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Uma K
Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Praveena S
Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

M Anjugam
Department of Agricultural Economics, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Corresponding Author:
Uma K
Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

A Gender study on resource use in onion integrated pest management

Uma K, Praveena S and M Anjugam

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Abstract
Onion is one of the most important and export oriented commercial crop and grown in Western, Northern as well as in Southern India. Tamilnadu contributes significant contribution in the onion exportable production and also doing Integrated Pest Management practices in order to increase the productivity. This study made an attempt to analyse the extent of use and availability of IPM components in onion, cost and returns in the IPM practices in the major onion growing areas of Tamilnadu. Totally 90 respondents were identified and primary information were collected from 60 IPM adopters and 30 non-adopters. From the results, it was identified that majority of the IPM adopters and non-adopters were following safety measures and also was found that high cost of inputs and time consuming are main constraints among the IPM adopters. There is no difference among genders in IPM in input use. In IPM farm households, decision on crop selection was jointly taken by both the men and women whereas in non-IPM farms, male alone taking decision. Most of them have their own seed production. Both the gender was able to identify the infestation clearly due to pest and disease in case of IPM and non-IPM farmers.

Keywords: Integrated pest management, role of gender, onion and decision making

Introduction
Onion is one of the most important commercial vegetables. It is grown in western, northern as well as in Southern India. Maharashtra, Gujarat, Uttar Pradesh, Orissa, Karnataka, Tamil Nadu, Madhya Pradesh, Andhra Pradesh and Bihar are Major onion growing states in India. India stands 2nd position in Onion production after China in the World. In India. Onion can be grown on all type of soils. However, Goradu, and medium black soils are best for its successful cultivation. Good drainage, weeds free plots and presence of organic matter favor production of good crop. The geographical area of Tamil Nadu was 130 lakh ha, of which the cultivated area of the State is 4.7 million ha during 2018-19, comprising 36% of the geographical area. The total area covered under horticulture crops accounts to 13.76 Lakh. Ha. The area under vegetables alone accounts to 2.29 lakh ha. The main vegetables grown in Tamil Nadu are Onion, Tomato, Brinjal, Bhendi and Tapioca. These account for over 70% of total area as well as the production of vegetables. (Department of Horticulture and Plantation Crops, Tamil Nadu, 2018-19. The total area under onion accounted for 28357 ha which is widely grown in 25 districts in Tamil Nadu. However, seven districts alone accounted for 80 per cent of the area under onion. Perambalur district ranks first in terms of area under onion i.e. 8899 ha (31.38 per cent) followed by Thoothukudi (10 per cent), Namakkal (9.28 per cent), Tirunelveli (8.79 per cent) and Trichy (7.43 per cent). The study has been undertaken in Trichy district, Tamil Nadu, since it is one of the major districts under onion as well as the popularization of IPM packages for onion was conducted in the same district. Trichy district was purposively selected to assess the gender based knowledge in IPM practices with the following specific objectives.

Objectives
- To assess the extent of use and availability of IPM components in the study area.
- To analyse the perception of farmers in adoption of IPM practices and benefits realized by the IPM farmers.
- To analyze the cost and returns of onion under adopters and non-adopters of IPM.

- To assess the gender based knowledge and awareness and constraints in adoption of IPM Practices by IPM trial farmers in onion

Methodology

For the present study, 60 onion growers adopting IPM practices were collected from two villages in Thuraiyur block, Trichy district namely Renganathapuram and Narasimmapuram were selected purposively where the popularization of IPM components were taken. In addition, 30 onion growers not adopted IPM practices were selected randomly to make comparison.

