

# SHARE OF IPM COMPONENTS INVOLVED IN PADDY PLANT PROTECTION AT DIFFERENT VILLAGES OF DHAMTARI DISTRICT IN CHHATTISGARH

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**Abstract:** The study was conducted at the prone area of different villages in Dhamtari district. During 2009, the average cost of IPM components involved with respect to paddy plant protection was ranged from Rs. 47.94 to 1931.21. The maximum cost of the chemical practices (Rs. 1931.21) was recorded followed by cultural practices (Rs. 2396.89) and minimum (Rs.47.94) in biological practices with the cost of share was 68.92, 20.30 and 1.71 percent, respectively. Whereas, during 2010, the Average cost of IPM components was ranged from Rs. 109.07 to 2520.92. The maximum cost of the chemical practices (Rs. 2520.92) was recorded followed by cultural practices (Rs. 769.26) and minimum (Rs.109.07) in biological practices with the cost of share was 63.28, 13.54 and 3.46 percent, respectively. Pooled cost of paddy plant protection was ranged from Rs. 109.07 to 2520.92. The maximum cost of the chemical practices (Rs. 2520.92) was recorded followed by cultural practices (Rs.769.26) and minimum (Rs. 109.07) in biological practices with the cost of share was 68.85, 12.56 and 2.98 percent, respectively. Descending order of the average cost of different practices of IPM components can be ranked as biological practices < physical practices < cultural practices < chemical practices. On the basis of information collected from the contact farmer through personal interview, some possible reasons comes out which may be the maximum respondents use of chemical practices on paddy cultivation which causes several problems such as development of insecticide resistance, environmental pollution and undesirable effects on non-target organisms.

**Keywords:** Cost of paddy cultivation, Plant protection cost, Cost of IPM component, Share of IPM cost in Dhamtari district

## INTRODUCTION

Rice is the main food of the largest population of the World. About 90 % rice in the world is grown and consumed by the population of the Asian countries which constitute 58 % population of the World (Chowdhury *et al.*, 2014). The pests which survived, build-up faster because of either the absence of natural enemies or very low populations which were ineffective in preventing build-up of hopper population (Kulshreshtha and Kalode, 1976). The continuous use of insecticides has destroyed the natural equilibrium between *N. lugens* and its natural enemies in India. In Asia, India has the largest area under the rice accounting for 28.5 per cent of the global rice area. Singh *et al.*, (2004) they examined the pattern of pesticide use in paddy cultivation and assessed the economic and environmental impact of adaptation of IPM practices in paddy in Haryana. Partial adoption of different IPM practices results in higher net return and reduced unit cost of production have been observed under IPM practices. The study of potential IPM farmer cooperators in Laguna, Rola *et al* (1988) found that about 31% of respondents thought that all insects are enemies of rice. However, a few farmers identified spider, dragonfly, and grasshopper as natural enemies of rice pests. Most farmers (80%) spray when they see these insects because they believe that the crop will be damaged. Most farmers (73.3%) spray as needed, when they feel that insects may damage their crop, but their idea of need was not related to any economic threshold. The cost incurred and returns realized from

pesticide use were worked out to Rs 2054.30 ha<sup>-1</sup> as reported by Shende, N. V. and Bagde, N. T. (2013). It is observed that 31.67 per cent farmers were applied one spray of weedicide. The application of weedicides was not so common in the sample area. These farmer were applied weedicides might be due to unavailability of labour or high wage rate for weeding. Sarkar *et al.* (2013) reported that the magnitude of crop loss due to pests, disease and weed infestation in paddy is very high. The actual production with attack is varied from 19.36 quintal to 20.88 quintal per acre. The overall loss with attack has been found to be 3.54 quintal per acre. Similarly, the overall normal production without attack is 23.52 quintal per acre. However, the percentage loss over normal production is less (15.05 per cent) than that of percentage loss over actual production.

## MATERIAL AND METHOD

The study was conducted at the prone area of different villages in Dhamtari. The practices applied by the farmers related to the share of IPM components over the years in each of the village during *kharif* crop season. There were ten each village in the Dhamtari (*viz.*, Medka, Kuhkuha, Bharda, Paraswani, Dahdaha, Shivnikala, Ravanguna, Bakni and Tenwari) and Janjgir-Champ districts (*viz.*, Satrelimala, Tamar, Portha, Dongiya, Jetha, Mudabhata, Parsadakala, Dumarपाली, Deragarghand Dorki villages) selected for the study. In each village, ten respondents were selected randomly in potential growing area during paddy cultivation in

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the year 2009 and 2010. The interview schedule was formulated on the basis of objectives framed out in "English" after thorough studies and discussion with the expert prior to conduct interviews. Interview schedule was performed with the respondents in "Hindi" through proper discussion and easy response. Tools and techniques were adopted on the personal interview in collecting data with respondents on their observations/ experiences. Respondents were interviewed through personal interview technique with the assurance that information given by them would be kept confidential without complications in the most formal and friendly atmosphere. The cost of IPM components data was processing and statistical framework used to calculate standard method. The collected data were tabulated into the coding sheet and then appropriate statistical techniques were applied for analysis of data according to objectives as suggested by Cochran and Cox (1957).

