

Factors Influencing Adoption of Improved Farm Practices among Women Farmers in Northern Jordan

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Abstract: The study assesses the factors influencing adoption of improved farm practices among women farmers in three agricultural rejoin in Northern Jordan. A total of 160 women farmers were randomly selected and information was collected through a pre-tested structured interview schedule. Descriptive statistical techniques like frequency counts mean and percentages were used to analyze the data. For inferential statistics correlation was used to determine the relationship between the variables. The study showed that the majority (81.75%) of the women farmers are in the age range between 21-50 years. About 83.75 percent are married while 10 percent are illiterate. Majority of the women farmers are small scale with mean farm size 15 donums. The data showed that credibility ($r = 0.469$), cost ($r = 0.359$), land tenure ($r = 0.319$), divisibility ($r = 0.277$), communication ability ($r = 0.254$) and relative advantage ($r = 0.247$) had positive and significant relationship with adoption of innovation. Furthermore; the study concluded that innovations which are costly and complex for the farmers to apply will not receive the good will of the farmers hence their rejection. Therefore; the extension agent or agencies of agriculture should make sure that the innovations taking to farmers must be relatively affordable so that it would be within the economic reach of the farmers. It should also be simple for the farmer to understand and use by themselves without much external assistance. Also innovations to be introduced must conform to norms and the belief of the people.

Key words: Adoption of innovation • improved farm practices • rural women • women farmers

INTRODUCTION

Rural women have been suffering serious problems all over the world. The situation has been worse in the developing countries generally, despite the existence of plans and policies for integrating rural women in to the development process [1]. Women living in rural areas, which are still home to 22 percent of the population deserve special attention, as their living conditions differ in many ways from those of urban women. To begin with, the living standards of their families are lower and they live in slightly larger but significantly poorer families which in comparison to urban families have less access to clean water, sanitation and sewage disposal and are less frequently connected to electricity supply systems. This, of course, reflects negatively on the quality of life of the women, who are usually the main household managers. Rural women are also disadvantaged with regard to education and health:

30.3 percent of rural women are still illiterate, as compared to 17.8 percent of women living in urban settlements. Although their rate of participation in the basic education cycle does not differ, significantly, less rural women than urban women acquire secondary school and higher education. This is partly due to the general lack of secondary schools and colleges outside the main cities, but it is greatly exacerbated by the fact that those fewer available facilities cater first and foremost to male students. The comparatively small numbers of rural women with intermediate diplomas or with bachelor, masters or higher studies degrees have very restricted employment opportunities [2].

Rural women, play a significant role in many agricultural activities in many countries [3]. Women activities include plant and animal production activities such as production of food for the household, planting and weeding, harvesting and post harvest activities, livestock care and commercial farming. Specific tasks

and activities are regarded in some societies as predominately female work. They are generally tedious and time consuming tasks and considered as household duties rather than work. Women time and mobility are constrained by their multiple domestic, reproductive and agricultural roles. Besides, there are more barriers that prevent women from improving their agricultural productivity than men. However, the role of women in agriculture and in rural development is increasingly recognized both at national and international levels. Women play a significant role in many agricultural activities; they produce over half of the world's food [4] and account for 50 percent of the total labor force engaged in agriculture [5, 6].

Rural women have a much reduced access to agricultural extension services worldwide compared to men and technology is rarely designed specifically to address their gender-based needs. In Africa only 7 percent of all agricultural extension resources were allocated to women farmers and home economic extension received only 1 percent of the resources. In the Sudan, for example in the Gezira irrigation scheme out of 120,000 farmers targeted by the agricultural extension services only 11 percent were women. The main constraints limiting women's access to extension services were related to cultural restriction, domestic responsibilities, mobility limitations and even language barriers [7].

Inadequate attention has been paid to the role of women in technology, while technology plays a decisive role in the process of agricultural development. Women rarely have access to labor saving gender-specific technologies for farm and home activities [8]. Moreover, women are under-served also by the private input supply system as women were found to constitute only 3 percent of target group [9]. However, women farmers are under-served worldwide. Average percentage of time and resources allocated to women farmers' worldwide was 5 percent and the percentages in different regions of the world by extension organizations in 1989 ranged between 1 to 9 percent. Lowest percentage was observed in North America and highest percentage was found in the Near East region [10].

Studies of Jordanian agriculture have focused on labor use and the division of labor on farms. Several studies documented that Arab rural women provided up to 70 percent of the agricultural labor in many Arab countries, either as owners of land or as hired laborers [11]. According to a report on status of women in Jordan [12], the economic activity rate is estimated to be 11.7 percent for women and 65.5 percent for men.

Female economic activity is only 9 percent in rural areas. The lowest economic activity rate is in Zarka (8.3%), while the highest is found in Karak (15.9%). Only 4.1 percent of the total employed population (15+ years of age) works in agriculture, hunting and forestry (4.2% male and 2.9% female). According to the field survey (MOA, 2004), the percentage of working females in agriculture is around 25 percent of the number of male workers. The highest rate is found in Ajloun (31%), followed by Aghwar (30%) and Badia (17%) [13], suggested that the main constraints facing women working in agriculture are: a) Norms and traditions that stop women from working outside the family farm unit, b) National statistics neglect to record the role of working women in the family and c) Lack of job opportunities for women, as compared to men.

