

Maize is grown in different environments in India; its area has seen a big jump from 3.16 Mha in 1950-51 to 8.55 Mha in 2010-11 (GoI, 2012). Karnataka, Andhra Pradesh, Maharashtra and Rajasthan together account for about 47 per cent of its total area and about 60 per cent of its total production. To study profitability in maize cultivation, Andhra Pradesh was selected as

**Table 3. Number of years profit reaped or loss incurred by bajra farmers during 1971-72 to 2010-11**

| State | Pre- agrarian crisis period (1971-72 to 1994-95) Ratio VOP to Cost C2 | | Agrarian crisis period (1995-96 to 2010-11) Ratio VOP to Cost C2 | | Entire period of analysis (1971-72 to 2010-11) Ratio VOP to Cost C2 | |
|---|---|---|---|---|---|---|
| | > 1.00 | < 1.00 | > 1.00 | < 1.00 | > 1.00 | < 1.00 |
| Gujarat (Irrigated) | 5/14 (35.71) | 9/14 (64.28) | 1/13 (7.69) | 12/13 (92.30) | 6/27 (22.22) | 21/27 (77.77) |
| Rajasthan (Rainfed) | 3/18 (16.66) | 15/18 (83.33) | 0/15 (0.00) | 15/15 (100.00) | 3/33 (9.09) | 30/33 (90.90) |

*Source*: Computed using data from CACP (various years).
*Note*: The figures within the parentheses are percentage to total number of years.

irrigated state and Rajasthan as less-irrigated state. The analysis showed that maize crop made losses in all the three time points (TE 1993-94, TE 2003-04, TE 2010-11) in the irrigated state, because of the upward movement of cost C2 (Table 4). Under the rainfed condition in Rajasthan, farmers reaped profits in only one (TE 1973-74) out of five time points selected for study.

A look at the entire period of analysis from 1971-72 to 2010-11 reveals that the position of profitability has not changed in maize cultivation. The maize cultivators of Andhra Pradesh have incurred loss in 14 out of 16 years (87.15%) for which cost of cultivation data were available (Table 5). During ACP, the loss was incurred by the farmers in more number of years. Even under rainfed condition, the farmers could get marginal profits in four out of 30 years (13.33%). The analysis has shown that there are no significant differences in the profitability of maize crop cultivated in irrigated and less-irrigated conditions.

## Gram

An important pulse crop considered for analysis was gram which is a major *rabi* crop accounting for about seven per cent of the total foodgrains area. The gram's area has steadily increased from 7.57 Mha in 1950-51 to 9.19 Mha in 2010-11. Madhya Pradesh, Rajasthan, Maharashtra and Uttar Pradesh are the leading producers of gram, together accounting for about 75 per cent of area and about 74 per cent of production in 2010-11. Of these four states, Madhya Pradesh was selected as the irrigated state and Uttar Pradesh as the less-irrigated state for study.

**Table 4. Profitability in maize crop cultivated in irrigated (Andhra Pradesh) and less-irrigated (Rajasthan) states during 1973-74 to 2010-11**

(₹/ha at 1986-87 prices)

| Time point | Cost C2 | | VOP | | Profit | |
|---|---|---|---|---|---|---|
| | Andhra Pradesh | Rajasthan | Andhra Pradesh | Rajasthan | Andhra Pradesh | Rajasthan |
| TE 1973-74 | NA | 1664 | NA | 1867 | NA | 203 |
| TE 1983-84 | NA | 2332 | NA | 1812 | NA | -520 |
| TE 1993-94 | 4522[a] | 2824 | 3469 | 1805 | -1053 | -1019 |
| TE 2003-04 | 5110 | 4283 | 4300 | 2245 | -810 | -2038 |
| TE 2010-11 | 8038 | 4595 | 3401 | 3401 | -6 | -1194 |
| Range | 4100 to 8200 | 1500 to 4800 | 3000 to 9400 | 1400 to 4100 | -900 to -1200 | -100 to -1800 |
| CV | 26.84 | 31.88 | 38.38 | 28.03 | 109.07 | 108.70 |

*Source*: Computed using data from CACP (various years).
*Notes*: [a]relates to TE 1996-97; NA – Data not available and others are same as in Table 2.

