

Socio-Economic Impact Assessment of Integrated Crop Management in Chilli Growing Areas in Telangana, India

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Abstract

The present study was on Socio-economic impact assessment of integrated crop management in chilli growing areas, which was conducted in Warangal and Kamam districts, the major chilli producing areas in Telangana. For the study, 30 ICM, 30 IPM and 30 Non-IPM farmers were randomly selected from two districts. Education and farm size were positively related to the adoption of ICM or IPM practices, similarly, the area under chilli was also positively related with the total size of land holding. The cost of cultivation of ICM, IPM and Non IPM farmers in Gudepally village was ₹ 259188.98, ₹ 249834.39 and ₹ 243611.11 hectare⁻¹, respectively. Whereas the same in Damaracherla village was ₹ 237196.15, ₹ 233786.73 and ₹ 224430.04 respectively. The gross returns hectare⁻¹ of chilli cultivation for ICM, IPM and Non-IPM farmers were ₹ 463145.24, ₹ 456886.11 and ₹ 318600 respectively in Gudepally village. Whereas, in case of Damaracherla village the same were ₹ 413472.22, ₹ 408100.00 and ₹ 342450.00 hectare⁻¹, respectively. Return on investment for ICM, IPM and Non-IPM farmers were 1.79, 1.83 and 1.31 respectively in Gudepally village. While the same in case of Damaracherla village was 1.74, 1.75 and 1.53 respectively for ICM, IPM and Non-IPM farmers. The overall analysis of the study revealed a positive impact of adoption of ICM and IPM technologies in chilli cultivation in association with ITC. Development of suitable farm machinery and equipment and provision of the same to the needy farmers at affordable prices. The state agricultural department should take initiatives, extension activities and trainings for promotion of the ICM or IPM technologies.

1. Introduction

India is the largest producer, consumer and exporter of chilli, which contributes to about 40% of total world production, followed by China and Pakistan. It is estimated that India produced 1378400 tonnes of chillies from an area of 787530 hectares in 2012-13 (Spice Board of India, 2014). During 2013-14, a total of 8,17,250 tons of spices and spice products valued Rs.13735.39 crore (US\$2267.67 Million) has been exported from the country (Spice Board of India, 2014). Integrated Crop Management (ICM) is a pragmatic approach to the production of crops, which combine a range of complementary methods to reduce a pest population below its economic injury level while minimising impacts on other components of the agro-ecosystem, thus taking into account the needs of producers, wider society and the environment (Kogan, 1998). IPM is the integral part of ICM. Insect pests are well recognized as

one of the major limiting factors in enhancing and sustaining agricultural production in India. India loses about 30% of its crops every year due to pests and diseases (Sharma and Rao, 2012). The production losses have shown an increasing trend over the years. In 1983, the losses due to insect pests were estimated worth Rs 6,000 crores (Rao and Murthy, 1983) which increased to Rs 20,000 crores in 1993 (Jayaraj, 1993) and to 29,000 crores in 1996 (Dhaliwal and Arora, 1996). Recent interactions with the farming communities revealed that 93% of the farmers in India had adopted chemical control. Majority of the farmers (73%) initiate the plant protection based on the first appearance of the pest, irrespective of their population, crop stage, and their damage relationships. The cost of plant protection on various crops ranged from 7 to 40% of the total crop production cost (Rao and Rao, 2010). It is adopted mainly in Cotton, Chilli, Plantation crops, Rice and Pulses.

Indian Tobacco Company (ITC) shares a century long



relationship with the farming community reaching directly to the farm gate, linking the farming community to the global business circuits and international best practices. ITC's foray into the spices business, through its Agri Business Division-International Limited (ABD-ILTD). Spices Crop Development Programme of ITC Limited has transformed from a limited Integrated Pest Management (IPM) approach to sustainable crop production practices, which is called Integrated Crop Management (ICM). The main objective of the study is to study the socio-economic impact assessment of integrated crop management in chilli growing areas in Telangana.

2. Material and Methods

Two villages from two districts i.e., Gudepally village from Warangal district and Damaracherla village from Khammam district were purposively selected wherein the ITC's Integrated Crop Management practices [crop rotations, appropriate cultivation techniques, careful choice of seed varieties, minimum reliance on artificial inputs such as fertilisers, pesticides and fossil fuels, maintenance of the landscape, social aspects and the enhancement of wildlife habitats] are largely adopted by chilli growing farmers, with the sample size of 90 (30 farmers adopting ICM, 30 farmers adopting IPM but not ICM and 30 farmers neither adopting IPM nor ICM) were randomly selected. The necessary observations were socio-economic aspects of sample farmers, such as family size and composition, education level, land holdings, income, source of irrigation, farm machinery and equipment, livestock or animal husbandry etc. The details pertaining to chilli cultivation namely the total cost of production and marketing which was broadly categorized into production cost, post harvest management cost and marketing cost.