In a study in north of Jordan in Irbid found that the farm household contributed 19 percent of the total labor requirements of cereals and legumes under rain-fed conditions. Females' contribution was found to be quite limited as it amounted to about 3 percent of the total labor, but it represented 16.7 percent of the household labor. Females' contribution was relatively high in planting and fertilizing, medium in threshing, manual harvesting and low in weeding, cleaning and transport. Weeding is the most important activity of women in cereal production (56% of total wives work) planting (23%) and manual harvesting (13%). Weeding is the most important activity of women in legume production (54% of total wives work), manual harvesting (36%) and transport (7%). Contribution of hired female labor was more significant in cereal production than legumes (17% against 0.4%). Highest contribution in cereals was in winnowing and cleaning, threshing and manual harvesting, while contribution in legumes was limited to winnowing and cleaning (26% of the total labor of this activity). One explanation for the minor contribution of females was the introduction of mechanical harvesting and the adoption of herbicides has displaced women from agricultural work. Another reason was related to social consideration that is the wish of farmers for not to allow their wives or daughters to be involved on farm work off the house. A further explanation would be that farmers refrain from disclosing farm work of female's family members [14].

In a survey in Al-Azraq area in Zarqa Governorate found that women's contribution in agricultural work was restricted to home gardening. The motives for all respondents were to improve the standard of living for the family. Growing vegetables and fruit trees were the main plant production activities. Ninety two percent of the sample was found to be raising few animals (i.e. 20 birds,

1-3 sheep or goat) and few have two cows. Thirty percent were found to be working as wage labor off the house. Thirteen percent of women were found to own the land and 9 percent were found to be able to take independent decision with regard to agricultural work. None was found to use any machinery. Seventy one percent were found to be spending 1-2 hours in farm work. Farm inputs were found to be secured through the husbands. Twenty percent of women were found to be getting credits from commercial bank, which was found to be used by the husbands. Women contribution was highest in caring for domestic animals, except shepherding and wool shearing, weeding, harvesting, transportation and storage (75%). Medium contribution was observed in planting (45%) and marketing (40%). Low contribution was observed in ploughing (20%) and minor contribution in pruning trees (5%). Food processing (using traditional methods) was found to be exclusively female work such as bread making for sale, pickling, tomato paste, drying vegetables and dairy products. It was concluded that extension services should be enhanced for home gardening and home economics [15].

It becomes imperative that women have significant roles to play in increasing agricultural productivity in the country. On the other hand, this realization of the high potentials of women have made government to shift ground and focused them in the development, especially in agricultural sector. Programs of development were focused on them: Participatory Support and Land Development Project (1997-2001), Income Resources Diversity Project (1995-2001), Agricultural Resources Management Project in Yarmouk Basin River (2000-2006), Agricultural Exhibition Project (2001), Project Designed to Increase of the Income of Rural Woman in the Eastern Region (1999-2001), Laying Poultry Production Project (2002), Permanent Exhibition For Rural Products Project (2001-2002) and Establishment of Dairy Units Project in Jordan's Badia. However, it was reported that the projects partly succeeded in achieving the following among the agricultural environments [16].

- Increasing income-generating capabilities of rural women.
- Increasing women farmers' involvement in production activities by applying modern methods for soil/water conservation and planting fruit trees.
- Improving living conditions of targeted women's groups.
- Help the rural families in marketing their products.
- Increasing communication and networking among

production associations in different municipalities through the agricultural departments.

- Establishing a permanent exhibition for rural products
- Raising and improving rural women's skills in dairy product manufacturing.
- Training women in targeted categories.
- Promoting the development and use of appropriate agricultural technologies among women.

Despite all these that were done among women farmers, agricultural production still remain subsistence and the food production can not cope with the teeming population of the country. Therefore this study found out what are the factors that could still be responsible for the low productivity of agricultural output among women farmers.

Objectives of the study: The main objective of the study is to investigate the factors influencing adoption of improved farm practices among women farmers in Northern Jordan.

The specific objectives are to:

- Identify the socio-economic characteristics of the women farmers.
- Determine the improved farm practices passed to farmers.
- Examine sources of information of improved farm practices.
- Determine the adoption of improved farm practices.
- Investigate the factors influencing adoption of farm practices.
- Determine the characteristics of the improved farm practices.

Hypothesis of the study: There is no significant relationship between factors affecting innovation and adoption of improved farm practices.

Methodology: This study was carried out in the three agricultural areas of Northern Jordan (Badia region, Bani Kinana District and Ajloun governorate). A multistage sampling technique was employed to select the blocks, cells and villages used for the study. Simple random sampling techniques were used to select 160 women farmers in all study area. A well structured pre-tested and validated interview schedule was used to collect information from the women farmers during the year 2005 and 2006. Information was collected on the

demographic characteristics of the farmers, various sources of information available to them, factors influencing adoption and adoption of improved farm practices.

