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Awareness and perception of prevailing environmental issues in eco-friendly crop management practices

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Abstract

The study aimed to find the overall awareness, perception about environmental issues in eco-friendly crop management practices of the farmers. The study was conducted in Theni district of Tamil Nadu with 120 farmers by simple random sampling method. Pre-tested interview schedule, Percentage analysis, cumulative frequency, coefficient of correlation and multiple regression analysis were used for data analysis. The results reveals farmers had high level of awareness and perception about the prevailing environmental issues in the study area.

Keywords: awareness; eco-friendly; environmental issues intensive cultivation; perception

Introduction

In our country, green revolution has witnessed a quantum jump in agricultural production, with the introduction of High Yielding Varieties of various crops and by following intensive cultivation practices with the use of fertilizers, pesticides and other inorganic inputs. The intensive use of inorganic inputs has not only polluted the soil, water and the environment, but also affected human beings. Further the demographic pressure along with the increasing industrialization and urbanization has placed a tremendous strain on the shrinking resources. In order to balance this situation, eco-friendly farming, which aims at cultivating the land and raising crops in such a way as to keep the soil alive in good health, may be an alternative to the present system of farming which solely depends on chemicalsAccordingly, Maliwal (2005) also reported that, "environment is a word which describes, in the aggregate, all of external forces, influences and conditions which affect the life, nature, behaviour and the growth, development and maturation of living organism". The harmful effects caused to an agricultural system due to the mismanagement of natural resources. The intensive use of inorganic inputs has not only polluted the soil, water and the environment, but also affected human beings. Further the demographic pressure along with the increasing industrialization and urbanization has placed a tremendous strain on the shrinking resources. In order to balance this situation, eco-friendly farming, which aims at cultivating the land and raising crops in such a way as to keep the soil alive in good health, may be an alternative to the present system of farming which solely depends on chemicals. Accordingly, Shashidhara (2012) revealed that majority of the respondents was in medium level adoption of eco friendly technologies. With respect to adoption on integrated nutrient management, majority of the respondents were not practicing applying of organic manures, selection of crops and cropping pattern, mixed cropping, inter cultivation practices, application of bio-fertilizers to soil and use of limited inorganic fertilizers. The maximum vegetable growers had low extent of adoption of the eco-friendly management practices followed by medium and high extent of adoption of the eco-friendly management practices Patel *et al* (2013). In a research study on awareness about environmental issues and management of natural resources was conducted by Arunachalam (2003) found that the variables education, farm size, social participation, risk orientation, farm waste disposal behaviour, integrated pest management, integrated water management, integrated weed management, integrated nutrient management, great concern for environment, progressive nature and farm machinery use behaviour of the respondents had

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their influence on the adoption of natural resource management practices. The innovativeness, attitude towards eco-friendly cultivation practices, perception on organic manures, perception on feasibility of eco-friendly cultivation practices, perception on health hazards, information source utilization, decision making, perception on environmental degradation were variables that had positive and significant association with adoption of eco-friendly technologies Chandra (2001). The eco-friendly technologies utilization among farmers was concluded that participation in training, perception on environmental degradation had shown a positive significant contribution for adoption of eco-friendly technologies Nalini (2004). It is essential to know the characteristics of the intensive growers and its influence with the dependent variable to have a clear understanding about their background, attitude, perception and their mind set in general. This would prove to be very important in understanding the results and interpreting them correctly. Thus the present study was done with an objective to assess the relationship and influence of the independent variables on adoption of eco-friendly crop management practices among the farmers. Thus a study was carried out to examine the adoption of eco-friendly crop management practices followed in intensive cropping area and constraints in the adoption of the same.Thus intensive cultivation of land without conservation of soil fertility and soil structure would ultimately lead to the springing up of deserts. With this existing scenario, it is felt that a study on awareness and perception of environmental issues particularly in intensive cropping area is the need of the hour. Only, when the farmers have awareness and perception of the environmental issues, they can develop favorable attitude to adopt eco-friendly practices to overcome the prevailing environmental issues. Keeping this in mind the present research study was carried out with the following objectives. The objective is to explore the awareness and perception of the respondents on the prevailing environmental issues.

