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Investigating Barriers to Adoption of Integrated pest management Technologies in Iran

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ABSTRACT

Integrated pest management is one of the sustainable agricultural strategies. IPM encompass the total package methods to control or manage pests and disease in crops. It provides a system approach to pest management and decrease pesticide using and it uses sustainable method. Farmer's participation is the key of IPM success and can help obtaining sustainable agricultural. It needs to detect the barriers of adopting integrated pest management. This research was done with aim to study the barriers of adopting integrated pest management in Iran. A questionnaire was used to collect data. For determining the validity of questionnaires, the content validity was used. Cronbach's alpha was used to measure reliability of the instrument, which was 95.9% and showed the instrument reliability. SPSS/Win software was used for data analyzing. This research studies 68 farmers that attending IPM classes. The firstpriority of barriers to adoptionintegrated pest management in Iran is "lack of farmer's assurance to control pests with pest management methods". The lastprioritization of barriers of adopting integrated pest management in IRAN is "lack of government's support for integrated pest management methods".

Key words: Integrated Pest Management (IPM), sustainable agriculture, pesticide, barriers, adoption.

INTRODUCTION

In the past three decades the concept of sustainable agriculture evolved as an answer to the negative impacts of conventional farming. There remains disagreement among farmers, the general public, and even agricultural professionals about what the concept means.Sustainable agriculture is a key element of sustainable development and essential to the future well being of the planet. Sustainability aims to achieve adequate safe and healthy food production, improved livelihoods of food producers and the preservation of non-renewable resources [1].

One of the major objectives of sustainable agricultural systems is to reduce inputs into crop production. One way in which this objective can be achieved is through integrated pest management (IPM), rather than sole reliance on pesticides [2].

Increasing agricultural production through heavy use of pesticides and inorganic fertilizers is now recognized as a threat to the natural resource base. Environmental concerns such as depletion of natural resources, pollution of soil, air water and chemical residues in foods have become important topics in agricultural production. Subsequently, the demand for Integrated Pest Management (IPM) has increased due to negative effects observed from use of pesticides[3].

IPM is a strategy which encourages the reduction of pesticide use by employing a variety of pest control options in combination to contain or manage pests below their economic injury levels. Implementation and adoption of an Integrated Pest Management strategy can help to reduce environmental and human health risks and reduce pest management costs[4]. IPM is a vital component of agro-ecological engineering for sustainable development of agriculture. IPM programs utilize all possible control strategies, including biological control, cultural control, environmentally sound chemical control and ecosystem health techniques, with the goal of reducing purchased inputs while maintaining the yield, quality and profit of crops[5].

Indeed, Integrated Pest Management, or IPM, is a method used to control pests in an environmentally responsible manner. By reducing our dependence on pesticides, IPM protects the environment and our health. It also saves money. IPM can be applied wherever pests are found: on and in farms, schools, homes, hospitals, restaurants, golf courses and home gardens. IPM combines different techniques to prevent pest damage without harming the environment. Pests can include insects and mites, rodents and certain birds, plant diseases, and weeds. IPM practices include monitoring, modifying pest habitat, protecting natural enemies, and, when needed, the use of pesticides [1].
In summary, integrated pest management (IPM) helps growers use pesticides wisely in combination with other approaches to minimize economic, health and environmental risks. IPM provides a system for growers to use knowledge instead of just pesticides to control pest problems. To make good choices about control, growers need knowledge gained from training and observations in the field. This includes education about pest life cycles, scouting for pests and the impact of pesticides[2]. IPM's systematic approach helps growers use information to make sound decisions about pest control that take into account cost, effectiveness, resistance management and potential environmental impacts. IPM emphasizes a range of options to prevent pest problems – including solutions based on mechanical (e.g., mowing or pruning) or cultural practices (e.g., planting cultivars that match site conditions or are disease resistant) [6]. With improved spray timing, IPM enables growers to use pesticides more efficiently, effectively and safely. Growers can reduce or eliminate practices such as application of broad-spectrum pesticides that disrupt natural processes for controlling pests[1].

Research concluded that attitude towards IPM, Knowledge of IPM and risk bearing ability are the important factors influencing adoption of IPM. Looking to this fact, a study was thought necessary to undertake with one important objective. That is detecting the barriers of adopting integrated pest management in Iran.

MATERIALS AND METHODS

The present study was undertaken on 68 farmers that attending IPM/FFS in KhorasanRazavi(a Province of Iran). The method of this study involves descriptive and quantitative research. The data were collected by questionnaires from 68 farmers. The questionnaire divided in two parts. Part 1 contains demographic data such as age, educational level, agricultural experience and so forth. Part 2 contains barriers to adoption IPM. Those barriers was assessed with likert-type scale (1=low, 2=very low, 3= intermediate, 4= high and 5= very high).

Validity of the instrument was obtained by faculty members at science and research university of Tehran, department of agricultural extension and education. Reliability of the instrument was measured by calculating Cronbach's alpha coefficient, a measure of internal consistency. The reliability was acceptable (alpha=95.9). Data was collected with interview. Data were analyzed using Statistical Package for the Social Science (SPSS). Descriptive statistics was used to analyze the collected data. Descriptive statistics methods like mean, Standard Deviation, Ordinal Cofficient of Variation were used to analyze the data.