Which were collected through pre tested schedules and secondary data from Revenue Office or Mandal Revenue Office, Regional Agricultural Research Station Warangal and the office of ITC. Analysis of the collected data was done by working out simple averages, % and partial budgeting technique.

3. Results and Discussion

The total literacy of the ICM, IPM and Non-IPM farmers was 86.66, 93.33 and 73.33% respectively presented in Table 1. The % of illiterate sample farmers was comparatively more than the other two groups i.e., ICM and IPM. It could be concluded that the level of education will have a significant role in ready adoption of innovative agricultural practices by the farmers.

Among the ICM, IPM and Non-IPM sample farmers, 46.67, 40 and 33.33% of the farmers were in the age group of 31-40 years. Majority of the ICM farmers i.e., 56.67% had small size of family, 76.67% of IPM and 73.33% of the Non-IPM farmers

had small size family, indicating the spread of nuclear and small family culture even in rural areas and reduced availability of farm family labour (Table 1).

The average size of holding of ICM, IPM and Non-IPM farmers was 4.4, 4.6 and 2.54 ha respectively were presented in the Table 1. The study has found a positive relationship between farm size and adoption of ICM or IPM practices. The results are comparable with the results of Singh et al. (2008). The average area under chilli cultivation was 1.51, 1.74 and 0.91 ha for ICM, IPM, Non-IPM chilli farmers respectively. On an average about one third of the total land holding of all three category farmers was under chilli cultivation. The area under chilli was also positively related with the total size of land holding.

It is evident from Table 1 that the sample farm households show maximum preference to hold bullocks (31.90%). This was followed by buffaloes (23.59%) and sheep and goat (21.72%). The number livestock held by ICM and IPM farmers was more than the Non-IPM farmers.

On an average in all three groups of sample farm families, there was one male and one female labour available for farm work irrespective of the size of the holding (Table 1). This indirectly indicates the increasing scope for farm mechanization in future.

The average total cost of cultivation hectare⁻¹ of chilli was ₹ 259188.98, ₹ 249834.39 and ₹ 243611.11 respectively under ICM, IPM and Non-IPM farms in Gudepally village. Whereas the same in Damaracherla village was ₹ 237196.15, ₹ 233786.73 and ₹ 224430.04 respectively. A significant difference between ICM and Non-IPM was observed mainly because ICM farmers incurred more variable cost particularly on human labour than Non-IPM farmers. This is because ICM or IPM farmers have higher awareness on minimum standards of cleanliness. These observations are comparable with the results of Reddy et al. (2011) and similar results were also reported by Rao et al. (2007).

The average yield of ICM, IPM and Non-IPM farms in Gudepally village was 65.67, 65.17 and 49.83 q ha⁻¹. Whereas, in Damaracherla the average yield was 51.67, 51.50 and 48.23 q ha⁻¹ respectively. The gross returns hectare⁻¹ of chilli cultivation for ICM, IPM and Non-IPM farmers were ₹ 463145.24, ₹ 456886.11 and ₹ 318600 respectively in Gudepally village. Whereas, in case of Damaracherla village the same were ₹ 413472.22, ₹ 408100.00 and ₹ 342450.00 hectare⁻¹, respectively. The returns from the ICM and IPM sample farms was significantly higher than the Non-IPM farmers, because the ICM and IPM farmers realized more yields and received maximum price to their produce by ITC.

Return on investment for ICM, IPM and Non-IPM farmers



were 1.79, 1.83 and 1.31 respectively in Gudepally village. While the same in case of Damaracherla village was 1.74, 1.75 and 1.53 respectively for ICM, IPM and Non-IPM farmers. These results were similar with the findings of Reddy et al. (2011) and Pawar (1995).

The estimated net change in profit due to adoption of ICM and IPM techniques worked out using partial budgeting technique was found to be significantly higher. The net change in the profit obtained by the ICM farmers in Gudepally village was observed to be ₹ 132729.5 hectare⁻¹ due to adoption of ICM practices in their farms as against the practices adopted by the Non-IPM farmers. The same in case of ICM farmers of Damaracherla village was found to be ₹ 61029.17 hectare⁻¹. The net change in profit gained by IPM farmers in Gudepally village was ₹ 132926.1 hectare⁻¹ due to adoption of IPM practices. The same in case of IPM farmers of Damaracherla village was found to be ₹ 59411.99 hectare⁻¹.

