# Knowledge, Adoption and Effectiveness of Recommended Practices in Paddy and Cotton after Heavy Rains

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## Abstract

*A study was conducted to assess the Knowledge, Adoption and Effectiveness of recommended practices in paddy and cotton crops after heavy rains in Khammam district of Andhra Pradesh* during 2012-13. Frequency and percentages were used for statistical analysis. The study reveals that 100 per cent of the respondents have knowledge on draining out excess water from the field and majority of the farmers are adopting this practice after heavy rains. The reasons for not adopting other practices were due to lack of knowledge.*

## Introduction

Indian agriculture is heavily dependent on rainfall which largely occurs during the monsoon season. However, the abnormal behaviour of the monsoon may cause natural disasters such as cyclones, floods, heavy rains etc. Agricultural production is an outcome of biological activity, which is highly sensitive to changes in weather. Important weather variables such as temperature, humidity, rainfall, wind etc., influence the biological process directly or indirectly. Heavy rains may submerge the growing crops in the early stages and may cause logging in the later stages of crop growth. Similarly hailstorms, wind and cyclones damage the standing crops by uprooting. High humidity may cause outbreak of pests and diseases. All these result in partial loss in yield and sometimes complete crop failure and hence reduced income to farmers (Gurdev singh, 2010).

Perceived change in the climate also has implications on the insect-pest dynamics and resultant crop losses will have serious environmental and socio-economic impacts on farmers whose livelihoods depend directly on agriculture. The farmers have to face new and intense pest problems due to spread of insect-pests to new areas along with shift in cultivation areas of their host crops. Certain effective cultural pest management practices like crop rotation, early/late planting etc. will be less or not

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effective with changed climate due to shrinking of crop growing seasons, colonization of crops by early insect arrival and or increased winter survival (Petzoldt and Seaman, 2010).

In Andhra Pradesh, standing crops of agriculture, horticulture and other miscellaneous crops were badly damaged due to torrential rains in the wake of Nilam cyclone. The Andhra Pradesh Government estimated the loss to agriculture and horticulture crops due to the Nilam cyclone in the state at Rs. 1,710 crores. Standing agriculture crops mainly paddy and cotton were the worst hit and suffered damage resulting in a loss of Rs. 102 crores (NRAA, 2013).

Risks in agriculture could be prevented or minimised by undertaking appropriate action in advance. For instance, risk of loss in crop yield due to pest attack could be minimised by undertaking preventive pest control measures (Gurdev singh, 2010). Knowledge on recommended technologies by the farmers has been found to be an important contributing factor for adoption (M.S.Shakya *et al.*, 2008). Farmers can realize the benefits of improved technologies and maximize the yield and income, if they adopt technologies, which are generated from research institutes. However, owing to many reasons, there is always a gap in the adoption of recommended technologies resulting in production inefficiencies. Therefore, a regular monitoring of the adoption level of different technologies transferred to the field and their effectiveness would help the policy makers and extension workers in designing and implementing appropriate programmes for technology transfer and the researchers in fine tuning of the technologies as per the requirements of farmers. In this context, this study was undertaken with the following objectives:

1. To assess the knowledge, adoption by farmers and effectiveness of recommended practices, after heavy rains, in paddy and cotton crops
2. To study the reasons for non-adoption of recommended practices by the farmers after heavy rains.

## Methodology

The study was carried out in Khammam district of Andhra Pradesh during 2012-13. Ex-post facto research design was formulated and multi stage random sampling was followed for this study. From Khammam district, 6 mandals were selected and from each mandal 2 villages were selected based on the criteria of larger extent of paddy and cotton cropped areas during Kharif, 2012-13. From each village 10 farmers, who were growing both paddy and cotton, were selected randomly, making the total sample size of 120. For measuring the effectiveness, the farmers who adopted and partially adopted particular recommendations constituted the sample.

The data were collected from the selected sample through a structured schedule and interview technique. Recommended practices followed by the farmers after heavy rains for paddy and cotton were assessed in relation to three variables viz, knowledge, extent of adoption and effectiveness of the technologies based on three point rate continuum. The data were collected during 2012-13. The statistical tools used for analysing the collected data were frequency and percentage.