## RESULT AND DISCUSSION

The share of IPM components involved with respect to cost incurred per ha in paddy plant protection at different villages of Dhamtari district during 2009 and 2010 are presented in table- 1, 2, & 3 and fig.- 1, 2 & 3.

### Cultural practices

During 2009, cost of the cultural practices ranged from Rs. 411.45 to 709.57. The maximum cost of cultural practices (Rs.709.57) was noticed in village V<sub>5</sub> followed by village V<sub>8</sub> (Rs.676.00) with the minimum (Rs.411.45) in village V<sub>4</sub>. During 2010, the cost was ranged from Rs. 327.45 to 1682.67. The maximum (Rs.1682.67) was recorded in village V<sub>3</sub> followed by village V<sub>6</sub> (Rs.1514.04) with the minimum (Rs.327.45) in village V<sub>1</sub>. On the basis of two years, the cost of cultural practices was ranged from Rs. 368.58 to 1171.97. The maximum (Rs.1171.97) was recorded in village V<sub>3</sub> followed by in village V<sub>6</sub> (Rs.1070.98) with the minimum (Rs.368.58) in village V<sub>1</sub>.

### Physical practices

District, during 2009, cost of the physical practices ranged from Rs. 0.00 to 460.77. The maximum cost of the physical practices (Rs.460.77) was recorded in village V<sub>9</sub> followed by in village V<sub>2</sub> (Rs.390.04) with the minimum (Rs.37.10) in village V<sub>4</sub> while village V<sub>1</sub> not adopted any physical practices. During 2010, the cost was ranged from Rs. 45.55 to 652.35. The maximum (Rs.652.35) was recorded in village V<sub>5</sub> followed by in village V<sub>9</sub> (Rs.354.18) with the minimum (Rs.45.55) in village V<sub>4</sub>. On the basis of two years, the cost was ranged from Rs. 69.05 to 867.43. The maximum (Rs.867.43) was recorded in village V<sub>6</sub> followed by in village V<sub>3</sub> (Rs.842.10) with the minimum (Rs.69.05) in village V<sub>4</sub>.

### Biological practices

During 2009, cost of the biological practices ranged from Rs. 0.00 to 147.26. The maximum cost of the biological practices (Rs.147.26) was noticed in village V<sub>3</sub> followed by in village V<sub>6</sub> (Rs.96.15) with the minimum (Rs.89.43) in village V<sub>10</sub> while no costs were recorded in village V<sub>1</sub>, V<sub>2</sub>, V<sub>5</sub> and V<sub>8</sub>, respectively. During 2010, the cost was ranged from Rs. 0.00 to 560.00. The maximum (Rs.560.00) was recorded in village V<sub>3</sub> followed by village V<sub>6</sub> (Rs.364.00) with the minimum (Rs.294.00) in village V<sub>10</sub> while no costs were recorded in village V<sub>1</sub>, V<sub>2</sub>, V<sub>5</sub> and V<sub>8</sub>, respectively. On the basis of two years, the cost was ranged from Rs. 0.00 to 353.63. The maximum (Rs.353.63) was recorded in village V<sub>3</sub> followed by village V<sub>6</sub> (Rs.230.08) with the minimum (Rs.41.36) in village V<sub>7</sub>.

### Chemical practices

During 2009, cost of the chemical practices was ranged from Rs. 1220.57 to 2649.11. The maximum cost of the chemical practices (Rs. 2649.11) was recorded in village V<sub>5</sub> followed by village V<sub>8</sub> (2396.89) with the minimum Rs.1220.57) in village V<sub>4</sub>. During 2010, the cost was ranged from Rs. 1148.99 to 5386.85. The maximum (Rs.5386.85) was recorded in village V<sub>6</sub> followed by village V<sub>3</sub> (Rs.4806.81) with the minimum (Rs.1148.99) in village V<sub>4</sub>. On the basis of two years, the cost was ranged from Rs. 1258.05 to 3789.18. The maximum (Rs.3789.18) was recorded in village V<sub>6</sub> followed by village V<sub>9</sub> (Rs.3436.59) with the minimum (1258.05) in village V<sub>7</sub>.