RESULTS AND DISCUSSION

Demographic Information of Respondents

Distributional pattern of demographic information of respondents is shown in Table 1. As it can be seen, most frequency of respondents (51%) was between the age of 45-60 years. 45.6% of respondent's experience in agriculture is between 10-20 years. Also the majority education of farmers was primary school (%35). Findings showed that more than half of the respondents (55.8%) had apple orchard less than 1.5 hectares.

Table1. Demographic Information of Respondents

Demographic characteristics	Frequency	%
Age		
<30	3	4.4
30-45	17	25
45-60	35	51
>60	13	19.1
Educational level		
Illiterate	9	13.2
Litarate (not primary school)	11	16.2
Primary school	24	35.3
High school	9	13.2
Post high school	6	8.8
MC	9	13.2
Agricultural experience		
<10	17	25
10-20	31	45.6
20-30	10	14.7
>30	10	14.7
Cultivation area of apple orchard (ha)		
<1.5	38	55.8
1.5-3	23	33.8
>3	7	10.3

Barriers to adoptionintegrated pest management technologies

According to farmers idea the barriers of adopting integrated pest management areprioritized in table 2. That shows lack of farmer's assurance to control pests with IPMtechnologies has first priority of IPM adoption, because of having the lowest extent of ordinal coefficient of variance (ordinal CV= 0.17). Lack of farmer's information about IPM technologies (ordinal CV= 0.22), complexity and difficulty of IPMtechnologies(ordinal CV= 0.25), IPM technologies are expensive (ordinal CV= 0.253), respectively, have allocated priorities from second to forth. In addition, IPM technologies need to have exact discipline and scheduling (ordinal CV= 0.26),the products that produced with IPM technologies are not very different in terms of price with other products (ordinal CV= 0.26), People don't have tendency to use production that produced with IPM technologies (ordinal CV= 0.29) and lack of government's support for IPMtechnologies (ordinal CV= 0.323) with the highest extent of ordinal coefficient of variance have allocated last priorities to themselves.

Table 2:Priority setting of farmers view about barriers to adoption ofIPM technologies

Statement	SD	Median	Ordinal CV	Priority
lack of farmer's assurance to control pests with IPMtechnologies	0.68	4	0.17	1
lack of farmer'sinformation about IPM technologies	0.91	4	0.22	2
Complexity and difficulty of IPMtechnologies	0.75	3	0.25	3
IPM technologies are expensive	0.76	3	0.253	4
IPMtechnologies reduce production	0.77	3	0.256	5
IPM technologies need to have exact discipline and scheduling	0.78	3	0.26	6
The products that produced with IPM technologies are not very different in terms of price with other products	0.80	3	0.266	7
People don't have tendency to use production that produced with IPM technologies	0.87	3	0.29	8
lack of government's support for IPMtechnologies	0.97	3	0.323	9

CONCLUSION

A key concept in IPM programs is the application of decision making processes to determine when a chemical pesticide or other actions are needed or not. Such decisions depend on evaluation of the pest problem often in a quantitative manner. In the evaluation of agricultural crop pests, the point at which the economic benefit of pesticide use exceeds the cost of treatment is commonly referred to as the economic threshold level [7].

In summary, according to the results the majority of the respondents(51%) are in the age of 45-60. It shows that most of the farmers are old and for motivating them we need a good planning according to their perception and age. 45.6% of respondent's experience in agriculture is between 10-20 years. It shows that respondents had enough experience. Also the majority education of farmers was primary school (%35). It shows that respondents didn't have enough and suitableeducation and they need a good program according to their education to introduce with IPM technologies. Findings showed that more than half of the respondents (55.8%) had orchard less than 1.5 hectares.

The result of Ordinal Cofficient of Variation shows the prioritization of barriers to adoptionintegrated pest management in Iran.

The firstpriority of barriers to adoption IPM is "lack of farmer's assurance to control pests with pest management methods". Nalyanya et al. [8] in their studies expressed the effect of IPM school to improve farmer's assurance.

The second barriers of adoption is lack of farmer's information about IPM technologies and the third is complexity and difficulty of IPMtechnologies. Montgomery [3]in her study expressd this result. Her study showed that complexity of IPM technplogies and lack of knowledg less adoption. The lastpriority of barriers to adoptionintegrated pest management in Iran is "lack of government's support for integrated pest management methods

According to these results, extension agent couldn't inform appropriate information about IPM benefits and advantages. It isrecommended that agricultural extension agent educate farmers about benefits of IPM technologies. It revealed the importance of using suitable information canals according to culture, gender, age, literacy and feasibility. Extension agent should use suitable extension educational methods to notify farmers about integrated pest management techniques and skills. That can help farmers to use IPM methods more and improved their assurance about IPM methods to control pest, environmental and economical effects. It shows the importance of using appropriate approaches to inform IPM benefits to farmers.

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