## Results and Discussion

The results on knowledge, adoption pattern and effectiveness of recommended practices after heavy rains for paddy and cotton are discussed separately below.

### Knowledge, adoption and effectiveness of recommended practices after heavy rains as perceived by farmers for paddy crop

It can be observed from Table 1 that 100 per cent of the farmers were having 'knowledge' on draining out excess water from the field followed by spraying Tricyclazole 0.6 g or Isoprothalane 1.5 ml or Kasugamycin 2.5 ml per litre of water to control blast and neck blast (66.7%). Majority (86.70%) of the respondents had 'no knowledge' on spraying 5% salt solution on paddy crop fallen to the ground followed by 65 per cent of respondents who had no knowledge on spraying carbendizm 1 g/lit or propiconazole 1 ml/lit to control false smut when crop is in flowering stage. It is evident from Table 1 that most of (88.30%) of the farmers 'adopted' the practice of draining out the water from the field to avoid stagnation in the field followed by 55.80 per cent of the respondents who 'adopted' practice of spraying Tricyclozole 0.6 g or Isoprothalane 1.5 ml or Kasugamycin 2.5ml per litre of water to control blast and neck blast.

Of the adopters and partial adopters, most of the farmers (93.69%) found, adopting the practice of draining out water from the field to avoid stagnation in the field 'effective', followed by 87.32 per cent of respondents who found adopting the practice of spraying Tricyclozole 0.6 g or Isoprothalane 1.5 ml or Kasugamycin 2.5 ml / litre of water to control blast and neck blast 'effective'. It is evident from the results that draining out water from the field gives aeration to the plants which otherwise, due to submergence and anaerobic conditions, would wither and finally die. The chemicals presently recommended for control of blast and neck blast are functioning effectively. Most importantly 68.18 per cent of respondents found spraying of 5 per cent salt solution on harvested paddy bundles laid in the field 'effective' and 27.27 per cent found it 'partially effective'. It can be inferred that spraying 5 per cent salt solution on harvested paddy bundles laid in the field is effective but due to continuous rains sometimes, this technology is ineffective hence farmers want more effective technology to prevent germination and discoloration of paddy grains even in case of heavy rains. (Table 1).

**Table 1. Level of Knowledge, extent of Adoption and effectiveness of recommended practices after heavy rains as perceived by farmers in Paddy crop**

(N=120)

| S.No. | Name of Practice | Knowledge | | | Adoption | | | n | Effectiveness (n = A+PA) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Paddy | K | PK | NK | A | PA | NA | | E | PE | NE |
| 1. | Drain out the water from the field to avoid stagnation in field | 100.00 (120) | 0.00 (0.0) | 0.00 (0.0) | 88.30 (106) | 4.20 (5) | 7.50 (9) | 106+5 = 111 | 93.69 (104) | 3.60 (4) | 2.70 (3) |
| 2. | Spray 5% salt solution on harvested paddy bundles laid in field | 50.00 (60.00) | 17.50 (21) | 32.50 (39) | 35.00 (42) | 1.70 (2) | 63.30 (76) | 42+2 = 44 | 68.18 (30) | 27.27 (12) | 4.55 (2) |
| 3. | Spray 5% salt solution on paddy crop when it is fallen to the ground in harvesting stage | 10.00 (12) | 3.30 4 | 86.70 (104) | 7.50 (9) | 3.30 (4) | 89.20 (107) | 9+4 = 13 | 38.46 (5) | 53.85 (7) | 7.69 (1) |
| 4. | Spray Carbendizm 1g /lit or Propiconazole 1ml/lit to control false smut when crop is in flowering stage | 18.30 (22) | 16.70 (20) | 65.00 (78) | 13.30 (16) | 10.80 (13) | 75.80 (91) | 16+13 = 29 | 55.17 (16) | 34.48 (10) | 10.35 (3) |
| 5. | Spray Tricyclozole 0.6 g /lit or Isoprothalane 1.5 ml /lit or Kasugamycin 2.5 ml / litre of water to control Blast & Neck blast | 66.70 (80) | 8.30 (10) | 25.00 (30) | 55.80 (67) | 3.30 (4) | 40.80 (49) | 67+4 = 71 | 87.32 (62) | 8.45 (6) | 4.23 (3) |