Materials and Methods

The research was conducted in Theni district of Tamil Nadu. Cumbum block of uthamapalayam Taluk was selected for sampling. Five revenue villages of cumbum block were selected based on the judgement of Assistant Agricultural Officer, Agricultural Officer and the Agricultural Development Officer of the block. They opined / judged that the intensive cultivation is practiced in the above villages. Based on proportionate sampling method sample size of 120 farmers were selected for the study. In the present study, awareness about the environment was operationalised as the extent to which the farmers were familiar with different environmental issues. Perception on environmental issues was operationalised as the farmer's opinion towards environmental issues related with agriculture. For this purpose an exhaustive list of environmental issues related with intensive agriculture was documented based on the knowledge gained in the pilot study and also in consultation with the local extension workers. The awareness and perception of the respondents on the documented issues (13 statements) were studied. The scoring procedure followed by Venkatesan (2000) and Arunachalam (2003) was adopted for this study as given below. The scoring pattern for awareness of environmental issue was measured as (aware-2; not-aware -1) were as perception of environmental issue was measured as (agree-2; disagree-1). Finally, respondents were categorized into high, medium and low by following cumulative frequency method. For this study, expost-facto research design was followed. The data were collected with the help of a well-structured and pre-tested interview schedule. With the statistical tool of percentage analysis, cumulative frequency, correlation and multiple regression the data were analyzed.

Results and Discussion

Profile characteristics of the respondents: The characteristics of the respondents provide a clear understanding about their background, attitude, perception and their mind set in general. This would prove to be very important in understanding the results and interpreting them correctly. Seventeen characteristics were taken up for analysis in the study, given in Table 1.

Majority of the respondents were found to be old and had a high level of education i.e., primary education to collegiate. Most of them had high level

Table 1. Distribution of the respondents according to their profile characteristics

S. No	Category	Frequency	Percentage
$X_{1.}$	**Age**		
	Young	39.00	32.50
	Middle	34.00	28.30
	Old	47.00	39.20
$X_{2.}$	**Education**		
	Illiterate	09.00	07.50
	Functionally literate	00.00	00.00
	Primary education	17.00	14.20
	Middle School Education	29.00	24.20
	Secondary School Education	25.00	20.80
	Collegiate	40.00	33.30
$X_{3.}$	**Farming experience**		
	Low	27.00	22.50
	Medium	00.00	00.00
	High	93.00	77.50
$X_{4.}$	**Farm size**		
	up to 2.5 acre (marginal)	11.00	09.17
	2.6 to 5 acre (small)	40.00	33.33
	5.01 to 10 acre (medium)	41.00	34.17
	10.1 and above (Big)	28.00	23.33
$X_{5.}$	**Farm power utilization**		
	Low	30.00	25.00
	Medium	48.00	40.00
	High	42.00	35.00
$X_{6.}$	**Source of irrigation**		
	Canal	42.00	35.00
	Tank	00.00	00.00
	Well	15.00	12.50
	Canal +Well	63.00	52.50
$X_{7.}$	**Livestock possession**		
	Low	88.00	73.34
	Medium	00.00	00.00
	High	32.00	26.66
$X_{8.}$	**Cropping intensity**		
	Low	09.00	07.50
	Medium	69.00	57.50
	High	42.00	35.00

$X_{9.}$	**Farm waste disposal behavior**			
	Farm Waste	Method of disposal	Frequency	Percentage
i.	Waste water after washing the containers, equipments in which chemical inputs were stored /used.	a) Thrown in the main field	93.00	77.50
		b) Disposed safely outside	27.00	22.50
ii.	Plastics and aluminium container	a) Just thrown in the field	17.00	14.16

	after the use of inputs like herbicides and other chemicals.	b) Cleaned and used for domestic purpose	56.00	46.66
		c) Safely disposed	47.00	39.18
iii.	Disposal of crop waste	a) Left uncared	45.00	37.50
		b) *Insitu*ploughing	69.00	57.50
		c) Preparing compost for future use	06.00	05.00
iv.	Disposal of tree waste	a) Fuel purpose, sold	66.00	55.00
		b) Left as such	47.00	39.16
		c) Stored for future use.	07.00	5.84
v.	Disposal of Animal waste i) Animal waste	a) Domestic purpose	90.00	75.01
		b) Fuel purpose	16.00	13.33
		c) Compost preparation	14.00	11.66
	ii) Dead animal / bird	a) Burnt safely	55.00	45.83
		b) Buried	65.00	54.17

