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Effective factors on adoption of intercropping and it's role on development of agricultural sustainable in North of Iran

Hamidreza Doroudian[1], Seyyed Ali Noorhosseini[2*]

[1]*Department of Agronomy, College of Agriculture, Lahidjan Branch, Islamic Azad University, Lahidjan, Iran*

[2]*Young Researchers and Elite Club, Rasht Branch, Islamic Azad University, Rasht, Iran*

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Abstract

This study aimed to identify factors affecting adoption of intercropping in Guilan province, north of Iran was in 2013. This survey was conducted using a questionnaire with open-ended and close-ended questions. In this study, data were collected by 180 farmers in Guilan province, north of Iran (Including villages from cities of *Rasht*, *Some'esara*, *Masal*, *Astaneh-Ashrafieh*, *Lahidjan*, *Siahkal* and *Langerood*). Data were analyzed using the Mann-Whitney test. The results showed that there were a significant differences between intercropping adopters and non-adopters in terms of mean rank of in communication, access to fertilizers, the amount of thought leadership in putting fallow arable land, access to finance / credit / equity investment ($p<0.05$) level associated with promoting agents, attendance rate training, promoting access to fertilizers, access to chemical pesticides, social participation and access to agricultural implements ($p<0.01$).

***Corresponding Author:** Seyyed Ali Noorhosseini ✉ Noorhosseini.sa@gmail.com

Introduction

Today, intercropping increased crop diversity as one of the pillars of sustainability in ecosystems and sustainable agriculture and organic farming is considered to be of special interest. Maximize use of traditional agriculture based on environmental factors and the relationships between plants and their effects on pests and diseases to attend joint intercropping (Setouhian, 1991). Intercropping in many parts of the world were preferred on the monoculture especially in low-lying areas, and popular culture and farmers desire to have this kind. Economic factors such as the number of workers and wage rates, and literacy skills of workers in agriculture, credit and financial resources, product demand and product prices have major impacts on multicultural agriculture and the order in system adopted have cultured (Mazaheri, 1994). Select a multicultural agriculture is depended on to factors such as consumption, employment, farmers and plant growth period depends on soil properties has a major impact on cropping pattern. Almost the only crop cultivated rice in lowland flooding Guilan (other than sandy soils Astaneh Ashrafieh). Possibility of Second or third crop cultivation after rice harvest depends on how the soil can be removed from the flood mode. According to the prevailing view of agriculture was largely based on monoculture, recognizing thoughts and opinions of farmers and researchers to understand the reasons for adoption or rejection of intercropping and monoculture. Certainly only having this information with the promotion of intercropping and crop rotation will be possible to implement. Guilan province although is one of smallest Iran's provinces but this is one of main agricultural polar because of neighboring Caspian Sea, consistent rainfall and plenty moisture. In recent years, there have been many problems in the production (Mahdavi et al, 2004). The province despite having suitable climate conditions, suffers from a severe lack of crop rotation .Especially fields' rice, the province's diversity index is greatly reduced. Subsequently these were attended by increasing index farms to control pests and weeds, proper using of nutrition elements, erosion control, decreasing risks of farmers. The farmers that have low farm fields and their family was used to cultivate farms, certainly they gathered maximum efficiency from labor workers. Because this method of cultivation, the land plots manpower can be reduced to a minimum. In addition, intercropping environmental resources in the temporal and spatial dimensions is considered. A review of previous studies indicates that the components of a mixture of different morphological production rate will be higher than monoculture. Due to the efficient use of resources and thus increases the quantity and quality in intercropping farmers can earn more profits. Multicultural agriculture needs to more managed skills because the cultivate system must be washed from interaction relationship between different plants and addition to vegetative needs and buying production. The purpose of this study was to identify factors affecting farmers' adoption of intercropping in Guilan province, North of Iran.

Materials and Methods

Study area

Study was performed using in Guilan Province, North of Iran (Including villages from cities of *Rasht*, *Some'esara*, *Masal*, *Astaneh-Ashrafieh*, *Lahidjan*, *Siahkal*, and *Langerood*) in 2013 (Fig. 1).

