

Income Impact Analysis -2010

Bihar



International Development Enterprises (India)



INCOME IMPACT ANALYSIS - BIHAR

Methodology

IDEI carried out an Income Impact study to understand the following issues:

1. Income generated through use of the IDEI promoted technology KB Treadle Pump (KBTP)
2. Land brought under irrigation and cultivation using these technologies
3. Various crops grown and diversity
4. Plot sizes for various crops
5. Quantity sold for each of the crops and prices obtained
6. Cost of cultivation for each of the crops
7. Components of cost of cultivation were also gathered and analyzed
8. Individual crop profitability was analyzed

Present study is based on findings from a random sample of 81 smallholders which is a part of total sample of 996.

Incomes reported are exclusively agricultural earnings through use of KBTP for irrigation. Both gross income and net income after deduction of investments have been recorded for all crops. All cost of cultivation, including labour based and input based costs were gathered. Data on income, investments or any monetary transactions are in ₹. Income mentioned for the state is median value of net annual incomes.

Key Findings

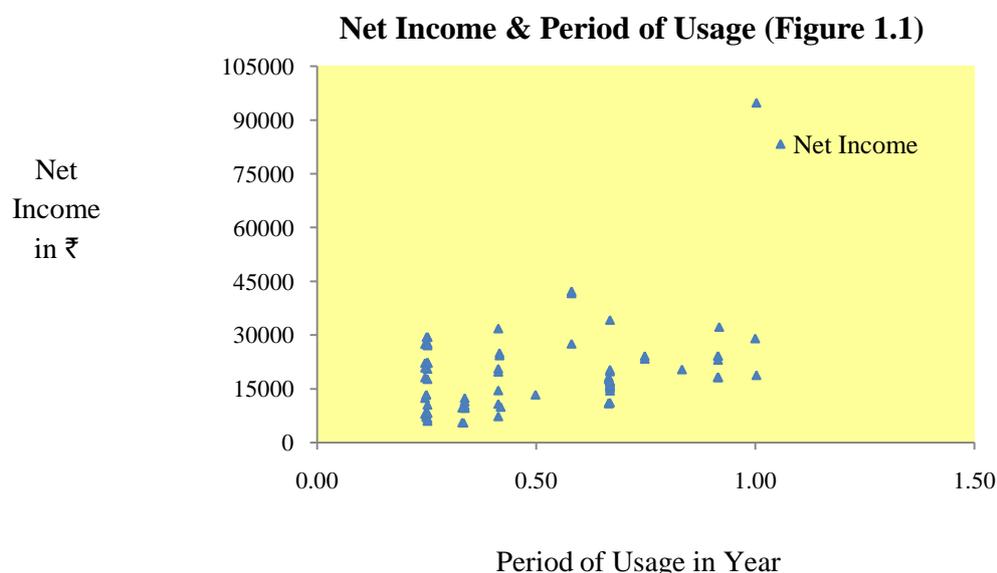
- ✚ Median net annual income for smallholder TP farmers was ₹ 19,640, minimum being ₹16,507.
- ✚ Income was independent of the period of usage of TP, and cropped area as well
- ✚ 89% of the smallholders cultivated high value crops, predominantly vegetables

- ✚ Cost of cultivation was 40% of gross returns from crops on an average
- ✚ Plant nutrients (29.11%), seed material (25.33%) and hiring agricultural equipments (16.74%) were the major cost components
- ✚ 30% of the smallholders cultivated three or more crops for a given period of usage and 34% cultivated two crops
- ✚ 42.3% of crop plots were less than or equal to 0.25 acre and 90.7% less than or equal to 0.5 acre
- ✚ Crop Planning & selection were major determinants of income

Income Pattern

Income and Usage Period

With an objective to understand if period of usage of TP mattered, respondents have been categorised into four groups, i.e. users below six months, 6-12 months, 1-1.5 yr and 1.5-2 yr based on the period they have used the TP. Net income of users during the usage period was analysed to understand if income was proportionate to period of usage. Income was found to be independent of period of usage of TP. Smallholders who earned higher were from all the four categories.



Net income figures during the usage periods were then extrapolated to estimate annual incomes of the smallholders, from their respective cropped areas. Analysis of the income estimates showed that all the customers using TP had a net annual income greater than ₹ 16,000. The lowest net annual income was ₹ 16,507. Median net annual income for the small holders was ₹ 19,640.