Results and Discussion

General Profile of the sample respondents

From the results, the average age of the sample farmer was 48.5 and 41.30 years for IPM and non-IPM farmers, respectively. Men and Women are equally participating in farm work which ranged from 1.03 to 1.18. However, participation of men and women in non-farm work was low which indicated that the sample households were mainly depending on agriculture for their livelihood. The farming experience was comparatively more among IPM farmers (33.15 years) than non-IPM farmers (25.46 years). However, experience in vegetable cultivation was around 20 years and 15 years for men and women, respectively. The percentage of men owning land assets in their name among the sample farmer was nearly 100 per cent in both the cases. Whereas, women possessing land was only 3.33 per cent of the total sample. It shows that access to assets particularly land was very minimum for the women folk. Moreover, the composition of sample farmers revealed that only 10 to 23 per cent of them were women. Majority of the sample IPM farmers (88.33 per cent) and non-IPM farmers (66.67 per cent) had primary education and illiteracy was found to be less than five percent in both the cases.

Majority of the IPM farm households (43.33 per cent), decision on crop selection was taken jointly by both the men and women followed by men alone (40 per cent); whereas, it was opposite in case of non - IPM farms (i.e.) in 53.33 per cent of households men alone taking decision followed by both the gender (43.33). However, women in decision making on crop selection was poor (i.e.) 16.67 and 3.33 percent in case of IPM and non-IPM farms, respectively. Similarly, in 50 per cent of the sample households, men alone taking the decision on varietal selection followed by both the gender (38 to 43 per cent) in both the cases. Men and women were jointly involved in decision making.

Knowledge and source of information about pesticides

The knowledge on pest and disease control measures on vegetables especially in onion revealed that both the sample men (100 per cent) and women (95 per cent) were known ETL for application of pesticides. However, the level was 87 and 70 per cent for men and women respectively, in case of non- IPM farmers. It results showed that IPM farmers were known to ETL better than non – IPM farmers both in case of men and women. Similarly, both the gender were able to identify the infestation clearly due to pest and disease which was 95 and 67 per cent in case of IPM and non-IPM farmers, respectively

The source of information on use of pesticides for the sample farmers revealed that extension agents were the major source of information for use of pesticides (95%) followed by pesticide dealers (83.33%), Neighbours (66.67%) among sample IPM farms. Whereas it was only the pesticide dealers advising the farmers on use of pesticides (76.67 per cent) followed by neighbor farmers (40 per cent) in the case of non-IPM farmers.

Knowledge and Awareness of Bio-inputs and IPM components

The knowledge and awareness on bio-inputs and IPM components of sample farmers revealed that all the sample IPM farmers were aware of bio-inputs and IPM components, whereas 77 per cent on non-IPM farmers were aware of these inputs.

Results of IPM training attended by sample farmers revealed that 100 percent of IPM farmers attended IPM training through trials conducted by Tamil Nadu Agricultural University. Of these sample, spouse (women) were also attended the training to the extent of 18 per cent and 78 per cent of the trainees were passed on the information to their spouses (women).

Awareness and Adoption of Bio-inputs

It revealed that 100 per cent of IPM farmers were aware of Pseudomonas, Trichoderma, Pheromone trap/ yellow sticky trap, border crop, resistant varieties, neem cake application, seed treatment, selection of healthy seedlings, where as 100 per cent of non- IPM farmers were aware of neem cake, summer ploughing, timely sowing, synchronized sowing, seed treatment, seed selection and recommended spacing, etc. Regarding bio control inputs such as Psuedomonas, Trichoderma were known by 70 per cent of the non-IPM farmers and pheromone trap / light trap by 33 per cent of them. (Chart.1) Moreover, only 87 per cent of them adopted pheromone trap and light trap and only 28.33 per cent of them followed border crops as one of the IPM practices. Among the non-IPM farmers, 100 per cent of them followed timely and synchronized sowing, good seed selection and recommended spacing. Neem cake application and summer ploughing practices were adopted by about 83 per cent of the farmers and seed treatment by 73 per cent of them. Though they were known to IPM practices and not attended any training, 57 and 17 per cent of them followed pseudomonas / trichoderma and Pheromone / light traps, respectively. This is mainly due to the efforts taken by the Agrl. Extension department functionaries in the study area.