(Figures in parentheses are no. of respondents)

Note: K: Full Knowledge PK: Partial Knowledge NA: No Knowledge
A: Fully Adopted PA: Partially Adopted NA: Not Adopted
E: Effective PE: Partially Effective NE: Not Effective

**Knowledge, adoption and effectiveness of recommended practices after heavy rains as perceived by farmers in cotton crop**

Table 2 reveals that, all the cotton growing farmers were having 'knowledge' on draining out water from the field to avoid stagnation. However, 65.83 per cent of the respondents were having 'no knowledge' on spraying of copper oxy chloride 30 g and 1 g streptocyclin or plantamycin per 10 litres of water to avoid boll rot. A considerable number of respondents (44.17%) were having 'no knowledge' on spraying of urea 20 g or potassium nitrate 10 g per litre of water to bring the crop to the normal situation. Majority of the respondents (46.67%) were having 'partial knowledge' followed by 32.5 per cent of them having 'Full knowledge' on basal application of urea 25 kg and 10 kg MOP to supplement nutrition.

It can also be observed from the Table that most of the farmers (88.3%) have 'adopted' the practice of draining out the water from the field to avoid stagnation. However, more than half of the respondents (58.33 per cent) have 'not adopted' the practice of urea spray (20 g) or potassium nitrate 10 g per litre of water to bring the crop to the normal situation. This is due to the farmers' lack of knowledge or spraying difficulty or ignorance. In addition 74.17 per cent of the respondents have 'not adopted' the recommended practice of spraying copper oxy chloride 30 g and 1 g of sreptocyclin or plantamycin per 10 litres of water to avoid boll rot. The non adoption of this recommendation due to lack of knowledge or non severity of disease or its effect on yields may be very less.

Nearly one-third of respondents were in the categories of 'partially adopted' (38.33 per cent) and 'not adopted' (36.67 per cent) on the recommended basal application of urea 25 kg and Muriate of potash 10 kg per acre to supplement nutrition. The partial adoption of this recommendation may be due to the fact that farmers are not aware of the technology or the recommended fertilizers may not be available in their locality or due to their habit they are applying other fertilizers, and non adoption may be due to lack of finance or ignorance. (Table 2).

It is evident from Table 2 that the respondents who adopted the recommended practice of draining out the water from the field fully and partially found it "effective" to avoid stagnation of water in the field. Similarly, majority of respondents who adopted the recommended practices of spraying of urea 20 g or potassium nitrate 10 g per litre of water fully or partially, found it 'effective' in bringing the crop to the normal situation and hence were satisfied about this recommendation due to its effectiveness and they expressed that the crop recovered fast or could withstand the negative effect of water stagnation in the field.

**Table 2. Level of Knowledge, extent of Adoption and effectiveness of recommended practices after heavy rains as perceived by farmers in Cotton crop**

**(N=120)**

| S. No | Name of Practice | Knowledge | | | Adoption | | | Effectiveness sample size (n) | Effectiveness (n = A+PA) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cotton | | K | PK | NK | A | PA | NA | | E | PE | NE |
| 1. | Drain out water from the field to avoid stagnation in field | 100.00 (120) | 0.00 (0.0) | 0.00 (0.0) | 88.30 (106) | 3.30 (4) | 8.30 (10) | 106+4 = 110 | 84.55 (93) | 6.67 (8) | 8.18 (9) |
| 2. | Spray Urea 20 g or Potassium Nitrate 10g /litre of water to bring crop to normal situation | 32.50 (39.00) | 23.33 (28) | 44.17 (53) | 21.67 (26) | 20.00 (24) | 58.33 (70) | 26+24 = 50 | 76.00 (38) | 14.00 (7) | 10.00 (5) |
| 3. | To avoid boll rot spray Copper oxy chloride 30g and 1g streptocyclin or plantamycin / 10 litres of water | 20.83 (25) | 13.33 (16) | 65.83 (79) | 15.83 (19) | 10.00 (12) | 74.17 (89) | 19+12 = 31 | 38.71 (12) | 51.61 (16) | 9.68 (3) |
| 4. | Basal application of Urea 25kg and MOP 10 kg per acre to supplement nutrition | 32.50 (39) | 46.67 (56) | 20.83 (25) | 25.00 (30) | 38.33 (46) | 36.67 (44) | 30+46 = 76 | 25.00 (19) | 67.11 (51) | 7.89 (6) |