Income and Cropping Area

Apart from period of cropping/usage of TP, an attempt was made to understand if the gross cropped area (GCA) was a key determinant to income. GCA here refers to the total area under all crops grown by a farmer in a given period (in which TP is used). Hence GCA as a probable factor was analysed.

GCA for the customers studied varied from as low as 0.1 to 5 acre, depending on factors such as period of cropping, no. of crops, cultivable land available, etc. Net annual incomes from respective cropped areas were extrapolated to get net annual incomes per acre for selected set of smallholders (Figure 1.2).

Net Annual Income per Acre (Figure 1.2)

Net Annual Income Per Acre	% Customers in the Income Category
< ₹ 15,000	18.52%
₹ 15,000 - ₹ 30,000	3.7%
₹ 30,000 - ₹ 50,000	4.94%
> ₹ 50,000	72.84%

Among the smallholders who earned above ₹ 50, 000 per acre annually, more than 96% cultivated a gross area upto 0.5 acre. This hints at the fact that smallholders with just an acre of cropping area can earn potentially well and income is independent of area put to cultivation. Figure 1.3 further explains this.

GCA was categorized into five classes, i.e. less than 0.5 acre, 0.5 to 1 acre, 1 to 1.5 acre, 1.5 to 2 acre and greater than 2 acre. The idea was to study income variations with respect to GCA. Net annual incomes from respective cropped areas were extrapolated to obtain net annual incomes per acre for selected set of smallholders

Net Annual Income per Acre (in ₹) and GCA (Fig 1.3)

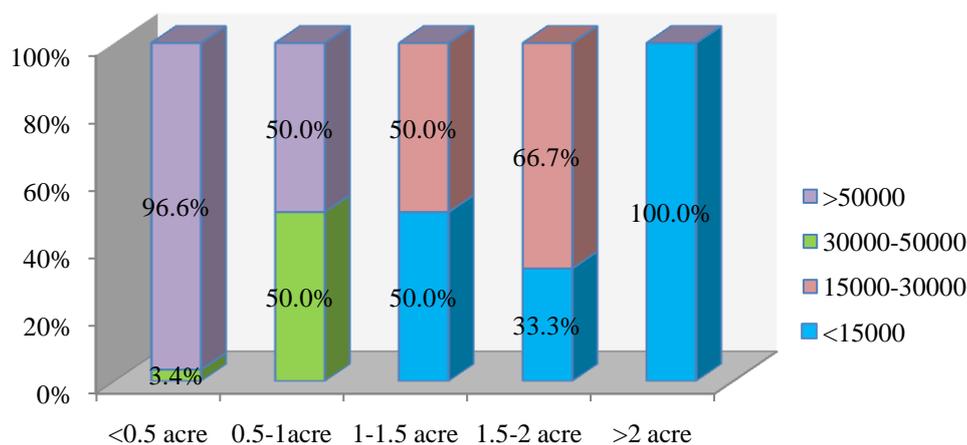


Figure 1.3 shows that most of the smallholders with just 0.5 acre of GCA or even lesser, earned a minimum of ₹ 50,000 per acre annually. In case of smallholders with GCA between 0.5 to 1acre, 50% earned in the range ₹ 30, 000 to ₹ 50, 000 and 50% above ₹ 50, 000. On the contrary smallholders with more than 2 acre were found to earn lesser per acre. Hence GCA was not a determinant for net income per acre.

Smallholder farmers with smaller agricultural lands surpassed those with larger cultivable areas. They usually adopted priority cultivation, need based crop selection, etc. which fetches them higher returns.