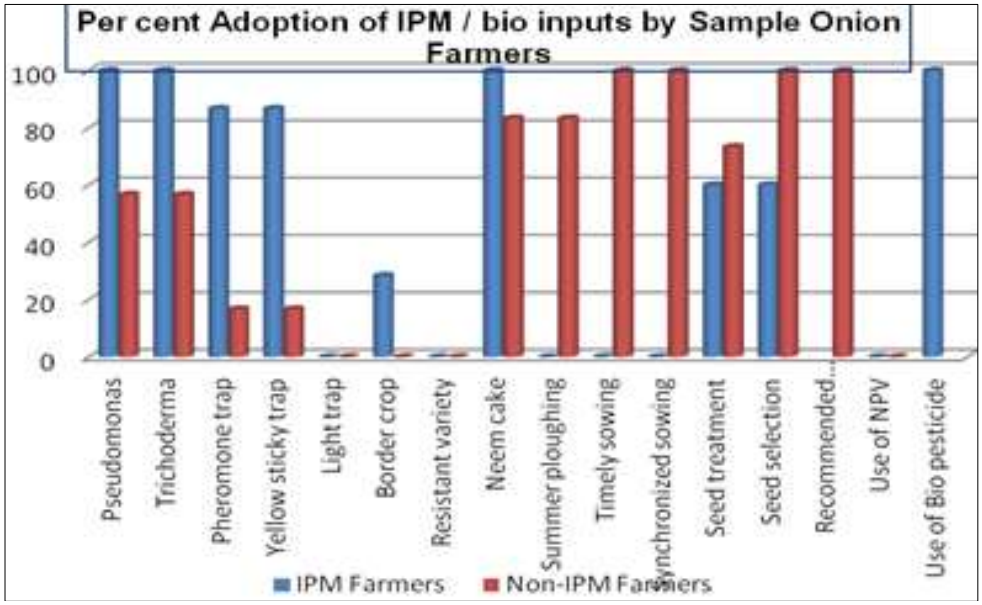

Chart 1: Adoption of IPM/ Bio-inputs by Sample Onion farmers

Impact of IPM components

Impact of IPM components among IPM sample farmers revealed that low pesticide use and convenience to use by both gender were the major impact perceived by 100 per cent of the sample farmers in adoption of IPM components. (Table.4.) Women involvement is high in case of IPM farms which shows that IPM technologies are women friendly. Nearly 95 per cent of the farmers reported that higher yield, higher income and better quality of the produce in terms of shining color and bold bulbs were obtained by adoption of IPM components. Nearly 87 per cent of them reported that they received premium price in the market due to better quality of the produce. Moreover, 75 per cent of them reported reduction in quantity of pesticide use and 70 per cent of them reported lesser cost of cultivation which may be due to low level of pesticide use and higher yield.

Constraints in Adoption of IPM Components

Regarding the use of IPM components, the sample farmers revealed that cost of input, high time consumption were the important constraints reported by them. Moreover, they also expressed that they need technical assistance while using these components and the neighbours were not supporting them in using these components, particularly keeping of pheromone trap.

Resource Use in Onion Cultivation

The resource use in onion cultivation in sample farms revealed that the average human labour use particularly men labour use was 31.09 and 32.61 labour days in the case of IPM and non-IPM farms which was 1.52 labour days lesser in IPM farms. Whereas, the women labour use were 92.97 and 85.45 labour days which were 7.52 labour days higher in IPM farms. It is clearly evident that women labour use was high among onion cultivation compared to men and also the women labour use was 7.52 days higher among IPM farms than non-IPM farms i.e. IPM technology is women friendly. Noticeable difference is observed in case of number of sprays and fertilizer application i.e. on an average there is a reduction in spraying hours to the tune of 50 hrs and fertilizers application was 85.48 kg per ha in the case of IPM farms than in non-IPM farms. Similarly, use of plant protection chemicals and other chemicals also reduced to the tune of 0.35 litres and 0.24 kg in IPM farms than in non-IPM farms.