**Table 5. Number of years profit reaped or loss incurred by maize farmers during 1971-72 to 2010-11**

| State | Pre- agrarian crisis period (1971-72 to 1994-95) Ratio VOP to Cost C2 | | Agrarian crisis period (1995-96 to 2010-11) Ratio VOP to Cost C2 | | Entire period of analysis (1971-72 to 2010-11) Ratio VOP to Cost C2 | |
|---|---|---|---|---|---|---|
| | > 1.00 | < 1.00 | > 1.00 | < 1.00 | > 1.00 | < 1.00 |
| Andhra Pradesh (Irrigated) | 0/1 (0.00) | 1/1 (100.00) | 2/15 (13.33) | 13/15 (86.66) | 2/16 (12.5) | 14/16 (87.5) |
| Rajasthan (Rainfed) | 4/14 (28.57) | 10/14 (71.42) | 0/16 (0.00) | 16/16 (100.00) | 4/30 (13.33) | 26/30 (86.66) |

*Source*: Computed using data from CACP (various years).
*Note*: The figures within the parentheses are percentage to total number of years.

The analysis revealed that the irrigated gram crop was profitable in all the time points considered for the analysis (Table 6). However, the profit over cost C2 fluctuated in every alternate time point, which is a matter of concern as it depicts instability in the income. The rainfed gram crop (Uttar Pradesh) was also found profitable to the farmers in all the time points. But, the profit over cost C2 was found unsteady throughout the period, the variation being from ₹ 1049/ha during TE 2003-04 to ₹ 505/ha during TE 2010-11. The analysis for the entire period showed that the irrigated gram crop was profitable to farmers in 31 out of 33 years (93.93 %) and higher profits were reaped during ACP (Table 7). In the rainfed gram too, the farmers reaped profits in all the 25 years for which data were available. No significant difference was observed in the number of profitable years in gram cultivation between irrigated and rainfed states (Table 7).

## Groundnut

The oilseed crops are predominantly cultivated under the rainfed condition and the total area under nine oilseed crops has increased from 10.73 Mha in 1950-51 to 27.22 Mha in 2010-11. Groundnut is the major oilseed crop which accounted for about 22 per cent of the total area under oilseeds in 2010-11. The groundnut area has increased moderately from 4.49 Mha to 5.86 Mha during this period. Gujarat, Andhra Pradesh, Tamil Nadu and Karnataka are the major producers of groundnut which together accounted for about 80 per cent of area and about 78 per cent of its production in 2010-11. For the study, Gujarat was selected as the rainfed state as it cultivated groundnut with irrigation coverage of 11.47 per cent and Tamil Nadu was selected as the irrigated state because it cultivated this crop with the irrigation coverage of

**Table 6. Profitability in gram crop cultivated in irrigated (Madhya Pradesh) and less-irrigated (Uttar Pradesh) states**

(₹/ha at 1986-87 prices)

| Time point | Cost C2 | | VOP | | Profit | |
|---|---|---|---|---|---|---|
| | Madhya Pradesh | Uttar Pradesh | Madhya Pradesh | Uttar Pradesh | Madhya Pradesh | Uttar Pradesh |
| TE 1973-74 | NA | NA | NA | NA | NA | NA |
| TE 1983-84 | 1877 | 2790 | 2504 | 3196 | 627 | 406 |
| TE 1993-94 | 3045 | NA | 3441 | NA | 396 | NA |
| TE 2003-04 | 3572 | 3769 | 4306 | 4818 | 734 | 1049 |
| TE 2010-11 | 3553 | 4425 | 4287 | 4930 | 734 | 505 |
| Range | 1300-4100 | 2500-4300 | 1200-5500 | 2800-6700 | 100-6700 | 100-2400 |
| CV | 27.70 | 17.46 | 30.57 | 21.89 | 61.21 | 79.59 |

*Source*: Computed using data from CACP (various years).
*Notes*: NA – Data not available and others are same as in Table 2.

**Table 7. Number of years profit reaped or loss incurred by gram farmers during 1971-72 to 2010-11**

| State | Pre- agrarian crisis period (1971-72 to 1994-95) Ratio VOP to Cost C2 | | Agrarian crisis period (1995-96 to 2010-11) Ratio VOP to Cost C2 | | Entire period of analysis (1971-72 to 2010-11) Ratio VOP to Cost C2 | |
|---|---|---|---|---|---|---|
| | > 1.00 | < 1.00 | > 1.00 | < 1.00 | > 1.00 | < 1.00 |
| Madhya Pradesh (Irrigated) | 16/17 (94.11) | 1/17 (5.88) | 15/16 (93.75) | 1/16 (6.25) | 31/33 (93.93) | 2/33 (6.06) |
| Uttar Pradesh (Rainfed) | 10/10 (100.00) | 0/9 (0.00) | 15/15 (100.00) | 0/15 (0.00) | 25/25 (100.00) | 0/25 (0.00) |

*Source*: Computed using data from CACP (various years).
*Note*: The figures within the parentheses are percentage to total number of years.