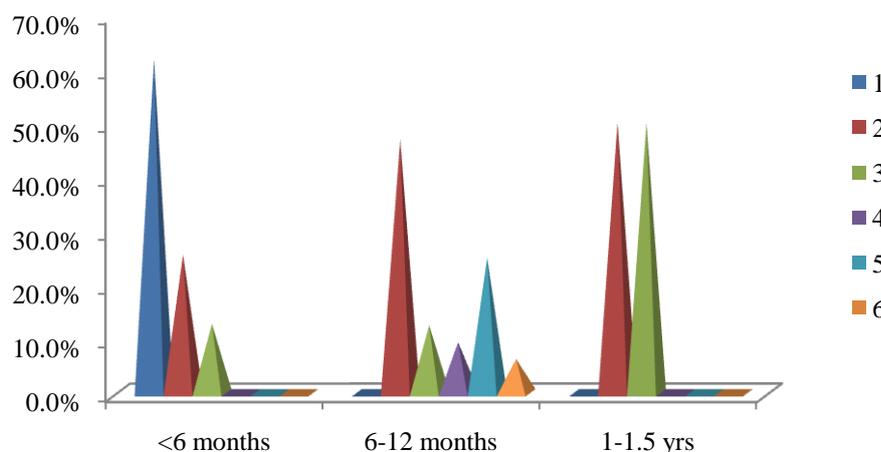
Cropping Pattern

Cropping Intensity

Prior to adoption of treadle pump the smallholders usually practiced rainfed agriculture with limited number of crops. With treadle pump irrigation was not only assured but easier. Hence the users cultivated crops throughout the year, which resulted in higher cropping intensity.

Figure 2.1 explains the total number of crops that were taken up by the smallholders who had used TP for different periods.

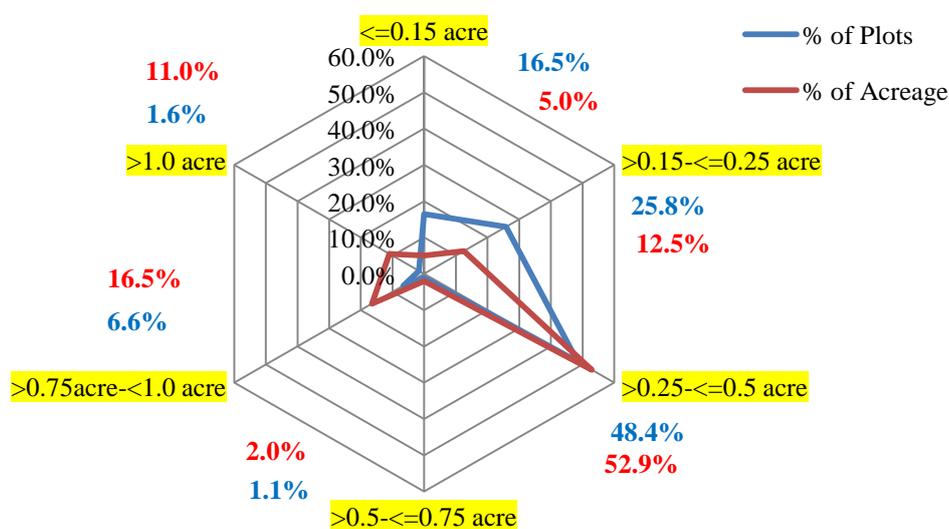
Period of Usage and No. of Crops Grown (Fig. 2.1)



Overall, 35.8 % of the smallholders cultivated a single crop for a given period of usage. Of these all had used TP just for six months or lesser. 34.6% of the smallholders cultivated two crops of which 51.7% had used TP for six months to one year. 29.6% cultivated three or more crops of which 58.6% had used TP for six to eighteen months.

Most of the smallholders, who cultivated larger number of crops, did so in smaller plots in order to take up more number of crops. Selection of different crops was a kind of risk mitigation strategy by these smallholders, to avoid dependability on a single crop, and also to meet the cash needs throughout the year. Approximately 90.7% of the crop plots were less than or equal to 0.5 acre in size (16.5% of the crop plots were smaller than 0.15 acre, 25.8% between 0.15 to 0.25 acre and 48.4% between 0.25 to 0.5 acre), and these plots constituted 70.5% of the total cultivated area studied. Less than 2% of the crop plots were greater than an acre. (Figure 2.2)

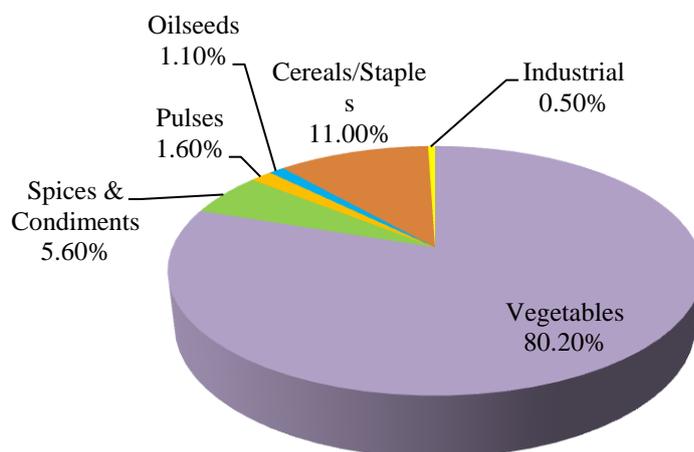
Crop Plot Sizes (Fig. 2.2)