Operational Cost of Cultivation of Onion

The operational cost per ha was Rs. 50783 and 51058 for IPM and non-IPM farms respectively. Though there was no much difference in the operational cost, there was difference in cost in terms of use of resources in onion between IPM and non-IPM farms. The amount spent on manures, weeding and bio-inputs such as bio fertilizers, bio pesticides and other inputs like pheromone and yellow sticky trap was high among IPM farms than non –IPM farms for about 21.63, 6.95 and 101.57 per cent, respectively. However, the amount spent on fertilizers and plant protection chemicals were lesser in IPM farms for about 34.95 and 37.96 per cent, respectively.

Yield and Net income

It revealed that the average yield was 676 kg higher in IPM farms compared to non-IPM farms. The price realized was ranged from Rs.7 to Rs.8 per kg. The net income realized was Rs. 12136.84 per ha higher in IPM farms compared to non-IPM farms. There is no difference among genders in IPM in input use. Operational cost difference of Rs. 6500/- found between gender. IPM farmer were able to get more price especially women farmers would got margin of Rs0.50/ kg of onion due to post harvest sorting and other care of crops.

Summary and Conclusion

Both the gender were able to identify the infestation clearly due to pest and disease in case of IPM and non-IPM farmers. The average yield and net income was higher in IPM farms compared to non-IPM farms. Though there was no much difference in the operational cost, there was difference in cost in terms of use of resources in onion between IPM and non-IPM farms. Women labour use was higher among onion cultivation compared to men and also the higher among IPM farms than non-IPM farms. Use of plant protection chemicals and other chemicals also reduced in IPM Farms. Similarly, There is a reduction in spraying hours and fertilizers application in the case of IPM farms. There is no difference among genders in IPM in input use. IPM farmer were able to get more price especially women farmers.

Policy implications

- Training on IPM packages may be given to Agricultural / Horticultural Extension personnel's and Pesticide dealers since they were the major source of information on use of pesticides to control pests and diseases.
- Education on IPM packages or components and its potentials by each component may be given to the farmers through television and radio since they the major source of information on agricultural technology to promote wider adoption of these packages.
- Women folk may be given thorough training on IPM practices /components to increase more adoption since women labour use in onion was higher.
- Non IPM farmers think that only through high dose of fertilizers and chemicals it is possible to get good returns. And also, farmers constraints in adoption of IPM were Cost of input is high, Time consuming, Need technical assistance, Neighbours not supporting, High labour cost, Non availability of inputs. While seeing break up of input cost and operations cost disproving that. This may be aware to farmers. Lack of technical knowledge guidance and input availability may be taken care of training, demo, field days and making local women groups to be involved in production.

Table 1: Impact of IPM Components among Sample IPM farmers (n=60)

S. No.	Particulars	No. of farmers reported	Per cent to total
1	Low level of pesticide use	60	100.00
2	Convenient to use by both gender	60	100.00
3	Higher yield	57	95.00
4	Higher income	57	95.00
5	Better quality products	57	95.00
6	Premium price	52	86.67
7	Reduction in frequency of pesticide use	45	75.00
8	Less cost of cultivation	42	70.00

Figures in parentheses indicate the per cent to total

Table 2: Resource Use in Onion cultivation in Trichy District (per ha)

