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Knowledge Level of Rice Farmers Regarding Cultivation Practices In Mahanawiyah district, AL-Qadisiya Province, Iraq

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Abstract

Productivity of most common Iraqi rice cultivar was low compared to an average production among major rice-producing countries, this may be due to inadequacy of knowledge and skills of rice farmers about rice cultivation practices. The study was conducted in Mahanawiyah district of AL-Qadisiya Province in Iraq, to assess knowledge level of rice farmers about some rice cultivation practices .The study was conducted with 125 rice farmers selected through random sampling. A structured questionnaire and face-to-face interviews were used to collect data. The findings revealed that half of respondents had medium knowledge level about rice cultivation practices. The respondents have a high level of knowledge in aspect of land preparation and medium level in aspects of marketing, harvesting and post harvesting, fertilization, seed and seedling, and water management. Significant correlation was investigated between respondent's knowledge and educational attainment, years of experience in rice cultivation and annual revenue from rice cultivation. There is a significant difference between knowledge level of respondents depending on these characteristics. For increasing rice production and productivity, improved and scientific rice cultivation practices should be diffused and application by rice farmers.

Keywords: Awareness, Field Crops, Iraq, Production

1. Introduction

Rice (*Oryzae sativa*) is the fundamental principle food for about half of the world's population. In Iraq rice is the most important summer crop. It comes in third place after wheat and barley in terms of area planted and production for 2015 .The area under rice cultivation was 27608 hectare producing 109209 tons of paddy, with an average yield 3.96 Mt.ha^{-1}, its cultivation concentrated in the Middle Euphrates provinces especially AL-Qadisiyah which come first in terms of planted area (16094 hectare) and production (56563 tons), (SCO, 2016).

Rice productivity in Iraq is 3.96 Mt.ha^{-1}, very low compared with Egypt (9.5 Mt.ha^{-1}), Morocco (7.5Mt.ha^{-1}), (AOAD, 2015) ,China (6.7Mt.ha^{-1}), USA(8.3Mt.ha^{-1}), (Mundhe, 2015) and Uruguay (8 Mt.ha^{-1}), (Tarlera *et al*., 2016). Therefore the present level of rice production and productivity needs to be increased. The low yield is mainly due to inadequacy of knowledge and skills of farmers about rice cultivation practices. Several scientists (such as: Mkanthama, 2013; Mohamed *et al*., 2016) have pointed out that knowledge about improved practices is a key factor to achieved good yield from rice, so, we can achieve the required level of production and productivity by improving farmer's skills, experience and knowledge through following the recommended scientific practices; this requires a lot of scientific and research efforts. Identification of knowledge level of farmers will be helpful to identify the aspect of training to be given to rice farmers to increase their skills and productivity.

Several recent studies such as Akinbile (2007), Uddin (2008), Rizwana, and Paris (2009), Balakrishnan and Vasanthakumar (2010), Chandawat *et a l*(2011), Khatik *et al* (2012), Meena *et al* (2012), Singha and Sony (2012), Singha and Devi (2013), Singh and Yadav (2014), Sucheta and Oliver (2014), Indeche and Mwaura (2015) , Nirmala *et al* (2015), Channamallikarjuna and Sadaqath (2016), Salunkhe and Pandya (2016), Singh *et al* (2016) have been conducted in many countries aims at understanding of rice farmers knowledge regarding improved rice cultivation practices. These studies focused on two key points: overall knowledge, and knowledge about aspects and sub-aspects of rice cultivation. We can concluded from the above studies that over half of the respondents had medium level of

knowledge, 20% – 30% had low level , less than 20% had high level of knowledge, rice farmers having medium to high knowledge about aspects and sub-aspects of rice cultivation like; suitable soil type, land preparation, quality seed, spacing, seed rate per hectare, time of sowing/nursery raising, age of seedlings, appropriate dosage of fertilizer, time of first weeding, weeding operations, harmful insects, insect pest control, irrigation management, harvesting, storage, and marketing.

Depending on the economic and fooding importance of rice crop, and the importance of rice farmer's knowledge in increasing production and productivity, this study was undertaken with the following objectives.

Identify knowledge level of rice farmers in Mahanawiyah district, AL- Qadisiyah Province in some rice cultivation practices.

Study the correlation between some characteristics of rice farmers (age, educational attainment, area cultivated with rice, years of experience in rice cultivation work, number of training coerces, annual revenue from rice) and their level of knowledge.

Identify the significant differences between the respondents in their level of knowledge depending on their characteristics.