3.1. Overall economics of chilli production and marketing

In abstract, the overall economics of chilli production and marketing by ICM, IPM and Non-IPM farmers in Gudepally village was furnished in Table 2 (Figure 1).

The total cost of production and marketing was broadly categorized into production cost, post harvest management cost and marketing cost. The share of production cost was maximum (>90%) in all the three farm categories. This was followed by post harvest management cost and marketing cost in case of ICM and IPM farms. Whereas, the same was followed by marketing cost (8.52%) and post harvest management cost (1.47%) in Non-IPM farms. These results once again clearly indicated that the ICM and IPM farmers who were tied with ITC benefited more by realizing higher yields, reduced cost of marketing and a higher premium price received for their produce when compared to the Non-IPM farmers.

The economics of chilli production and marketing by ICM, IPM and Non-IPM farms in Damaracherla village is presented in Table 3 and Figure 2. Similar to the farms of Gudepally

Table 1: Social characteristics

Sl. No.	Particulars	Respondents		
		ICM	IPM	Non-IPM
1	Illiteracy (%)	86.66	93.33	73.33
2	Age Group (Years)			
a	20-30	0 (0.00)	3 (10.00)	5 (16.67)
b	31-40	14 (46.67)	12 (40.00)	10 (33.33)
c	41-50	7 (23.33)	8 (26.67)	8 (26.67)
d	50 above	9 (30.00)	7 (23.33)	7 (23.33)
3	Family size (Number)			
a	Small (<4)	17 (56.67)	23 (76.67)	22 (73.33)
b	Medium (4-5)	12 (40.00)	7 (23.33)	8 (26.67)
4	Size of land holdings (Hectare)			
a	Marginal (<1ha)	0 (0.00)	1 (3.33)	4 (13.33)
b	Small (1-2 ha)	2 (6.67)	1 (3.33)	7 (23.33)
c	Medium (2-4 ha)	14 (46.67)	11 (36.67)	14 (46.67)
d	Large (4-10 ha)	14 (46.67)	17 (56.67)	5 (16.67)
e	Average land holding (ha)	4.4	4.6	2.54
5	Acreage under Chilli			
a	Absolute area (ha)	1.51	1.74	0.91
b	% to average size of holding	34.32	37.83	35.83
6	Livestock population (Number)			
a	Buffaloes	27 (20.93)	23 (18.70)	38 (31.40)
b	Bullock	52 (40.31)	52 (42.28)	15 (12.40)
c	Sheep or Goat	1 (0.78)	30 (24.39)	50 (41.32)
7	Average availability of family labour household ⁻¹ (Number)			
a	Men	1.23	1.20	1.20
b	Women	1.20	1.10	1.30

Note: Figures in parenthesis are %ages to their respective total



Table 2: Overall economics of chilli production and marketing in Gudepally village

Sl. No.	Item	Chilli cultivation (₹ ha ⁻¹)			Chilli production (₹ Q ⁻¹)		
		ICM	IPM	Non-IPM	ICM	IPM	Non-IPM
1	Returns	463145.24	456886.11	318600.00	7052.97	7011.04	6393.31
2	Production cost	259188.98	249834.39	243611.11	3947.04	3833.78	4888.52
		(95.18)	(95.51)	(86.55)	(95.18)	(95.51)	(86.55)
	ROI(1÷2)	1.79	1.83	1.31	1.79	1.83	1.31
3	Post harvest management cost	9726.68	8522.31	14800.33	148.12	130.78	297.00
		(3.57)	(3.26)	(5.26)	(3.57)	(3.26)	(5.26)
4	Marketing cost	3392.34	3214.67	23049.41	51.66 (1.25)	49.33 (1.23)	462.53
		(1.25)	(1.23)	(8.19)			(8.19)
5	Total cost (2+3+4)	272308.00	261571.37	281460.85	4146.82	4013.88	5648.04
		(100)	(100)	(100)	(100)	(100)	(100)
	ROI (1÷5)	1.70	1.75	1.13	1.70	1.75	1.13

Note: Figures in parenthesis are %ages to their respective totals

Table 3: Overall economics of chilli production and marketing in Damaracherla village