S. No.	Resource Use	IPM farmers			Non - IPM farmers		
		Qty	Male	Female	Qty	Male	Female
1	Human Labour use (Days)	…	31.09 (-1.52)	92.97 (7.52)	…	32.61	85.45
2	Machinery use (hrs)	7.39 (0.26)	…	…	7.13	…	...
3	Bullock power (hrs)	1.49 (0.56)	…	…	0.53	…	...
4	Spraying (hrs)	…	100.10 (49.9)	…	…	150	...
5	Seed (kg)	1477.86 (16.09)	…	…	1493.95	…	…
6	Manure - Neem cake (kg)	61.52 (10.94)	…	…	50.58	…	…
7	Bio inputs (kg)					…	…
	Bio pesticide	5.00 (2.68)	…	…	2.32	…	…
	Bio fertilizer	3.73 (1.88)	…	…	1.85	…	…
	Pheromone trap & Yellow Sticky Trap (Nos.)	10.78 (7.1)	…	…	3.68	…	…
8	Fertilizers (kg)	196.89 (-85.48)	…	…	282.37	…	…
9	Plant Protection chemicals (lit)	1.43 (-0.35)	…	…	1.78	…	…
10	Other chemicals (kg)	0.64 (-0.24)	..	..	0.88	…	…

Figures in parentheses indicate the difference between IPM and Non-IPM farms

Table 3: Cost of Cultivation of Onion in Trichy District (Per ha)

S. No.	Operational Cost	IPM farmers (60)	Non - IPM farmers (30)	Difference *
1	Field Preparation	2949.87	2753.95	195.92 (7.11)
2	Manures	1230.39	1011.58	218.81 (21.63)
3	Fertilizers & application charges	2793.83	4295.177	-1501.35 (-34.95)
4	Seeds and Sowing	16281.31	15003.33	1277.98 (8.52)
5	Irrigation	7503.16	7500.002	3.46 (0.04)
6	Weeding	4947.82	4626.317	321.50 (6.95)
7	Plant Protection chemicals and spraying cost	3353.24	5404.74	-2051.50 (-37.96)
8	Bio-inputs	2013.58	635.78	1377.80 (216.71)
	Bio fertilizers	560.15	277.89	
	Bio pesticides	375.00	173.68	
	Other inputs	1078.43	184.21	
9	Harvesting charges	6387.808	6486.842	-99.03 (-1.53)
	Subtotal	47461.03	47717.72	
10	Interest on Working Capital @ 7%	3322.272	3340.24	
11	Total Operational Cost	50783.30	51057.96	-274(-0.54)

* Denotes the difference between IPM and non-IPM farms (Figures in parentheses indicate the per cent difference between IPM and non-IPM farms)

Table 4: Input use and Crop output (Rs/ha)

Input	IPM Men			IPM women			Non-IPM women			Difference (6-9)
	Unit	Price	Value	Unit	Price	Value	Unit	Price	Value	
	1	2	3	4	5	6	7	8	9	
Seed Kgs	1474.66	8.29	12539.12	1501.60	8.50	12631.79	1542.80	8.29	12749.47	-117.69
FYM card load				0.00		0.00	0.00		0.00	0.00
Neem cake Kg	61.37	19.02	1227.39	62.63	20.00	1252.66	43.59	20.00	871.85	380.81
Urea Kg	94.73	12.53	1313.57	75.08	6.60	495.53	118.17	16.37	1977.42	-1481.89
Potash Kg	45.79	5.94	631.96	100.11	13.80	1381.47	19.70	1.97	271.80	1109.67
Phosphorous Kg	45.79	4.87	517.47	100.11	11.30	1131.20	19.70	1.61	222.56	908.65
Azospirillum packet	1.85	134.58	277.35	2.00	150.00	300.32	0.53	150.00	78.78	221.54
Phosphobacteria	1.85	134.58	277.35	2.00	150.00	300.32	0.53	150.00	78.78	221.54
Pseudomonas fluorescence	2.50	72.67	187.47	2.50	75.00	187.70	0.66	75.00	49.24	138.46
Trichoderma viride	2.50	72.67	187.47	2.50	75.00	187.70	0.66	75.00	49.24	138.46
Malathion /Rogar	0.55	559.86	465.58	0.44	160.00	140.58	0.92	822.86	803.57	-663.00
Kerogran / Saf powder	0.59	438.13	355.21	1.03	400.00	492.01	0.92	662.86	546.22	-54.21
Butachlor /oxycold	0.85	394.06	441.43	1.22	480.00	587.86	0.92	685.71	559.35	28.51
Yellow sticky trap No	11.16	43.07	558.07	7.99	33.33	399.36	0.00	0.00	0.00	399.36
Pheromone trap No	11.16	43.07	558.07	7.99	33.33	399.36	0.00	0.00	0.00	399.36
			19537.50			19887.86			18258.27	1629.59
Yield	12498.21	7.92	101757.64	12513.31	8.50	106363.15	11830.36	7.14	84502.55	21860.60