$X_{10.}$	**Concern for environment**				
	Statements	Frequency (Agree)	Percentage	Frequency (Disagree)	Percentage
	It is our duty to plant more trees wherever possible to conserve our environment	109.00	90.84	11.00	09.16
	By following organic farming practices, we can have clean and healthy environment	83.00	69.17	37.00	30.83
	One should not pollute the air, at any cost including intensive farming activating	107.00	89.17	13.00	10.83
	Environment education to 'all' is necessary	105.00	87.50	15.00	12.50
	Water is a precious resource and should not pollute by any means	112.00	93.34	08.00	06.66
	At most care should be taken to preserve the natural enemies, while going for chemical control of paste	110.00	91.67	10.00	08.33
	STL based fertilizer application will help to avoid pollution	95.00	79.17	25.00	20.83
	Now, the situation is so emergent that we have to go for minimum use of chemical inputs to avoid environmental hazards	106.00	88.34	14.00	11.66

$X_{11.}$	**Community participation**		
	Low	101.00	84.20
	Medium	19.00	15.80
	High	00.00	00.00
$X_{12.}$	**Environmental education**		
	Low	40.00	33.33
	Medium	56.00	46.67
	High	24.00	20.00
$X_{13.}$	**Innovativeness**		
	Low	15.00	12.50
	Medium	44.00	36.66
	High	61.00	50.84
$X_{14.}$	**Information seeking behaviour**		
	Low	37.00	30.83
	Medium	43.00	35.84
	High	40.00	33.33
$X_{15.}$	**Economic motivation**		
	Low	29.00	24.16
	Medium	35.00	29.16
	High	56.00	46.68
$X_{16.}$	**Scientific orientation**		
	Low	37.00	30.83
	Medium	37.00	30.83
	High	46.00	38.34

$X_{17.}$	**Adoption behaviour on IPM practices**	Adopted		Non-adopted	
		Frequency	Percentage	Frequency	Percentage
I.	**Cultural practices:**				
i.	Selection of right season	120.00	100.00	00.00	00.00
ii.	Summer ploughing (recommended tillage operations)	118.00	98.34	02.00	01.66
iii.	Raising pest and disease resistant varieties	50.00	41.67	70.00	58.33
iv.	Maintaining weed free environment	113.00	94.17	07.00	05.83
v.	Training and plastering of bunds	113.00	94.17	07.00	05.83
vi.	Synchronized sowing	114.00	95.00	06.00	05.00
II.	**Mechanical practices:**				
i.	Removal of destruction of pests, infected plant parts	117.00	97.50	03.00	02.50
ii.	Use of light traps	16.00	13.33	104.00	86.67
iii.	Use of sticky traps	02.00	01.66	118.00	98.34
iv.	Use of scarecrow	81.00	67.50	39.00	32.50
III.	**Botanical methods:**				
i.	Use of natural enemies	00.00	00.00	120.00	100.00
ii.	Use of pheromone, traps	15.00	12.50	105.00	87.50
iii.	Use of bio- pesticides	07.00	05.83	113.00	94.17
IV.	**Chemical methods:**				
i.	Use of recommended dose of insecticides and fungicides	00.00	00.00	120.00	100.00
ii.	Use of recommended dose of herbicides	00.00	00.00	120.00	100.00
iii.	Seed treatment with chemicals	00.00	00.00	120.00	100.00
iv.	Avoiding repeated use of same pesticides	00.00	00.00	120.00	100.00
v.	STL recommended fertilizers	00.00	00.00	120.00	100.00

of farming experience with medium sized land holdings (5-10 ac) and medium farm power utilization behaviour. More than half of the respondents depended on both canal and well for irrigation and had low livestock possession. Again a majority of the respondents had medium level of cropping intensity and had not disposed the farm waste in a way that would reduce the environmental issues documented. Regarding community participation, the respondents possessed low level of community participation to protect the environment but showed their great concern for environment. More than two-third of the respondents had medium to high level of environmental education, innovativeness, information seeking behaviour, economic motivation and scientific orientation. Among the integrated pest management practices, cultural and mechanical practices were widely adopted by the majority of the respondents where as none had adopted botanical and chemical methods. The results inline with Subramanian, 2000; Varghese, 1998