2. Materials and methods

The study was carried out in AL Qadisyah province, which located in the center-south of Iraq within East longitude 44.24 – 45.49 and North latitude 31.17 -32.24. AL Qadisyah province comprises 15 districts, one of them known as Mahanawiyah, which covers a total of 205 square kilometers of landmass constitute 2.5% of province area, and population stands at 43781 constitute 3.5% of province population, about (77.5%) of them lives in rural area (SDQ, 2016.)

Agriculture is the major source of income for a great number of people of Mahanawiyah district. The major farming activity in the study area is crop-livestock production. Large percent of district area is under rice cultivation. The population for this study consisted of 400 paddy farmers in the district, 10 of them were chosen for testing the questionnaire reliability. From the 390 remaining, 125 farmers were selected at random. A well-structured questionnaire with two parts was used to collect data. The first part included the socio-economic characteristics: age, educational attainment, area cultivated with rice, years of experience in rice cultivation, number of training courses and annual revenue from rice. The second part included 8 aspects of rice cultivation practices with 50 sub-aspects: land preparation (6 sub-aspects), seed and seedlings (13), water management (4), weed management (7), fertilization (5), disease and pest's control (7), harvesting and post harvesting (5), marketing (3).

Content validity of the questionnaire was established by a panel of experts in the field of agricultural extension and rice cultivation. A pilot study was conducted to establish reliability of the instrument, a Cronbach's alpha (a reliability coefficient) of 0.90 was established, indicating the instrument used was reliable and valid.

For each of the 50 sub-aspects, respondents were told to use a 4 Likert-like scale representing the knowledge level where: (4) represent very highly knowledge, (3) highly knowledge, (2) moderately knowledge, (1) slightly knowledge.

Data were collected throw personal interview with respondents during the month of October 2014. Data was analyzed using frequency, percentage, weighted arithmetic mean, simple correlation and Chi-square test. Based on alternatives answers placed of each of the 50 sup aspects a (1-4) numeric value was used. Respondents were classified into 3 categories according to total score including knowledge level: low (50–99), medium (100–149) and high (150–200). For the 8 main aspects and 50 sub-aspects classification was based on knowledge level as: low (1–1.9), medium (2–2.9), and high (3–4). Farmer's knowledge level of aspects and sup-aspects of rice cultivation practices was analyzed separately, weighted mean score were calculated, and the relative importance was ranked in descending order.

3. Results and discussion

3.1 Overall knowledge level of rice farmers

The findings related to farmers' knowledge level indicate that half of the respondents (50.4%) had medium level of knowledge regarding rice cultivation practices. While (29.6%) and (20.0%) of respondents had low and high level of knowledge respectively (see table 1), similar results found by Balakrishnan and Vasanthakumar (2010), Singha and Devi (2013), Singh and Yadav (2014), Singh *et al* (2016), Salunkhe and Pandya (2016). The average knowledge level for all respondents was (119.8) which are within medium level of values ranging between (50-200) numeric values. The findings revealed that vast majority (80%) of respondents had low to medium knowledge regarding cultivation practices, this indicated that more effort by extension agencies are needed to disseminate information about modern rice cultivation practices.

Further, farmer's knowledge about different aspects of rice cultivation practices was analyzed separately. The WE (weighted men Score) were

calculated. The relative importance of all 8 aspects of rice cultivation practices was highlighted by ranking in descending order.

Table 2 the data shows that land preparation aspect be in first ranked in terms of level of knowledge with an average (3.13), followed by marketing (2.98), harvesting and post harvesting (2.65), fertilization (2.43), seed and seedling (2.29), water management (2.17), weed management (1.80) and disease and pests control (1.77). The overall knowledge level index of improved rice cultivation practices were (M = 2.39). This means that aspect of Land preparation were a high level of knowledge ,while aspects of marketing, harvesting and post harvesting, fertilization, seed and seedling, water management were a medium level of knowledge, aspects of weed management, disease and pests control were a low level of knowledge.

With regard to land preparation, majority of respondents (72.8%) felt high level knowledge followed by (18.4% and 8.8%) in medium and low level respectively, this is due the fact that land preparation is the first among many practices in rice cultivation. Appropriate land preparation is one of the key determinates of rice yield, it provides a soil condition that is favorable for plant growth, facilitates water, nutrient, and pest management. Therefore rice farmers were very keen to perform this process in the best way, by increasing their knowledge of this aspect.

Marketing is the last stage of rice production, In Iraq; it is still done in traditional ways, where the harvesting machine unloading the crop into trucks which transfer it directly to government granaries. Majority of respondents (60%) felt high level knowledge followed by (30.4% and 9.6%) in medium and low level respectively.