Crop Portfolio

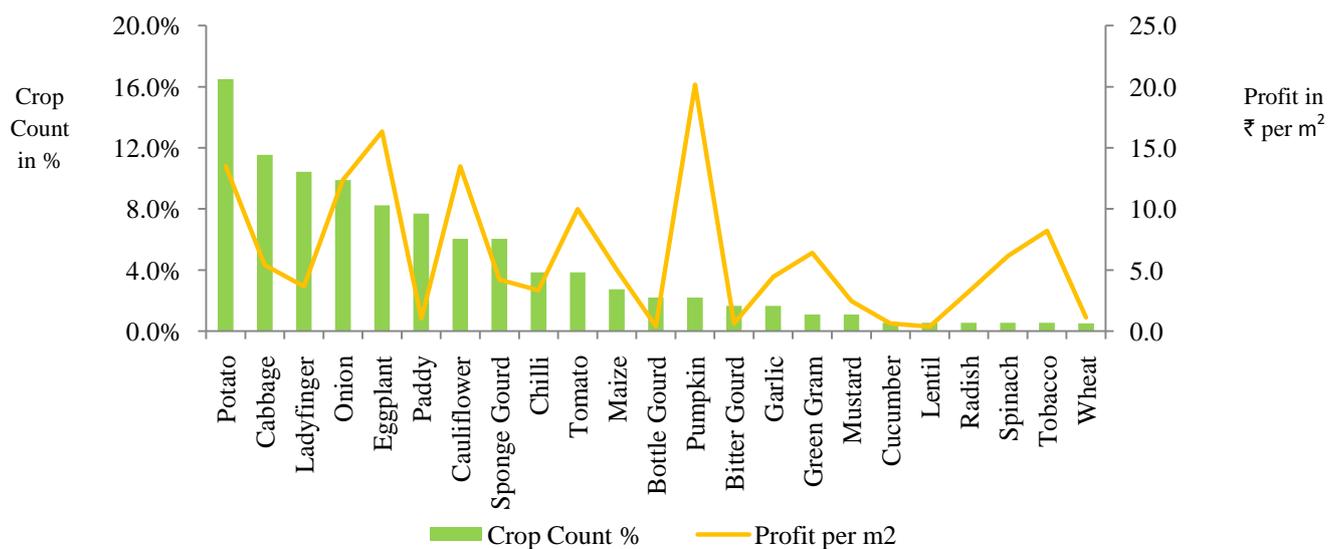
Most of the smallholders cultivated high value crops using treadle pump. Vegetable crops were predominant. Twenty three different crops were grown using TP. Figure 2.3 shows the different category of crops grown using TP.

Crop Categories (Fig. 2.3)



Most popular crops in the region were potato, cabbage, ladyfinger and onion. Crops like pumpkin, eggplant, potato and cauliflower were highly profitable, and also popular except for pumpkin. Few crops namely tobacco and green gram were found to be profitable, though not popular in the region.

Crop Popularity and Profitability (Fig. 2.4)

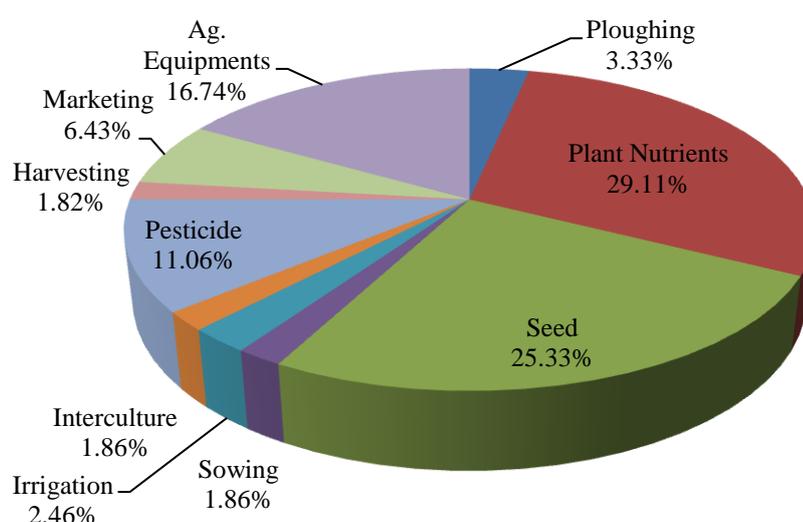


Margins

Cost of Cultivation

Cost of Cultivation of a crop is the total cost incurred by the smallholders in raising a crop and marketing it. So the costs start right from land preparation activities for any given crop. Average cost of cultivation for the region was found to be 40% of the gross returns, which indicates that the small holders made margins upto 60%. All the cost components were studied and categorised into two groups namely labour based and input based. Figure 3.1 explains the various cost components.