Awareness of environmental issues

It refers to the familiarity of the farmers about the environmental issues documented in the study area due to intensive cultivation practiced by them. It shows whether they are aware of the various issues prevailing in their surroundings or not. Responses of the respondents on the awareness of environmental issues of their locality are presented in Table 2 and the findings are discussed below.Almost all the respondents were aware about ground water recharge potential reduction, residue of chemical, in crop produce, pollution of air, farm workers health hazards. Majority of the respondents (89.17%) were aware that there is loss in soil inherent fertility, about 86.67 per cent were aware about degradation of cultivation land, 85.84 per cent were aware about the depletion of nutrients in soil by intensive cultivation and equal percentage of the respondents were aware about reduction in biodiversity of natural enemies (80.84%) and contamination of irrigation water (80.00%) respectively. only (59.17%) of the respondents were aware about soil compaction. With regard to other issues prevailing in the study area, all the respondents were aware, that dumping of wastes causes pollution. And 87.50 per cent were aware about Parthenium weed menace and 59.17 per cent were aware about increasing rate of cultivable waste land.

Perception of environmental issues

It refers to the opinion of the farmers about the environmental issues documented in the study area. It shows the level of perception of the farmers about the various issues. Thus an attempt was made to study the perception of the respondents were presented in Table 2.

Almost all the respondents agreed that rainwater is lost due to reduced percolation into compact soil and thus groundwater recharge potential is reduced. Similarly all the respondents had perceived rightly that excessive use of chemical, dipping of vegetables in insecticides leave residues in crop produce, burning coir pith will pollute the air, and improper handling of chemicals without precautions will result in several health hazards among farm workers. Almost equal percentage of the respondents (83.34%) possessed right perception that more application of chemical inputs and less use of organic manure would result in loss of inherent soil fertility and indiscriminate use of insecticide for crop protection would reduce the natural enemies in the ecosystem and 82.50 per cent of the respondents agreed that intensive cultivation would result in depletion of nutrients in soil.

Adoption of high yielding varieties require heavier chemical inputs and which result in degradation of cultivable lands and mixing of leached chemicals would contaminate irrigation water were agreed by 77.50 per cent and 75.00 per cent of the respondents respectively. Nearly 55.00 per cent of the respondents had right perception that use of heavy machineries and deposition of heavy metals will result in soil compaction. With regard to other issues in the study area, every one possessed right perception about Parthenium weed problem, dumping improper disposal of wastes (municipal, household, animal slaughter, hospital waste) will lead to pollution. One-third of the respondents agreed that deposition of silicon dust from quarry will increase the rate of cultivable waste land.

Table 2. Distribution of respondents according to their awareness and perception about environmental issue

Sl. No.	Environmental issues on awareness and perception		Awareness				Perception			
			Aware		Not-aware		Agree		Disagree	
			F	%	F	%	F	%	F	%
1.	E.I.:	Soil inherent fertility loss	107	89.17	13	10.83				
	Per:	More application of chemical inputs & less use of organic manures					100	83.34	20	16.66
2.	E.I:	Soil compaction	71	59.17	49	40.83				
	Per:	Use of heavy machineries and deposition of heavy metals					65	54.17	55	45.83
3.	E.I.:	Depletion of nutrients in soil	103	85.84	17	14.16				
	Per:	Intensive cultivation of land without leaving in fallow					99	82.50	21	17.50
4.	E.I:	Degradation of cultivable land	104	86.67	16	13.33				
	Per:	Adoption of high yielding varieties + application of more chemical inputs					93	77.50	27	22.50
5.	E.I:	Groundwater recharge potential reduction	120	100.00	-	-				
	Per	Loss of rainwater due to reduced percolation into compact soil					120	100.00	-	-
6.	E.I.:	Contamination of irrigation water	96	80.00	24	20.00				
	Per	Mixing of leached chemical from the field and household waste water into canal					90	75.00	30	25.00
7.	E.I:	Reduction in biodiversity of natural enemies	97	80.84	23	19.16				
	Per	Indiscriminate use of insecticide for crop protection					100	83.34	20	16.66
8.	E.I.:	Residue of chemicals in crop produce	120	100.00	-	-				
	Per	Excessive use of chemical, dipping of vegetable in insecticide solution, harvesting the produce before degradation of toxicity					120	100.00	-	`-
9.	E.I:	Pollution of air	120	100.00	-	-				
	Per:	Burning of coir pith on road side					120	100.00	-	-
10.	E.I.:	Farm workers suffer due to health hazard	120	100.00	-	-				
	Per:	Improper handling of chemical inputs without necessary precautions					120	100.00	-	-
	Other issues in study area									
11.	E.I.:	Increased rate of cultivable waste land	71	59.17	49	40.83				
	Per:	Deposition of silicon dust from quarry					40	33.34``` `	80	66.66
12.	E.I:	Weed menace	105	87.50	15	12.50				
	Per:	Parthenium pose severe ill effects and problem in cultivating fields					110	91.60	10	8.40
13.	E.I.:	Dumping of waste	120	100.00	-	-				
	Per:	Dumping (or) improper disposal of household, municipal, poultry and animal slaughters and hospital waste					120	100.00	-	-