In aspect of harvesting and post harvesting about (41.6%) of respondents felt high level of knowledge followed by (35.2 and 23.2 %) in medium and low level of knowledge respectively.

In case of fertilization (35.2%) felt low level of knowledge followed by (32.8% and 32%) in medium and high level of knowledge categories respectively. This indicates that rice farmers knowledge in fertilization aspect is within medium category, and they feel the need to increase their knowledge.

With regard to Seed and seedling, (40%) of respondents felt medium level knowledge followed by (38.4% and 21.6%) in low and high level respectively. Seed and seedling practices are very important in rice cultivation, they are influences yield quantity and quality. Always there are new practices and experiences in this aspect; therefore, respondents believe that their knowledge in this aspect is medium.

Water is the most important component for rice production, especially in the traditional rice farming in Iraq which suffers from water scarcity. Rice farmers feel they need more knowledge and experience in water management, so they were distributed according to their knowledge in water management to(46.4%) with low knowledge followed by(36% and 16.7%) in medium and high level respectively.

Weed spreads a lot in rice farms, its affect the quantity and quality of the product. Rice farmers try to control it, but they feel that knowledge of (67.2%) in this aspect is low, while (30.4%) in medium and only (2.4%) in high level of knowledge.

With regard to disease and pests control, majority of respondents (68%) felt low knowledge level followed by (32%) in medium level, so they lose a large percentage of their rice crop to pests and diseases every year .We can point to the low knowledge of rice farmers in this aspect through their high need for training, as indicated byBenard*et.al*.(2014) and Kshash (2016) who found that more than (80%) from rice farmers need training in aspect of disease and pests control.

Regarding rice farmers knowledge level about sub-aspects of land preparation practices, result in Table 3 relevant that respondents have high level of knowledge in time for land preparation (3.74),correct time to start ploughing (3.58), puddling (3.29), and use of tillage equipment (3.12). The results are in conformity with the findings of Chandawat *et al* (2011), Indeche and Mwaura (2015) and Channamallikarjuna and Sadaqath (2016).

About marketing sub-aspect, appropriate time for marketing alone with high knowledge level (3.15), the result is similar to Chandawat *et al* (2011).

With respect to harvesting and post harvesting, respondents have high level of knowledge in time of harvesting (3.34) and preparation of grains for storing (3.15). The results are in line with the research findings reported by Akinbile (2007) and Uddin (2008).

Under fertilization, two sub-aspects with high knowledge level where use of organic manures with fertilizers (3.38) and doses of fertilizers (3.31). These findings got support from the studies conducted by Akinbile (2007), Uddin (2008), Khatik *et al* (2012) and Indeche and Mwaura (2015).

Among the various sub-aspects of seed and seedling practices, seed rate per hectare ranked first in knowledge level (3.18) followed by depth of planting seedlings (3.10). The results were in line with the findings of Akinbile (2007), Uddin (2008), Kirarand Mehta (2009) and Balakrishnan and Vasanthakumar (2010).

Table 1. Overall Knowledge Level of the Respondents about Some Rice Cultivation Practices.

Categories	f	%	Average knowledge level	S.D.
Low (50 – 99)	37	29.6		35.04
Medium (100 – 149)	63	50.4	119.8	
High (150 – 200)	25	20.0		
total	125	100		

Table 2. Categories and Average Knowledge Level in Each Aspect of Rice Cultivation Practices

Aspects	Knowledge level category						Average knowledge
	low		medium		high		
	f	*%*	*f*	*%*	*f*	*%*	
Land preparation	11	8.8	23	18.4	91	72.8	3.13
Marketing	12	9.6	38	30.4	75	60.0	2.98
Harvesting and post harvesting	29	23.2	44	35.2	52	41.6	2.65
Fertilization	44	35.2	41	32.8	40	32.0	2.43
Seed and seedling	48	38.4	50	40.0	27	21.6	2.29
Water management	58	46.4	45	36.0	22	17.6	2.17
Weed management	84	67.2	38	30.4	3	2.4	1.80
Disease and pests control	85	68.0	40	32.0	0	0	1.77

In water management respondents did not reach high level of knowledge in any sub-aspects, time and method of irrigation ranked first (2.72). The results are in conformity with the findings of Kirar and Mehta (2009) and Balakrishnan and Vasanthakumar (2010). Regarding rice farmers knowledge level about sub-aspects of weed management, the highly knowledge level was (2.33) in knowledge of chemical weed herbicides. These findings get support from the studies conducted by Balakrishnan and Vasanthakumar (2010) and Singha and Devi (2013).