Cost Components in Cultivation (Fig. 3.1)

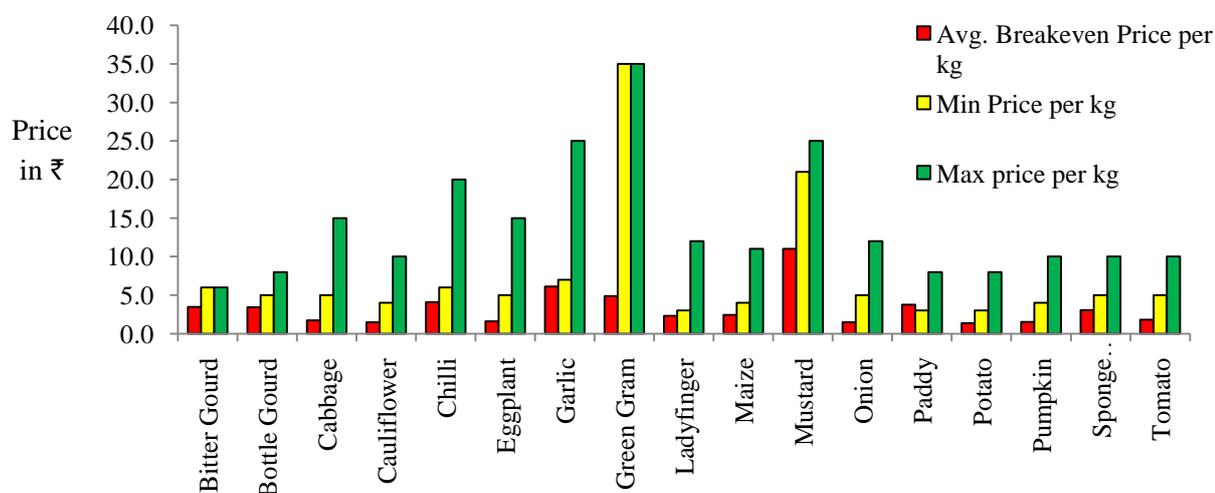


Amongst all components cost incurred on plant nutrients, which includes the cost of fertilizers and manures) was the highest (29.11%) followed by cost on seed (25.33%). It was observed that cost incurred on labour based cultivation components (which include ploughing, sowing, interculture and harvesting) accounted for 9% of CoC.

Selling Price

Prices at which the smallholders sold their produce varied from farmer to farmer for different crops. On an average maximum price obtained for any crop was twice that of minimum price. Garlic, Chilli, cabbage and brinjal were some of the crops for which maximum price fluctuations was observed.

Maximum, Minimum & Average Breakeven Prices (Fig. 3.2)



Breakeven Price

Breakeven Price (BEP) for any agricultural produce is the minimum price a farmer must get so that he recovers all the costs incurred in producing and selling the crop. So any price above BEP ensures profits to the smallholders. For the crops that were grown and sold by the smallholders, selling price was always higher than the BEP. Hence the smallholders made profits even at the minimum selling price. Few farmers, who received higher prices, could do that either because of better quality produce or better market timings. Figure 3.2 shows the minimum & maximum selling prices and average values of BEPs for various crops.

Conclusion

Smallholders in the region now cultivated year round. Increased cropping coupled with selection of high value crops increased the incomes. But that can be further increased if following areas are addressed

- ✚ Cost of cultivation on an average was quite higher for the state. Reducing costs incurred on plant nutrients and seed materials (which together constituted more than 50% of total cost of cultivation) may help smallholders earn higher
- ✚ Reducing the cost of cultivation for specific crops like garlic, bottle gourd, bitter gourd, lentil and paddy in particular (since the crops are taken up by a good number of smallholders) which were found to be much higher than that of others.
- ✚ Information on markets and market prices so that price fluctuations for any commodity is minimum