36.37 per cent in TE 2010-11. The data presented in Table 8 show that the irrigated groundnut crop was profitable to the farmers in only two time points. With cost C2 rising drastically, the losses varied from ₹ 2244/ ha in TE 2003-04 to ₹ 392/ha in TE 2010-11. Under the rainfed condition, the groundnut cultivators reaped profit in three out of five time points. A relatively large rise in cost C2 under the rainfed condition appears to have affected the profitability of groundnut cultivation.

The plight of groundnut farmers is more or less similar under both irrigated and rainfed states as much of the losses were occurred during ACP (Table 9). Out of 24 years, the irrigated groundnut crop yielded profits to farmers in only seven years (29.16 %). The rainfed groundnut farmers earned profit in 21 out of 33 years (63.63 %). It seems that the rainfed groundnut farmers are relatively better-off than their irrigated counterparts in reaping profit in more number of years.

**Cotton**

Cotton is an important commercial crop of the country and is cultivated predominantly under the rainfed condition. Its area has increased tremendously after the introduction of Bt varieties, from 5.88 Mha in 1950-51 to 11.24 Mha in 2010-11. About 80 per cent of area and production were from Gujarat, Andhra Pradesh, Maharashtra and Punjab in 2010-11. Maharashtra and Gujarat being the two largest cotton cultivating states were chosen for the study. Maharashtra was considered as rainfed and Gujarat as irrigated state for the study.

**Table 8. Profitability in groundnut crop cultivated in irrigated (Tamil Nadu) and less-irrigated (Gujarat) states, TE 1973-74 to TE 2010-11**

(₹/ha at 1986-87 prices)

| Time point | Cost C2 | | VOP | | Profit | |
|---|---|---|---|---|---|---|
| | Tamil Nadu | Gujarat | Tamil Nadu | Gujarat | Tamil Nadu | Gujarat |
| TE 1973-74 | 3290 | 2615 | 3303 | 2848 | 13 | 233 |
| TE 1983-84 | 4230 | 3959 | 4274 | 3775 | 44 | -184 |
| TE 1993-94 | NA | 3859 | NA | 3692 | NA | -167 |
| TE 2003-04 | 8244 | 5389 | 6000 | 6687 | -2244 | 1298 |
| TE 2010-11 | 6664 | 6252 | 6272 | 6590 | -392 | 338 |
| Range | 2800 to10200 | 2000 to 6700 | 2200 to 8100 | 1500 to 8900 | -500 to -1600 | 80 to 300 |
| CV | 30.71 | 25.74 | 28.90 | 37.35 | 216.63 | 300.34 |

*Source*: Computed using data from CACP (various years).
*Notes*: NA – Data not available and others are same as in Table 2.

**Table 9. Number of years profit reaped or loss incurred by groundnut farmers during 1971-72 to 2010-11**

| State | Pre-agrarian crisis period (1971-72 to 1994-95) Ratio VOP to Cost C2 | | Agrarian crisis period (1995-96 to 2010-11) Ratio VOP to Cost C2 | | Entire period of analysis (1971-72 to 2010-11) Ratio VOP to Cost C2 | |
|---|---|---|---|---|---|---|
| | > 1.00 | < 1.00 | > 1.00 | < 1.00 | > 1.00 | < 1.00 |
| Tamil Nadu (Irrigated) | 4/9 (44.44) | 5/9 (55.55) | 3/15 (20.00) | 12/15 (80.00) | 7/24 (29.16) | 17/24 (70.83) |
| Gujarat (Rainfed) | 12/17 (70.58) | 5/17 (29.41) | 9/16 (56.25) | 7/16 (43.75) | 21/33 (63.63) | 12/33 (36.36) |

*Source*: Computed using data from CACP (various years).
*Note*: The figures within the parentheses are percentage to total number of years.

**Table 10. Profitability in cotton cultivated in irrigated (Maharashtra) and less-irrigated (Gujarat) states, TE 1973-74 to TE 2010-11**

(₹/ha at 1986-87 prices)

| Time point | Cost C2 | | VOP | | Profit | |
|---|---|---|---|---|---|---|
| | Gujarat | Maharashtra | Gujarat | Maharashtra | Gujarat | Maharashtra |
| TE 1973-74 | NA | NA | NA | NA | NA | NA |
| TE 1983-84 | 5801 | 2484 | 6477 | 2609 | 676 | 125 |
| TE 1993-94 | 5131 | NA | 6463 | NA | 1332 | NA |
| TE 2003-04 | 5782 | 6153 | 7046 | 5652 | 1264 | -501 |
| TE 2010-11 | 9040 | 7888 | 14070 | 8855 | 5030 | 967 |
| Range | 2200-9300 | 1600-9300 | 2200-18200 | 1900-11200 | 200-8600 | 100-800 |
| CV | 36.02 | 46.86 | 49.59 | 46.21 | 119.42 | 378.32 |

*Source*: Computed using data from CACP (various years).
*Notes*: NA – Data not available and others are same as in Table 2.