With respect to disease and pests control, sub-aspect of identification of pests and their control measures ranked first with (2.17) level of knowledge. The findings of the study were in accordance with the results of Uddin (2008) and Kirar and Mehta (2009).

It is evident from the Table 3 that respondents have high level of knowledge in 11(22%) sub-aspects, they are time for land preparation (3.74),correct time to start ploughing (3.58) , use of organic manures with fertilizers (3.38), time of harvesting (3.34), doses of fertilizers(3.31), puddling (3.29) , seed rate per hectare(3.18), preparation of grains for storing (3.15), appropriate time for marketing(3.15), use of tillage equipment(3.12), depth of planting seedlings(3.10). There is 22(44%) sub-aspects with medium level of knowledge and 17(34%) with a low level of knowledge.

3.2 Relationship between socio-economic characteristics of rice farmers and their level of knowledge

In order to study the relationship between the level of knowledge and the profile characteristics of rice farmers, correlation analysis was done and findings are furnished in table 4.

It is revealed from the table 4 that educational attainment, years of experience in rice cultivation and annual revenue from rice cultivation had positive and significant association with knowledge level of respondents. While age, area cultivated with rice and participate in training courses in rice cultivation were found to be non-significant. Similar findings have been reported by Dhenge *et al* (2014) and Nirmala *et al* (2015).

It's clear that farmer's knowledge increased by increase in educational attainment, years of experience and annual revenue. Education enhances knowledge level of rice farmers, and by increasing the individual's educational attainment, he has access to agricultural information sources. Knowledge is often influenced by years of experience, knowledge increase is often occurred as a result of the integration of knowledge gained from years of experience and added scientific knowledge. Any increase in agricultural annual revenue cannot be reached without application of improved practices which require more knowledge.

3.3 Difference in knowledge level depending on characteristics of respondents

An effort was made to find out that whether the knowledge level of rice farmers varies depending on their characteristics, it is evident from Table 5 there is a significant difference depending on educational attainment, area cultivated with rice, years of experience in rice cultivation, participate in training courses in rice cultivation and annual revenue from rice cultivation, while there is no

significant difference between knowledge level of respondents depending on age. The results show that the highest proportion of respondents with high level of knowledge were among the third category of educational attainment (14%), followed by third category of annual revenue (13.6 %).While the highest percentage of respondents at least level of knowledge within the first category of training courses (17.6%) and second category of both educational attainment and cultivated area (16 %).

Table 3. Weighted Mean for Knowledge Level of Sub-Aspect for Some Rice Cultivation Practices

Aspect	Sub-aspect	Weighted Mean
Land preparation	Time for land preparation	3.74
	Correct time to start ploughing	3.58
	Puddling	3.29
	Use of tillage equipment	3.12
	Depth of plough	2.70
	leveling	2.35
Marketing	Appropriate time for marketing	3.15
	Appropriate method for marketing	2.90
	Appropriate place for marketing	2.89
Harvesting and post harvesting	Time of harvesting	3.34
	Preparation of grains for storing	3.15
	Control of pests and rodents under storage condition	2.65
	Threshing and winnowing	2.14
	Drying of harvested paddy	1.97
Fertilization	Use of organic manures with fertilizers	3.38
	Doses of fertilizers	3.31
	Time and method of fertilizer's application	2.57
	Knowledge about the nutrient content of fertilizer	1.68
	Knowledge of soil testing	1.21
Seed and seedlings	Seed rate per hectare	3.18
	Depth of planting seedlings	3.10
	Selection and healthy seed for sowing	2.98
	Spacing for Transplanting	2.88
	Proper time for seedling preparation	2.64
	Method of sowing	2.38
	Prepare the ground for planting seedlings	2.22
	Optimum time of sowing	2.16
	Method of seed treatment	1.98
	Preparation of nursery	1.92
	Age of the seedlings for transplanting	1.85
	Collecting of seedlings	1.48
	correct way of planting seedlings in the field	1.00
Water management	Time and method of irrigation	2.77
	Critical stage of water requirement	2.52
	Water level at time of transplanting	2.11
	Water level in nursery	1.28
Weed management	Knowledge of chemical weed herbicides	2.33
	Identification of rice weed	2.22
	Method use and doses of weed herbicides	2.14
	Appropriate time for application of weed herbicides	1.95
	Knowledge of cultivation and mechanical practices to preventing weeds	1.72
	Knowledge of preventive culture and mechanical practices	1.18
	Biological weed control	1.10
Disease and pests control	Identification of pests and their control measures	2.17
	Selection of appropriate pesticides	2.12
	Identification of diseases and their control measures	2.00
	Method of application and doses of pesticides	1.77
	Identification of effective factors in rice disease spread	1.64
	Understanding the disease symptoms of rice	1.44
	Appropriate time for application of pesticides	1.25