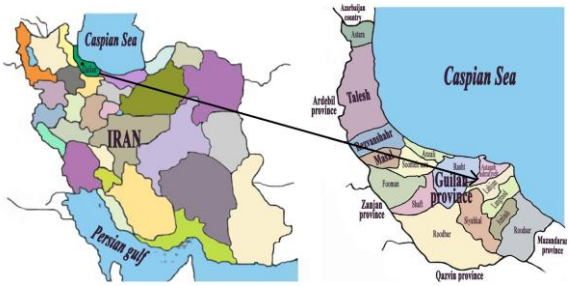

Fig. 1. Site of study.

Sample Size

Respondents were selected from rural areas. A total of 180 farmers were selected using random sampling technique using a table for determining the sample from given population developed by Bartlett et al. (2001).

Data Collection

This survey was conducted using a questionnaire with open-ended and close-ended questions. Face and content validity of the questionnaire was assessed Comments experts and specialists .To test the reliability of the questionnaire, a pilot study was therefore outside the scope of the original study based on the results of the pilot study; the questionnaire was amended and revised.

Data Analysis

The dependent variables in this study were effective factors on adoption of intercropping by farmers in the Guilan province, Iran. In order to analyze Mann-Whiney test was used. Data were analyzed using SPSS 16 software.

Result and Discussion

Factors Influencing Adoption of Intercropping

Mann-Whiney test results showed that significant differences between the two groups of adopters and non-adopters of intercropping in terms of mean scores of actors promoting communication, education attendance rates overall ($p<0.01$), the level of thought leadership in putting fallow arable land, access to finance / credit / equity investments ($p<0.05$) is the highest rank of the corresponding recipients. In other words, these variables increased intercropping increased adoption among farmers. Also significant differences between acceptors and anti-acceptors intercropping in terms of variables associated with the city ($p<0.05$), the availability of chemical fertilizers, chemical pesticides levels of access, social participation and access to agricultural implements ($p<0.01$) found that the highest rank in the anti-acceptors respectively. The Reduce this of variables was cause to increase to adoption of intercropping at farmers. There are also significant differences between the groups in terms of variables between adopters and non-adaptors of intercroping to the location field communication agricultural services; agricultural service center distance between the farm and the amount spent on their products by the farm was not (Table1). In terms of impact and influence of these variables on the adoption of innovations by researchers were reported similar results Pezeshkirad et al (2006); Lashgarara and Asadi (2008); Faraji and Mirdamadi (2006), Darvish et al (2009), Radjabi and Noorhosseini-Niyaki (2011).

Table 1. Characteristics comparison of acceptors and non-acceptors of intercropping using Mann-Whitney.

Characteristics	Groups	Mean rank	Standard deviation	z	p
Distance home from field	Non-adopters	95.20	7235.00	1.505^{ns}	0.132
	Adopters	84.34	8518.00		
Communication with agricultural service center	Non-adopters	92.78	7144.00	0.571^{ns}	0.568
	Adopters	88.80	9146.00		
Farm distance from agricultural cooperatives	Non-adopters	87.84	6500.50	0.090^{ns}	0.928
	Adopters	87.24	8724.50		
Communication with the City	Non-adopters	102.31	7878.00	2.836*	0.005
	Adopters	81.67	8412.00		
Social corporation amount	Non-adopters	106.93	8127.00	4.298**	0.000
	Adopters	75.50	7626.00		
Amount of communication with extension agents	Non-adopters	77.13	5862.00	0.881**	0.004
	Adopters	97.93	9891.00		
Rate of participation in educational – extensional activities	Non-adopters	67.84	5155.50	5.253**	0.000
	Adopters	105.64	10775.50		
Rate of thought leadership in leaving fallow of farm	Non-adopters	50.73	1623.50	2.426*	0.015
	Adopters	67.22	6251.50		