Table 10 shows that the irrigated cotton crop was profitable in all the time points. Although the cost C2 has almost doubled from ₹ 5801/ha in TE 1983-84 to ₹ 9040/ha in TE 2010-11, the profit over cost C2 has increased substantially because of increased value of output in the irrigated state. The rainfed cotton did not provide a respectful profit in any time point. With cost C2 rising abnormally, the cotton farmers of Maharashtra have been struggling to get a steady profit which generally fluctuates every alternate year. This could be one of the reasons as to why the cotton farmers of Maharashtra commit suicide (*see*, GoI, 2007). Besides reaping better profit, the farmers of the irrigated state of Gujarat have reaped profit more number of times as compared to their counterparts in Maharashtra (Table 11). The better irrigated cotton farmers reaped profits in 25 out of 29 years (86.20 %), while rainfed cotton farmers of Maharashtra acquired profits only in 16 out of 24 years (66.70 %). The analysis suggests that the irrigated cotton-growers are relatively better-off over the rainfed cotton-growers in terms of reaping profit.

## Conclusions

The analysis of five important rainfed crops grown under irrigated and rainfed conditions has shown that the farmers have either reaped miniscule profit or suffered losses in cultivating most of the investigated crops. Bajra and maize crops have not been profitable under both irrigated and rainfed conditions. The study has found that most of the losses in the selected cereal crops were incurred during the agrarian crisis period (1995-96 and 2010-11). It is indeed gram that has

**Table 11. Number of years profit reaped or loss incurred by cotton farmers during 1971-72 to 2009-10**

| State | Pre- agrarian crisis period (1971-72 to 1994-95) Ratio VOP to Cost C2 | | Agrarian crisis period (1995-96 to 2010-11) Ratio VOP to Cost C2 | | Entire period of analysis (1971-72 to 2010-11) Ratio VOP to Cost C2 | |
|---|---|---|---|---|---|---|
| | > 1.00 | < 1.00 | > 1.00 | < 1.00 | > 1.00 | < 1.00 |
| Gujarat(Irrigated) | 12/14 (85.71) | 2/14 (14.28) | 13/15 (86.66) | 2/15 (13.33) | 25/29 (86.20) | 4/29 (13.79) |
| Maharashtra(Rainfed) | 8/10 (80.00) | 2/10 (20.00) | 8/14 (57.14) | 6/14 (42.85) | 16/24 (66.66) | 8/24 (33.33) |

*Source*: Computed using data from CACP (various years).
*Note*: The figures within the parentheses are percentage to total number of years.

yielded appreciable profits in both irrigated and rainfed regions. The profitability of the rainfed gram has been found at par with that of the irrigated one. A most surprising result that has emerged from the study on gram is that much of the profits have taken place during ACP. The profits have been found insignificant in groundnut and cotton in both irrigated and rainfed regions. It is the soaring cost of cultivation that has dispirited the farmers in reaping appreciable profit.

The empirical results of the study have not completely supported the long held view that 'irrigated crops are more profitable than rainfed crops'. The continued meager earnings from crop cultivation would definitely discourage the farmers from engaging in farming in the future (Kalamkar and Narayanamoorthy, 2003; Swaminathan, 2008). This is also reflected in the recently conducted Situation Assessment Survey (SAS) where 40 per cent of the farmers have reported their desire to quit farming due to poor remuneration (NSSO, 2005; Narayanamoorthy, 2006). A steady flow of remunerative income from the crops will definitely boost the farmers to go for cultivation in the following seasons. Therefore, well-thought out strategies need to be worked out to cut down the cost of cultivation and to improve the value of output so as to increase the profitability of crops not only in the irrigated regions but in the less-irrigated regions as well.

The country's farm sector has been in the grip of an acute crisis in both irrigated and rainfed regions which is the result of lack of profitability from the crops. A viable solution to cut-off the vicious tentacles of this crisis is to provide incentives to the farmers in the form of higher profitability, be it an irrigated farmer or a rainfed farmer. The unabated farm suicides reported from various parts of the country in the recent years also suggest that one-time support like farm loan waiver[3] or enhancement of farm credit in every union budget will in no way resurrect the dwindling status of the farmers. For the farmers, the main issue is of bridging the gap between ever-increasing costs of inputs (labour, fertilizers, pesticides and seeds) and lower incomes for the produce. To mitigate the ongoing uproar in the farming horizon, a reasonable profit margin is the need of the hour. And this can be achieved only by fixing the price of crops in tune with their cost of cultivation (*see*, Narayanamoorthy and Suresh, 2013).

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