E.I.: Environmental Issue, Per: Perception

Overall awareness and perception of environmental issues

It could be inferred from the Table 3 that about 49.18 per cent of the respondents were found with high level of awareness about environmental issues followed by 31.66 per cent and 19.16 per cent with low and medium level of awareness. It also found from the Table 3 that about majority (41.68 %) ofthe respondents were found with high perception followed by 36.66 per cent and 21.66 per cent with moderate and less perception about the environmental issues. High level of awareness and perception on the environmental issues of the respondents might be due to the factor such as high literacy, intensive cropping behavior, high environmental education, high innovativeness, high information seeking behavior, high economic motivation and scientific orientation.

Table 3. Distribution of respondents according to their overall awareness and perception about environmental issues

Sl. No.	Category	Awareness		Perception	
		Frequency	Percentage	Frequency	Percentage
1.	Low	38	31.66	26	21.66
2.	Medium	23	19.16	44	36.66
3.	High	59	49.18	50	41.68

Relationship between the profile characteristics of the respondents with their awareness

This section deals with the contribution of the independent variables with that of the dependent variable namely awareness. Correlation and multiple regression were performed to study the relationship, contribution and effect of independent variables were presented in Table 4.

Correlation

It is evident from the table that out of the seventeen independent variables, educational status (X_2), concern for environment (X_{10}), environmental education (X_{12}), innovativeness (X_{13}), information seeking behavior (X_{14}) and economic motivation (X_{15}) had shown positive and significant association with the awareness of the respondents at one per cent level of significance. Further, the correlation values of the remaining eleven variables showed non-significant association with awareness of the respondents. Thus it may be stated that awareness was a function of educational status, concern for environment, environmental education, innovativeness, information seeking behavior and economic motivation.

Multiple regression

Multiple regression was preferred to find out the extent of contribution of each character towards awareness of the respondents. The results are presented in Table 4.The table indicated that R^2 value was 0.468 and this indicated that 46.80 per cent of variation in the awareness level was explained by the seventeen independent variables selected for the study. The F-test for R^2 showed statistical significance. The multiple regression equation was fitted for awareness level of the respondents with the seventeen independent variables as given below:

$$Y = 12.993 + 0.040\ X_1 + 0.173\ X_2^{*} - 0.052\ X_3 + 0.025\ X_4 + 0.089\ X_5 + 0.016\ X_6 - 0.194\ X_7 - 0.002\ X_8 + 0.014\ X_9^{*} + 0.238\ X_{10}^{**} - 0.009\ X_{11} + 0.239\ X_{12}^{*} + 0.486\ X_{13}^{**} + 0.040\ X_{14}^{**} + 0.107\ X_{15}^{**} - 0.014\ X_{16} - 0.026\ X_{17}$$

It is evident from the above equation that the partial regression co-efficient of the variables, educational status (X_2), concern for environment (X_{10}), environmental Education (X_{12}), innovativeness (X_{13}), information seeking behavior (X_{14}), economic motivation (X_{15}), were found to be positive and significant in their contributions to the awareness of respondents. The contributions of X_2 and X_{12} were significant at 5% level of significance. The others $X_{10,}$ $X_{13,}$ X_{14} and X_{15} had contributed significantly at 1% level of

significance. The strength of contribution of these variables can be explained, *ceteris paribus,* as one unit increase in educational status, concern for environment, environmental education, innovativeness, information seeking behavior, economic motivation result (or) would bring 0.173, 0.238, 0.239, 0.486, 0.040, 0.107 units increase in awareness of the environmental issues.