Family Partnership in agricultural activities	Non-adopters	68.51	5001.00	4.368**	0.000
	Adopters	100.50	10050.00		
Access to fertilizers	Non-adopters	103.34	7957.00	3.539**	0.000
	Adopters	80.90	8333.00		
Access to chemical pesticides	Non-adopters	100.38	7729.00	2.580**	0.004
	Adopters	82.16	8380.50		
Access to Agricultural implements	Non-adopters	115.79	8800.00	6.183**	0.000
	Adopters	69.91	7131.00		
Access to finance / credit / investment	Non-adopters	75.03	5402.00	2.529*	0.011
	Adopters	93.19	9133.00		
The rate of Self-consumption of crops by farmers	Non-adopters	93.64	7116.50	1.317ns	0.188
	Adopters	84.60	8459.50		

ns Non significant, *significant at P<0.05, **significant at P<0.01

Intercropping and Its Role on Sustainable Agriculture

Intercropping role in reducing pest and disease may be due to the effects of insecticidal or insect repellency, preventing flying pests and plant utilization of excess reserves is late in damage to a plant. Subjects may have been mixed together and fed at the same rate, resulting in increased performance (Bourgeois and Boote, 1992). In multicultural farms, high plant has a role such windbreakers for small plant and too it protects small plants from wind and cool as such as maize cultivation between soya plants. Fall planting of alfalfa and barley mixed in some parts of the country, the climate in order to fall protection good young alfalfa (FAO, 2002). Plants with primary weak growth will have more weeds if they are cultivated monoculture and the weeds are not control, they will have more effects onto yield. If these plants with other plants that initial growth is rapid (e.g., beans) are grown in mixtures, which prevents the growth of weeds and grass according to Boone et al (1997). In addition to planting mungobean mixed with Indian chickpea production more effective in causing choking weeds and grasses to thus it may be concluded intercropping method is its most innocuous and cheapest way to control weeds is the grass. In intercropping, a plant can be used as other vegetable prices. For example, a mixture of maize and beans cleaners, corn is base-surrender of beans. Culture combined with peas, mustard, mustard role of guardian increase chickpea yield was 40%. If pea is cultivated together avenae, certainly pea uses from avenae as such as base-surrender. Although multicultural method is common method at most wide world of countries but developmental countries hate the method. In some cases, the plants used in intercropping are not the correct choice based on competition between species decreases performance (Boote, 1982). root exudates of one species may have a negative effect on neighboring species (Kouchaki and Sarmadnia, 2007). In some cases, the difficulties of being different nutritional needs and provide appropriate calculation of chemical fertilizers will develop. The use of herbicides or chemical toxins may cause crop yield loss to this type.

Conclusion and Recommendation

The results show that intercropping with higher acceptors promoting agents and further training in the classroom extension to the company. Fallow arable land they share their thoughts on leadership. Agents in connection with the promotion of research and training class. Promote the development of intercropping makes it more specific. Acceptors of multicultural system have low associated with the city of intercropping, social participation and access to fertilizers and agricultural implements. In fact, farmers are less likely to go to the city to meet their needs is the most cultivated variety. This is probably due to less communication with the city's farmers

have less social participation. Since agricultural equipment for planting and harvesting have been developed for monoculture farming, farmers have less equipment, fewer problems, and more intercropping are intercropping. Since agricultural equipment for planting and harvesting have been developed for monoculture farming, farmers have less equipment, fewer problems, and more intercropping are intercropping. Variables such distance between the location of the farm, farming service center of communication, from farm to farm services, the availability of chemical pesticides, the availability of financing and capital to the extent of investment and consumption farmers have lower effects than any other variable in the farmers tend to have a role in multicultural system. Most farmers in connection with the promotion agents training classes. Promote the development of intercropping is recommended. Most cars today have stated that the operation, planting and harvesting of plants that are specially designed to blend probably less used in the cultivation. If farmers intercrop income portion will be effective in the design and manufacture of agricultural machinery performance in this culture must be studied and attempted to develop intercropping.

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