The overall the share of IPM components involved in paddy plant protection at different villages of Dhamtari district, during 2009, the average cost of paddy plant protection was ranged from Rs. 47.94 to 1931.21. The maximum cost of the chemical practices (Rs. 1931.21) was recorded followed by cultural practices (Rs. 2396.89) and minimum (Rs.47.94) in biological practices with the cost of share was 68.92, 20.30 and 1.71 percent, respectively. Whereas, during 2010, the Average cost of IPM components was ranged from Rs. 109.07 to 2520.92. The maximum cost of the chemical practices (Rs. 2520.92) was recorded followed by cultural practices (Rs. 769.26) and minimum (Rs.109.07) in biological practices with the cost of share was 63.28, 13.54 and 3.46 percent, respectively. Pooled cost of paddy plant protection was ranged from Rs. 109.07 to 2520.92. The maximum cost of the chemical practices (Rs. 2520.92) was recorded followed by cultural practices (Rs.769.26) and minimum (Rs. 109.07) in biological practices with the cost of share was 68.85, 12.56 and 2.98 percent, respectively. Prasad (1991) revealed that the hardly (23.00%) of paddy farmers used recommended varieties and more than (90.00%) of the farmers did not treat seeds before sowing. Similar type finding were reported by Mishra *et al.*, 1994 they observed that the IPM techniques and skills by

involving a varieties of methods like cultural, mechanical, biological and chemical have shown increase in rice yield in 40 ha of farmers field during 1983 to 1990 with low cost on plant protection inputs, resulting in net saving to the growers. Similar finding were reported Rajendra (2000) they conducted a study in Akola district of Maharashtra state and reported that 85.40% of farmers were

medium adopters of bio control measures whereas, a mere 8.00% them of were high adopters and remaining 6.56% of them were low adopters of bio control measures. Not accurate but similar finding given Singh *et al.*, (2004). They examined the pattern of pesticide use in paddy cultivation and assessed the economic and environmental impact of adaptation of IPM practices in paddy in Haryana.

**Table 1.** Share of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2009

Practices	Surveyed village (ha <sup>-1</sup> )										Av	Share (%)
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	V <sub>7</sub>	V <sub>8</sub>	V <sub>9</sub>	V <sub>10</sub>		
<b>Cultural</b>	409.70	674.08	661.26	411.45	709.57	627.91	417.83	676.55	644.69	455.97	<b>568.90</b>	<b>20.30</b>
<b>Physical</b>	0.00	390.04	339.20	37.10	363.78	385.85	76.79	360.26	460.77	126.10	<b>253.99</b>	<b>9.06</b>
<b>Biological</b>	0.00	0.00	147.26	52.42	0.00	96.15	26.72	0.00	67.46	89.43	<b>47.94</b>	<b>1.71</b>
<b>Chemical</b>	1635.11	2279.77	1983.77	1220.57	2649.11	2191.51	1263.16	2396.89	2231.04	1461.15	<b>1931.21</b>	<b>68.92</b>
<b>Total</b>	<b>2044.81</b>	<b>3343.89</b>	<b>3131.49</b>	<b>1721.54</b>	<b>3722.46</b>	<b>3301.42</b>	<b>1784.5</b>	<b>3433.7</b>	<b>3403.96</b>	<b>2132.65</b>	<b>2802.04</b>	

**Table 2.** Share of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2010

Practices	Surveyed village (ha <sup>-1</sup> )										Av	Share (%)
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	V <sub>7</sub>	V <sub>8</sub>	V <sub>9</sub>	V <sub>10</sub>		
<b>Cultural</b>	327.45	962.64	1682.67	494.89	949.85	1514.04	631.30	842.81	1432.51	857.97	<b>969.61</b>	<b>19.72</b>
<b>Physical</b>	0.00	746.00	1345.00	101.00	659.00	1349.00	214.00	576.00	1200.00	466.00	<b>665.60</b>	<b>13.54</b>
<b>Biological</b>	0.00	0.00	560.00	143.00	0.00	364.00	56.00	0.00	285.00	294.00	<b>170.20</b>	<b>3.46</b>
<b>Chemical</b>	1579.00	4100.41	4806.81	1148.99	2809.81	5386.85	1252.93	3196.20	4642.13	2183.22	<b>3110.63</b>	<b>63.28</b>
<b>Total</b>	<b>1906.45</b>	<b>5809.05</b>	<b>8394.48</b>	<b>1887.88</b>	<b>4418.66</b>	<b>8613.89</b>	<b>2154.23</b>	<b>4615.01</b>	<b>7559.64</b>	<b>3801.19</b>	<b>4916.04</b>	