Sl. No.	Item	Chilli cultivation (₹ ha ⁻¹)			Chilli production (₹ Q ⁻¹)		
		ICM	IPM	Non-IPM	ICM	IPM	Non-IPM
1	Returns	413472.22	408100.00	342450.00	8002.69	7924.27	7100.35
2	Production cost	237196.15	233786.73	224430.04	4590.89	4539.55	4653.33
		(94.35)	(94.77)	(93.05)	(94.35)	(94.77)	(93.05)
	ROI (1÷2)	1.74	1.75	1.53	1.74	1.75	1.53
3	Post harvest management cost	10082.34	9360	13610.77	195.14	181.75	282.21
		(4.01)	(3.79)	(5.64)	(4.01)	(3.79)	(5.64)
4	Marketing cost	4132.60	3529.30	3150.87	79.99	68.53	65.33
		(1.64)	(1.43)	(1.31)	(1.64)	(1.43)	(1.31)
5	Total cost (2+3+4)	251411.09	246676.03	241191.68	4866.02	4789.83	5000.86
		(100)	(100)	(100)	(100)	(100)	(100)
	ROI (1÷5)	1.64	1.65	1.42	1.64	1.65	1.42

Note: Figures in parenthesis are %ages to their respective totals

village, here also in Damaracherla village the share of the production cost was maximum, followed by the post harvest management cost and marketing cost in all three farm categories. It was clear that ICM and IPM farmers who were in association with ITC were more benefited than the Non-IPM farmers. All sample farmers in Damaracherla village sold their produce in the field itself to the ITC and other organizations. Therefore marketing cost was less to all of them compared to Gudepally village.

In Gudepally village, the post harvest management cost of chilli cultivation hectare⁻¹ was ₹ 9726.68, ₹ 8522.31 and ₹ 14800.33 under ICM, IPM and Non-IPM farms respectively. The same was ₹ 10082.34, ₹ 9360 and ₹ 13610.77 hectare⁻¹ under ICM, IPM and Non-IPM farms respectively in Damaracherla village. The difference in post harvest management costs between ICM or IPM and Non-IPM farmers was because of nil incurrence of bag cost by ICM or IPM farmers who tied up with ITC.

Total marketing cost for ICM, IPM and Non-IPM farmers in Gudepally village was ₹ 3392.34, ₹ 3214.67 and ₹ 23049.41 hectare⁻¹, respectively. Whereas it was ₹ 4132.60, ₹ 3529.30 and ₹ 3150.87 hectare⁻¹, respectively in Damaracherla village. Less incurrence of marketing costs by ICM or IPM farmers in the Gudepally village was because the entire produce was sold to ITC in the field itself.

According to the sample farmers, the increase in quality of the produce is in the form of increase in colour, fruit size and reduction in discolouration of the produce, was mainly due to usage of harmless non synthetic chemicals (high cost), which are recommended by ITC. observations are comparable with the results of Varghese and Giraddi (2005).

The ICM and IPM farmers spending the increased income towards children's education as the most important expenditure. The various facilities provided by ITC include protective clothing for farmers spraying pesticides, trainings and meetings