Sign indicates that input use of Non IPM farmers was higher than IPM

Table 5: A Operational cost (Rs/ha)

Particulars	IPM Men		IPM women		Non-IPM women		Difference[1] (4-6)
	Unit	Cost	Unit	Cost	Unit	Cost	
	1	2	3	4	5	6	7
Field preparation Machine hr	2.59	1037.18	2.66	1064.96	2.49	997.90	67.06
Rotavator Machine hr	2.55	1911.07	2.53	1896.96	2.49	1871.06	25.90
Sowing Mandays	21.45	3387.17	21.35	3349.31	20.61	3367.91	-18.60
Bullock power (Rs700/3hr)	1.69	395.49	0.00	3349.31	1.05	3613.01	-263.70
Manures and Fertilizer application Mandays	2.92	594.85	2.13	439.30	5.78	1155.46	-716.17
Weeding 1 Mandays	17.76	2664.73	17.97	2695.69	27.05	4608.72	-1913.03
Weeding 2 Mandays	15.16	2274.44	15.42	2316.29	0.00	0.00	2316.29
Irrigation Mandays	30.00	7500.72	30.09	7521.30	29.94	7484.24	37.06
Spray No of tanks	97.98	6271.35	115.81	9467.52	149.68	3505.78	5961.74
Harvesting Mandays	39.59	6366.10	40.34	6548.86	213.50	6355.04	193.81
		32403.10		38649.49		32959.12	5690.37
		IPM Men	IPM women	Difference[2] (2-3)		Non-IPM women	Difference[1] (3-6)
	1	2	3	4	5	6	
Total income (Rs)		101757.64	106363.15	-4605.51		84502.55	21860.60
Total input cost(Rs)		19537.50	19887.86	-350.36		18258.27	1629.59
Total operational cost(Rs)		32403.10	38649.49	-6246.39		32959.12	5690.37
Cost of cultivation (Rs)		51940.6	58537.35	-6596.75		51217.39	7319.96
Net income(Rs)		49817	47825.80	1991.24		33285.16	14540.64

[1] Difference bet IPM & Non IPM women alone;
[2] Difference between IPM Men and Women

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References

1. Adam Sparger, Jeffrey Alwang, George Norton W, Mauricio Rivera, Donald Breazeale. Designing an IPM Research Strategy to Benefit Poor Producers and Consumers in Honduras, Journal of Integrated Pest Management 2011;2(3):A1-A9.
2. Kiruthika K. Adoption of Integrated Pest Management (IPM) in Vegetables:A case of onion in Tamil Nadu, American International Journal of Research in Humanities, Arts and Social Sciences 2013;2(2),2(2):111-115.
3. Maria Elisa Christie, Emily Van Houweling, Laura Zseleczky. Mapping gendered pest management knowledge, practices, and pesticide exposure pathways in Ghana and Mali, Agriculture and Human Values 2015;32:761-775.
4. Robert Ochago. Gender and pest management: constraints to integrated pest management uptake among smallholder coffee farmers in Uganda, Cogent Food & Agriculture, 2018, 2-20.
5. Victor Owusu. Examining the economic impacts of integrated pest management among vegetable farmers in Southern Ghana,Journal of Environmental Planning and Management 2017;62(11).