(Figures in parentheses are number of respondents)

Note: K: Full Knowledge PK: Partial Knowledge NA: No Knowledge
A: Fully Adopted PA: Partially Adopted NA: Not Adopted
E: Effective PE: Partially Effective NE: Not Effective

Half of the respondents (51.61 per cent) among adopters and partial adopters found spraying of copper oxy chloride 30 g and 1 g streptocyclin or plantamycin per 10 litres of water 'partially effective' and 38.71 per cent found this 'effective', in avoiding boll rot. This shows that the effectiveness of chemicals in case of heavy rains was not good, hence they need more effective technology (Table 2).

More than half of the respondents (67.11 per cent) found adoption and partial adoption of basal application of urea 25 kg and 10 kg MOP to supplement nutrition 'partially effective'. (Table 2).

**Reasons for non-adoption of recommended practices in paddy and cotton after heavy rains**

The reasons for non adoption of recommended practices after heavy rains in paddy and cotton may be seen below.

**Reasons for non-adoption of recommended practices in paddy after heavy rains**

The reasons for non-adoption of recommended practices after heavy rains for paddy were identified and the same are presented in Table 3.

Table 3 depicts that a meagre number of respondents (9) gave the main reason for non-adoption of the practice of draining out water from the field to avoid stagnation in field, as 'not possible', due to poor drainage facilities. The Table also shows that 35.53 per cent of respondents gave 'lack of knowledge' as the reason followed by 23.68 per cent who responded 'not effective', 17.11 per cent as 'negligence', 13.16 per cent as 'not necessary (only turning bundles is enough)' for non adoption of spraying 5% salt solution on harvested paddy bundles laid in the field.

It can be observed from Table 3 that more than half of the respondents (53.27 per cent) reasoned 'not necessary' as the main reason for non-adoption of spraying of 5% salt solution on paddy crop when it is in harvesting stage fallen to the ground because the farmers have misconceptions that spraying salt solution is useful only for the harvested crop laid in field. More over 16.82 per cent of respondents gave the reason that 'it should not be done' for coarse grain varieties which are used for parboiled rice due to millers' reluctance to purchase the salt sprayed paddy grain. The other reasons expressed by respondents were 'lack of knowledge' (19.63 per cent), 'not effective' (8.41 per cent) and 'negligence' (1.87 per cent).

**Table 3: Reasons for non-adoption of recommended practices for Paddy after Heavy rains (N=120)**

| S.No. | Name of the Practice | n (Sample size) | Reasons | Number | % |
|---|---|---|---|---|---|
| 1 | Drain out the water from field to avoid stagnation in field | 9 | Not possible | 9 | 100.00 |
| 2 | Spray 5% salt solution on harvested paddy bundles laid in the field | 76 | Negligence | 13 | 17.11 |
| | | | Not necessary (Only turning bundles is enough) | 10 | 13.16 |
| | | | Lack of knowledge | 27 | 35.53 |
| | | | Not effective | 18 | 23.68 |
| | | | Not Possible (Laborious process) | 6 | 7.90 |
| | | | Non availability of spraying pumps | 2 | 2.63 |
| 3 | Spray 5% salt solution on paddy crop when it is in harvesting stage fallen to the ground | 107 | Not necessary | 57 | 53.27 |
| | | | Lack of knowledge | 21 | 19.63 |
| | | | It should not be done (MTU-1061, 1001 etc.) | 18 | 16.82 |
| | | | Negligence | 2 | 1.87 |
| | | | Not effective | 9 | 8.41 |
| 4 | Spray Carbendizm 1g or Propiconazole 1ml to control false smut when crop is in flowering stage | 91 | Low incidence | 45 | 49.45 |
| | | | Lack of knowledge | 37 | 40.66 |
| | | | Not necessary | 9 | 9.89 |
| 5 | Spray Tricyclozole 0.6g or Isoprothalane 1.5 ml or Kasugamycin 2.5 ml / litre of water to control Blast & Neck blast | 49 | Effect of heavy rains on Blast & Neck blast is low (Not related to heavy rains) | 19 | 38.78 |
| | | | Cost is high | 3 | 6.12 |
| | | | Not effective | 5 | 10.20 |
| | | | Lack of knowledge | 22 | 44.90 |