Table 4. Correlation between the Socio-Economic Characteristics and Knowledge Level of Rice Farmers

Socio-economic characteristics	Correlation Coefficient (r)
Age	0.121 N.S
Educational attainment	0.360*
Area cultivated with rice	0.132 N.S
Years of experience in rice cultivation	0.472*
Participate in training courses in rice cultivation	0.135 N.S
Annual revenue from rice cultivation	0.658*

* Correlation is significant at the 0.05 level

Table 5. Distribution of Respondents According To Their Characteristics and Knowledge Level with Chi Square Values (N=125)

Categories of characteristics		Categories of knowledge level								Chi square
		low		medium		high		total		
		f	%	*f*	%	*f*	%	*f*	%	
Age (years)	28 – 38	15	12.0	23	18.4	6	4.8	44	35.2	
	39 – 49	12	9.6	21	16.8	9	7.2	42	33.6	2.136
	50 – 60	10	8.0	22	17.6	7	5.6	39	31.2	
	total	37	29.6	63	50.4	25	20.0	125	100	
Educational attainment	< secondary	10	8.0	10	8.0	2	1.6	22	17.6	
	secondary	20	16.0	25	20.0	5	4.0	50	40	17.00*
	university	7	5.6	28	22.4	18	14.4	53	42.4	
	Total	37	29.6	63	50.4	25	20.0	125	100	
Area cultivated with rice (ha)	< 6	15	12.0	10	8.0	0	0	25	20	
	6 – 10	20	16.0	30	24.0	10	8.0	60	48	20.299*
	> 10	2	1.6	23	18.4	15	12.0	40	32	
	Total	37	29.6	63	50.4	25	20.0	125	100	
Experience in rice cultivation (years)	8 – 18	7	5.6	25	20.0	3	2.4	35	28	
	19 – 29	13	10.4	28	22.4	12	9.6	53	42.4	14.712*
	30 – 40	17	13.6	10	8.0	10	8.0	37	29.6	
	Total	37	29.6	63	50.4	25	20.0	125	100	
Participate in training courses	Non	22	17.6	40	32.0	6	4.8	68	54.4	
	1 – 2	13	10.4	16	12.8	9	7.2	38	30.4	19.359*
	3 – 4	2	1.6	7	5.6	10	8.0	19	15.2	
	Total	37	29.6	63	50.4	25	20.0	125	100	
Annual revenue from rice (1000$)	< 15	14	11.2	13	10.4	5	4.0	32	25.6	
	15 – 25	11	8.8	30	24.0	3	2.4	44	35.2	17.224*
	> 25	12	9.6	20	16.0	17	13.6	49	39.2	
	total	37	29.6	63	50.4	25	20.0	125	100	

*chi square is significant at the 0.05 level

4. Conclusion and recommendations

Based on findings of present study, it can be concluded that selected rice farmers in this study are small scaled farms, the average area cultivated with rice was 9.4 hectare, with an average of 24.2 years as experience in rice cultivation. More than (40%) of them had university degree level. Half of the rice farmers (50.4%) had medium knowledge level regarding improved rice cultivation practices. Looking to main aspects, rice farmers perceived maximum knowledge level in land preparation (3.13) and medium level of knowledge in aspects of; marketing, harvesting and post harvesting, fertilization, seed and seedling, and water management. With regard to land preparation, majority (72.8%) of respondents felt high level of knowledge. Rice farmers give highest weighted score to practices like time for land preparation, correct time to start ploughing, use of organic manures with fertilizers, time of harvesting, doses of fertilizers. There is a positive and significant correlation between educational attainments, area cultivated with rice, annual revenue from rice cultivation and knowledge level. There are significant differences between the respondents in terms of knowledge level depending on educational attainment, area cultivated with rice, years of experience in rice cultivation,

participate in training courses in rice cultivation and annual revenue from rice cultivation.

In the light of study findings, we proffer the following recommendations:

1. For increasing rice production and productivity, improved and scientific rice cultivation practices should be diffuse and application by rice farmers in all aspects of rice cultivation especially and disease and pests control, weed management, water management, seed and seedling, fertilization , harvesting and post harvesting ,and marketing.
2. Training course should be conducted for rice farmers in aspects and sup aspects where respondents showed a low and medium knowledge level.
3. More similar studies should be conducted in another districts and provinces to know rice farmers knowledge level in more aspects and sub-aspect of rice cultivation practices.

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