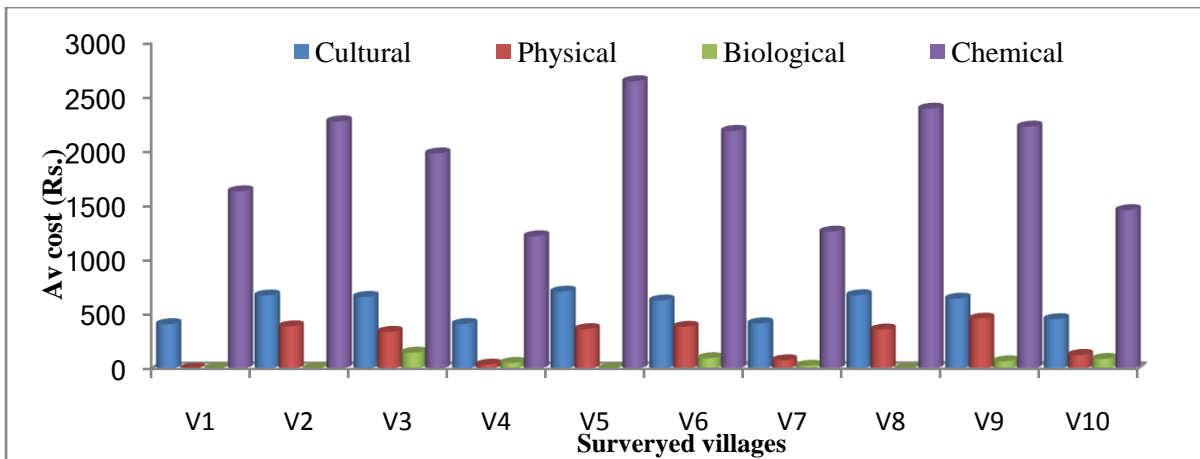
**Table 3.** Pooled cost share of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2009 & 2010

Practices	Surveyed village (ha <sup>-1</sup> )										Av	Share (%)
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	V <sub>7</sub>	V <sub>8</sub>	V <sub>9</sub>	V <sub>10</sub>		
<b>Cultural</b>	368.58	818.36	1171.97	453.17	829.71	1070.98	524.57	759.68	1038.60	656.97	<b>769.26</b>	<b>21.01</b>
<b>Physical</b>	0.00	568.02	842.10	69.05	511.39	867.43	145.40	468.13	830.39	296.05	<b>459.79</b>	<b>12.56</b>
<b>Biological</b>	0.00	0.00	353.63	97.71	0.00	230.08	41.36	0.00	176.23	191.72	<b>109.07</b>	<b>2.98</b>
<b>Chemical</b>	1607.06	3190.09	3395.29	1184.78	2729.46	3789.18	1258.05	2796.55	3436.59	1822.19	<b>2520.92</b>	<b>68.85</b>
<b>Total</b>	<b>1975.64</b>	<b>4576.47</b>	<b>5762.99</b>	<b>1804.71</b>	<b>4070.56</b>	<b>5957.66</b>	<b>1969.37</b>	<b>4024.36</b>	<b>5481.80</b>	<b>2966.92</b>	<b>3859.04</b>	

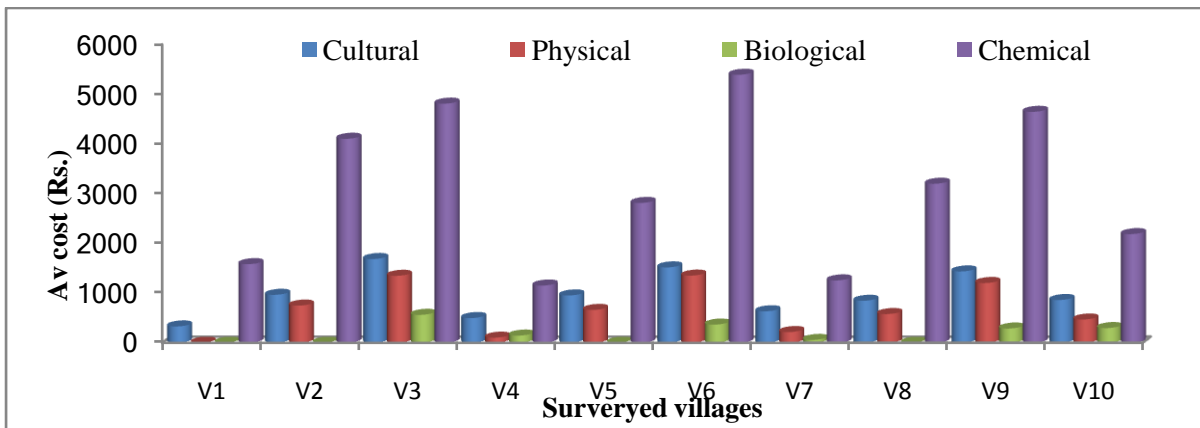
\*Cultural =summer deep Ploughing, Seed treatment;Physical =Light trap, pheromone trap;Biological =Trichocard, microplex, Chemical=Different groups of insecticides