**Table 4: Reasons for non-adoption of recommended practices in Cotton after Heavy rains**

**(N=120)**

| S.No. | Name of the Practice | n (Sample size) | Reasons | Number | % |
|---|---|---|---|---|---|
| 1. | Drain out the water from field to avoid stagnation in field | 10 | Not possible | 7 | 70.00 |
| | | | Not necessary | 3 | 30.00 |
| 2. | Spray Urea 20 g or Potassium Nitrate 10g /litre of water to bring crop to normal situation | 70 | Lack of knowledge | 43 | 61.43 |
| | | | Not necessary | 16 | 22.86 |
| | | | Not Possible | 11 | 15.71 |
| 3. | To avoid boll rot spray Copper oxy chloride 30g and 1g streptocyclin or plantamycin / 10 litres of water | 89 | Lack of knowledge | 79 | 88.76 |
| | | | Not Possible (Land is too wet) | 10 | 11.24 |
| 4. | Basal application of Urea 25kg and 10 kg MOP to supplement nutrition | 44 | Lack of knowledge | 24 | 54.55 |
| | | | Cost is high | 12 | 27.27 |
| | | | Non availability of fertilizer | 5 | 11.36 |
| | | | Shortage of labour | 3 | 6.82 |

The reasons for non-adoption of spraying carbendizm 1g or propiconazole 1 ml to control false smut when crop is in flowering stage were 'low incidence' (49.45 per cent) followed by 'lack of knowledge' (40.66 per cent) and 'not necessary' (9.89 per cent) (Table 3).

Table 3 indicates that 44.90 per cent of respondents gave 'lack of knowledge' as the main reason for non-adoption of spraying tricyclozole 0.6 g or isoprothalane 1.5 ml or kasugamycin 2.5 ml per litre of water to control blast & neck blast followed by 'effect of heavy rains on blast & neck blast is low' (not related to heavy rains) (38.78 per cent), 'not effective' (10.20 per cent) and 'cost is high' (6.12 per cent).

**Reasons for non-adoption of recommended practices in cotton after heavy rains**

It can be observed from Table 4 that nearly three fourth of respondents (70%) revealed the main reason for non-adoption of draining out water from the field to avoid stagnation in the field as 'not possible' followed by 'not necessary' (30 per cent).

Table 4 shows that 61.43 per cent of respondents perceived 'lack of knowledge' as the main reason for non adoption of spray of urea 20 g or potassium nitrate 10 g per litre of water to bring the crop to the normal situation. It also reveals that 88.76 per cent of respondents expressed 'lack of knowledge' as the reason for non-adoption of copper oxy chloride 30 g and 1 g streptocyclin or plantamycin per 10 litres of water.

More than half of the respondents (54.55%) perceived 'lack of knowledge' as the main reason for non-adoption of basal application of urea 25 kg and 10 kg MOP to supplement nutrition followed by 'cost is high' (11.36 per cent) and 'shortage of labour' (6.82 per cent).

## Conclusion and Recommendations

It can be concluded from the above findings that less than half of the respondents only have 'knowledge' about recommended practices after heavy rains for paddy and cotton and a lesser percentage of respondents adopted these practices. Nearly three fourth of the respondents who adopted, felt that adoption of recommended practices after heavy rains for paddy and cotton is 'effective'. Though the recommended practices are effective, majority of the respondents were not adopting them after heavy rains due to 'lack of knowledge'. Therefore, training programmes and other extension programmes should be organised to enhance the farmers' knowledge regarding recommended practices after heavy rains.

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