The formal education in schools and colleges and the environmental education through listening to radio, television, reading newspaper, journals exposure to poster, banners and exhibitions would have helped in gaining awareness about various environmental issues. These could be the reasons for positive and significant contribution of education and environmental education with awareness of the respondents. Exposure to different environmental issues through education and environmental education would naturally induce/create concern for environment in an individual and there by one could try to protect and conserve the environment. Information seeking behavior, innovativeness and economic motivation had shown positive and significant influence with awareness. Information seeking behavior, Innovativeness, Economic motivation are the important factors, which would help the respondents to gain information about new

Table 4. Correlation and multiple regression analysis of profile characteristics of the respondents with their awareness

Variable No.	Variable	'r' value	Regression coefficient	Std. Error	't' value
X_1	Age	0.024	0.040	0.143	0.282^{NS}
X_2	Educational status	0.267**	0.173	0.085	2.0300*
X_3	Farming experience	0.002	-0.052	0.196	-0.264^{NS}
X_4	Farm size	0.031	0.025	0.149	0.168^{NS}
X_5	Farm power utilization	0.046	0.089	0.071	1.255^{NS}
X_6	Source of irrigation	0.011	0.016	0.102	0.157^{NS}
X_7	Lives stock possession	-0.018	-0.194	0.119	-1.634^{NS}
X_8	Cropping intensity	-0.111	-0.002	0.004	-0.468^{NS}
X_9	Farm waste disposal behavior	0.024	0.014	0.068	0.213^{NS}
X_{10}	Concern for environment	0.255**	0.238	0.089	2.657**
X_{11}	Community participation	-0.033	-0.009	0.010	-0.902^{NS}
X_{12}	Environment education	0.408**	0.239	0.097	2.452*
X_{13}	Innovativeness	0.322**	0.486	0.172	2.817**
X_{14}	Information seeking behavior	0.377**	0.040	0.012	3.307**
X_{15}	Economic motivation	0.381**	0.107	0.035	3.068**
X_{16}	Scientific orientation	0.037	-0.014	0.033	-0.413^{NS}
X_{17}	Adoption behavior on IPM	-0.134	-0.026	0.067	-0.381^{NS}

R^2: 0.4680, F: 5.274^{**}

**Significant at 1% level of significance, *Significant at 5% level of significance, NS: Non-significant

technologies which are highly remunerative. Eventually they would have exposed to various environmental issues. The variables namely education status, concern for environment, environmental education, innovativeness, information seeking behaviour and economic motivation had shown positive and significant association with the awareness of the respondents. This finding inline with(Alagesan,1997; Singh, 2002; Mahindra, *et al*, 2004).

Relationship between the profile characteristics of the respondents with their perception

The contributions by each of theindependent variables in the same set were studied with perception, the dependent variable. To find out the

relationship between the dependent variable 'perception' and the seventeen independent variables the simple correlation co-efficient were worked out and presented in the Table 5.

Correlation

From the table it was clear that each of the five variables namely educational status (X_2), environmental education (X_{12}), innovativeness (X_{13}), information seeking behaviour (X_{14}), economic motivation (X_{15}), had positive and significant relation with perception at one per cent level of significance. Adoption behavior on IPM (X_{17}) showed a negative and significant relation with perception at one per cent level of significance. The correlation values of remaining eleven variables showed non-significant association with perception of the respondents. Thus it may be stated the perception was a function of educational status, environmental education, innovativeness, economic motivation, scientific orientation and adoption behavior on IPM.

Multiple regression

Multiple regression analysis was carried out to find out the extent of contribution of each character towards the perception level of the respondents. The table showed that 'F' value ofR^2 was significant and R^2value was 0.481. This indicated that 48.10 per cent variation in the perception level was explained by the seventeen independent variables selected for the study. Since the 'F' value was significant the multiple regression equation was fitted for the perception of the respondents as given below.