\* V<sub>1</sub>= Medka, V<sub>2</sub>= Kuhkuha, V<sub>3</sub>= Bharda, V<sub>4</sub>= Paraswani, V<sub>5</sub>= Dahdaha, V<sub>6</sub>= Shivnikala, V<sub>7</sub>= Parsadakala, V<sub>8</sub>= Ravanguna, V<sub>9</sub>= BakniandV<sub>10</sub>= Tewari

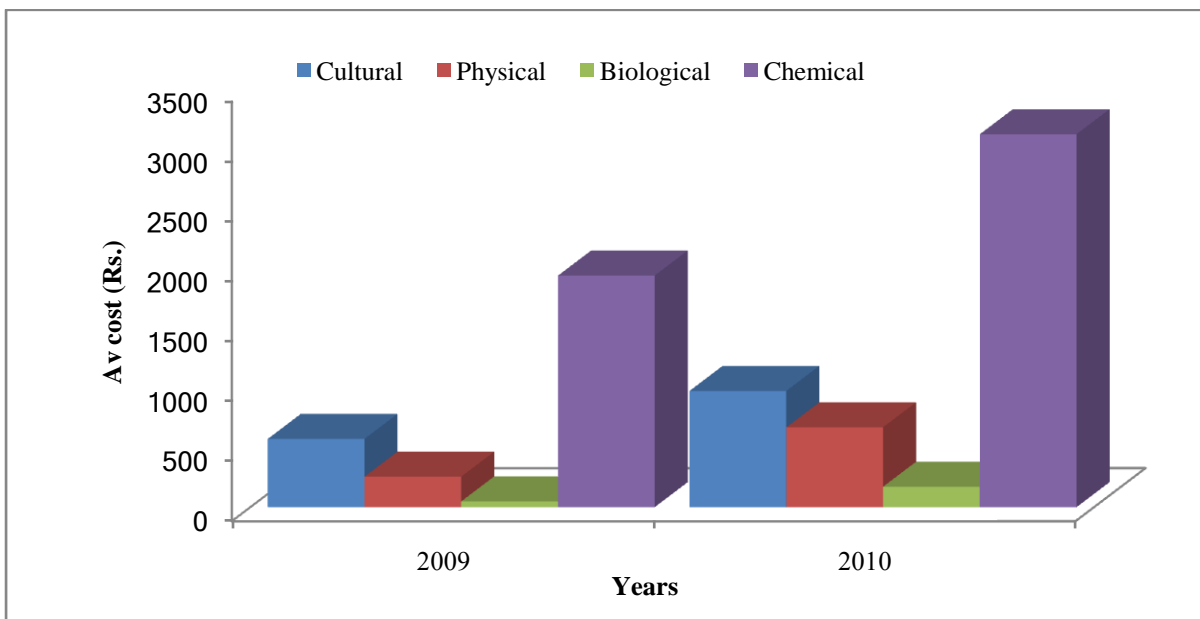
\* Number of ten farmersin each village



**Fig. 1.** Share of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2009



**Fig. 2.** Share of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2010



**Fig. 3.** Pooled cost of IPM components involved in paddy plant protection at different villages of Dhamtari district during 2009 & 2010

The farmers in the study area were using more quantity of pesticide. Therefore, there is an urgent need for proper education to the farmers about the balanced use of pesticides. The farmers should be educated to identify the threshold level of pest infestation and take measures only after that instead of blindly following the neighbouring farmers while applying plant protection chemicals. The farmers may be encouraged to use not only less toxic chemicals to human and livestock but also less persistent in the environment in place of more toxic and more persistent chemicals. They also need to be advised about the cultural, physical, biological practices applying and identifying the spurious techniques and methods as possible manner.

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