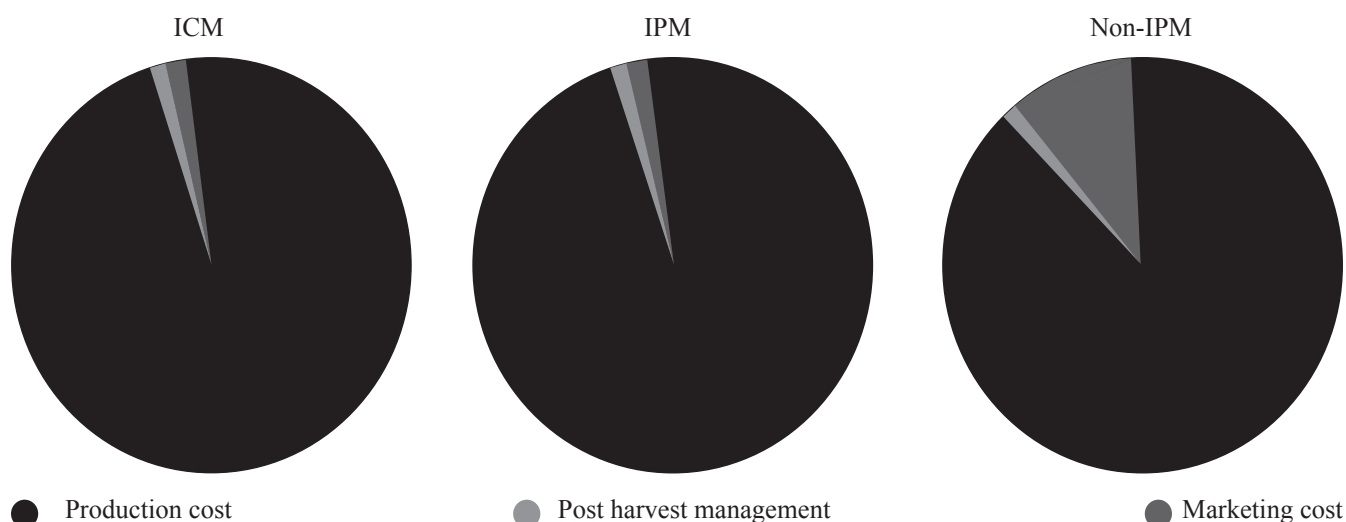


Figure 1: Overall economics of chilli production and marketing in Gudepally village

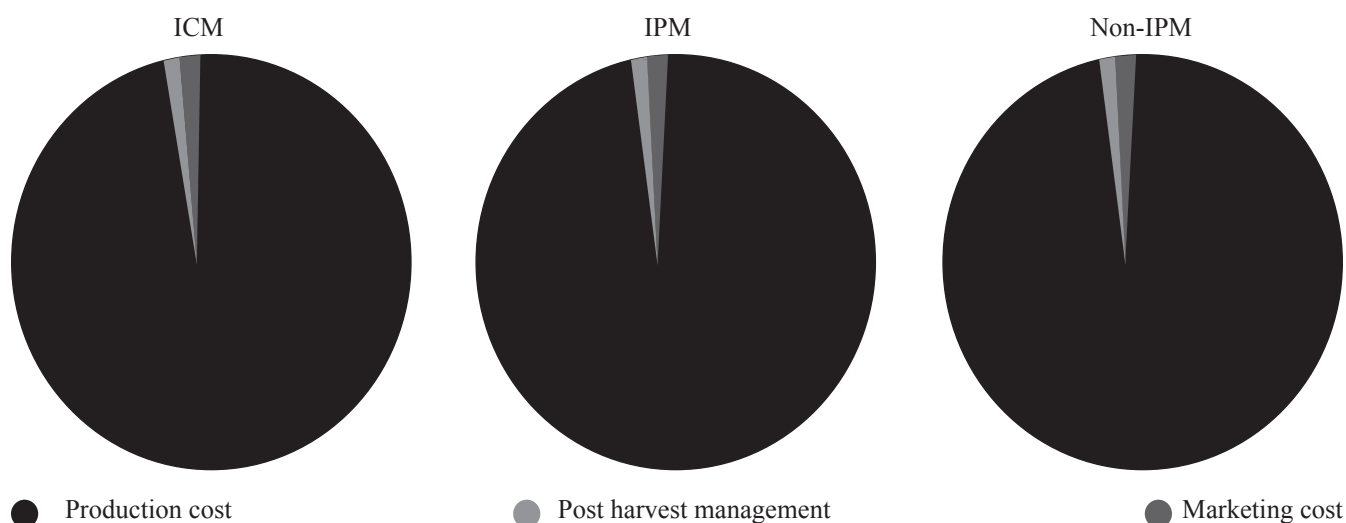


Figure 2: Overall economics of chilli production and marketing in Damaracherla village

to the sample farmers, organization of health camps, creation of infrastructural facilities in the school, supply of bio kit, trunk box, pheromone traps and yellow sticks etc. found as encouraging sign of social improvement in the villages selected by ITC for adoption of its ICM and IPM technologies.

3.2. Policy implications

- The problem of high requirement of labour and shortage of the same in villages for adoption of ICM practices can overcome by development of suitable farm machinery and equipment and provision of the same to the needy farmers at affordable prices.
- All chilli growers in a village can form in to a commodity group or society and have the required farm machinery and equipment for the entire group use at reasonable rents.
- As the adoption of ICM and IPM technologies are most profitable, the state agricultural department should take

initiatives for further promotion of the same through their wide spread extension activities.

- Presently, ITC is serving very limited area particularly with regard to ICM in chilli. The extension of its services to entire chilli area in the state is highly desirable for which the government may also support.

4. Conclusion

The adoption of ICM and IPM technologies were found to be more profitable in chilli cultivation. Initiations are taken by ITC, for social and economical improvement of the sample farmers. The overall analysis of the study revealed a positive impact of adoption of ICM and IPM technologies in chilli cultivation in association with ITC.

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