$Y = 19.876 - 0.273\ X_1 + 0.260\ X_2^{**} - 0.108\ X_3 + 0.134\ X_4 + 0.019\ X_5 + 0.237\ X_6 - 0.029\ X_7 - 0.015\ X_8^{**} - 0.110\ X_9 + 0.084\ X_{10} + 0.004 X_{11} + 0.341\ X_{12}^{**} + 0.432\ X_{13}^{*} + 0.032\ X_{14}^{*} + 0.098\ X^{*}_{15} + 0.009\ X_{16} - 0.145\ X_{17}$

Table 5. Correlation and multiple regression analysis of characteristics of farmers with their perception

Variable No.	Variable	'r' value	Regression coefficient	Std. Error	't' value
X_1	Age	-0.123	-0.273	0.166	-1.644^{NS}
X_2	Educational status	0.295**	0.260	0.099	2.619**
X_3	Farming experience	-0.023	-0.108	0.228	-0.472^{NS}
X_4	Farm size	0.072	0.134	0.174	0.772^{NS}
X_5	Farm power utilization	0.019	0.019	0.083	0.233^{NS}
X_6	Source of irrigation	0.090	0.237	0.119	1.991^{NS}
X_7	Lives stock possession	0.062	-0.029	0.138	-0.210^{NS}
X_8	Cropping intensity	-0.170	-0.015	0.005	-2.936**
X_9	Farm waste disposal behaviour	-0.052	-0.110	0.079	-1.397^{NS}
X_{10}	Concern for environment	0.172	0.084	0.104	0.802^{NS}
X_{11}	Community participation	-0.005	0.004	0.011	0.392^{NS}
X_{12}	Environment education	0.436**	0.341	0.114	3.000**
X_{13}	Innovativeness	0.316**	0.432	0.201	2.152*
X_{14}	Information seeking behaviour	0.296**	0.032	0.014	2.253*
X_{15}	Economic motivation	0.354**	0.098	0.041	2.395*
X_{16}	Scientific orientation	0.081	0.009	0.038	0.232^{NS}
X_{17}	Adoption behaviour on IPM	-0.241**	-0.145	0.078	-1.851^{NS}

R^2= 0.4810 F= 5.554^{**}

**= Significant at 1% level of significance

*= Significant at 5% level of significance

NS = Non-significant

It is evident from the above equation that the regression coefficients of the variable namely educational status (X_2) and environmental education (X_{12}) were positive and significant in their contributions to perception of respondents at one per cent level of significance. Cropping intensity (X_8) had a negative and significant association with perception of respondents at one per cent level of significance. Further, innovativeness (X_{13}), information seeking behavior (X_{14}), economic motivation (X_{15}) were found to have positive and significant contribution to perception of respondents at five per cent level of significance. The equation further indicates that the strength of variables can be explained, *ceteris paribus,* as one unit increase in educational status, environmental education, innovativeness, information seeking behavior, economic motivation would result an increase in the perception level of the respondents on the environmental issues by 0.260, 0.341, 0.432, 0.032 and 0.098 units. A unit increase in cropping intensity would decrease the perception level by 0.015 units. Formal education and Environmental education help the respondents to gain awareness about the environmental issues which further influence the perception of respondents on environmental issues. This would be the reason for positive and significant contribution of educational status and environmental education with perception of the respondents. Information seeking behavior is the frequency of utilization of localite and cosmopolite (personal and impersonal) sources to get information. Increased information seeking behavior would lead to the increase in awareness and perception level of the respondents. When the profit and relative value placed by the farmer on economic ends is high, they would adopt the new ideas earlier, thus their exposure help them to gain awareness which will lead to perception. This might be the reason for positive and significant contribution of economic motivation and innovativeness with perception of the respondents. Cropping intensity had shown negative and significant contribution with perception of respondents. Those farmers who practice intensive cultivation are more concerned about economic ends than protecting the environment. Variables namely, educational status, environmental education, innovativeness, information seeking behavior, economic motivation, had found to have a positive and significant relation with perception of the respondents. Adoption behavior on IPM had shown a negative and significant relation with the perception of respondents.The regression coefficients of the variables, namely educational status, environmental education, innovativeness, information seeking behavior, economic motivation, were found to contribute positively and significantly to perception of respondents while cropping intensity was found to have negative and significant association with perception of the respondents. This finding inline with (Elangovan, 1997; Arunachalam, 2003).

Conclusion

The study clearly established that the farmers of the study area had awareness and perception about the environmental issues and thus training program, follow-up programs and necessary steps should be taken to develop favourable attitude among the farmers to adopt eco-friendly practices.

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