Measurement of variables: The dependent variable is the adoption of improved farm practices among women farmers which was measured by using the 5 point scale stages of adoption. Awareness (1 point), Interest (2 points), Evaluation (3 points), Trial (4 points) and Adoption (5 points). The minimum score for adoption was 11 points while the maximum score was 55 points. The independent variables are demographic characteristics of the women farmers, sources of information and factors affecting adoption of improved farm practices.

RESULTS AND DISCUSSION

Socio-economic characteristics of the women farmers:

Data in Table 1 show the distribution of women farmers by demographic characteristics. The data showed that majority (81.25%) of the women were in the age range of 21-50 years, 12.5 percent were less than 20 years old while 6.25 percent were 50 years and above. About 83.75 percent were married, 6.25 percent were single and widowed respectively and 2.5 percent were divorced while 1.25 percent was separated.

About 48.75 percent of the women farmers had primary school completed, 15 percent had secondary school education while 13.75 percent of the women had adult literacy education. Also 12.5 percent had community college degree education but 10 percent of the women farmers had no education at all. Majority (87.5%) had their farm size between 1 and 10 donum. About 6.25 percent had farm size between 21-30 donum while 5 percent had between 11-20 donum but only 1.25 percent had farm size of 31 donum and above.

Majority (73.75%) of the women farmers had years of experience between 6-20 years, 22.5 percent had experience between 1-5 years while 3.75 percent had experience over 21 years.

Improved farm practices: Data in Table 2 show the distribution of improved farm practices passed across to women farmers. A hundred percent each identified application of fertilizers, use of crop residue, planting spineless cactus, milk processing techniques, planting of improved vegetable varieties, incorporate vetch in the crop rotation and using of the whole package of barley

Table 1: Distribution of women farmers by demographic characteristics

Characteristics	Frequency	Percentage
Age		
Less than 20 years	20	12.50
21-30 years	30	18.75
31-40 years	70	43.75
41-50 years	30	18.75
51-and over	10	6.25
Marital Status		
Single	10	6.25
Married	134	83.75
Divorced	4	2.50
Separated	2	1.25
Widowed	10	6.25
Education Level		
Illiterate	16	10.00
Adult literacy	22	13.75
Primary school	78	48.75
Secondary school	24	15.00
Community college Degree	20	12.50
Farm Size (donum = 1000 m²)		
1-10	140	87.50
11-20	8	5.00
21-30	10	6.25
31-and over	2	1.25
Farming Experience		
1-5 years	36	22.50
6-10 years	64	40.00
11-15 years	40	25.00
16-20 years	14	8.75
21- and over	6	3.75

Table 2: Improved farm practices

Improved technologies	Frequency	Percentage
Application of fertilizers	160	100.00
Use of crop residue	160	100.00
Use of the whole package of barley planting	160	100.00
Milk processing techniques	160	100.00
Planting of improved vegetable varieties	160	100.00
Spraying of herbicides	120	75.00
Use of uterus synchronization sponges	90	56.25
Feed blocks	150	93.75
Incorporating vetch in the crop rotation	160	100.00
Planting spineless cactus	160	100.00
Adding or and injecting vitamin (AD3E)	80	50.00

planting. About 93.75 percent identified feed blocks, while 75 percent identified spraying of herbicides. About 56.25 percent identified the use of uterus synchronization sponges and 50 percent identified the addition or and injecting vitamin (AD3E).

Table 3: Distribution of women by sources of information

Sources of Information	Frequency	Percentage
Ministry of Agriculture Extension agents, (NCARTT) agents and the Badia Development Center agents	160	100.00
Farmers (NGOs) organization meeting	160	100.00
Contact farmers	140	87.50
Friends and neighbors	120	75.00
Private sector salesman	90	56.25
Agricultural shows and Exhibitions	70	43.75
Demonstration plot	150	93.75
Farmers leaders at local community	160	100.00
Mass media	160	100.00
Bulletins	120	75.00

Sources of Information: The data in Table 3 show the distribution of respondents by sources of information available to them. A hundred percent each of the women farmers acknowledge the Ministry of Agricultural Extension Agents, National Center of Agriculture Research and Technology Transfer (NCARTT) agents and the Badia Development Center agents, farmers (NGOs) organization meeting, mass media and farmer leaders at the local community respectively as the source of information to them. About 93.75 percent identified demonstration plot, 87.5 percent mentioned contact farmers. About 75 percent each identified bulleting and friends and neighbors respectively. About 56.25 percent identified private sector salesman while 43.75 acknowledged agricultural shows and exhibitions as their source of information.

Adoption of improved farm practices: Data in Table 4 show the distribution of women farmers by adoption of improved farm practices. A hundred percent each have adopted application of fertilizer, milk processing techniques, planting spineless cactus and use of crop residue respectively. About 93.75 percent each adopted planting of improved vegetable varieties and incorporating vetch in the crop rotation and 83.75 percent adopted feed blocks for animal feed. About 56.25 percent adopted the use of the whole package of barley planting, while 37.5 percent adopted spraying of herbicides Only 25 percent adopted the use of uterus synchronization sponges and 18.75 percent were found to have adopted adding or and injecting vitamin (AD3E).

Factors influencing adoption of improved farm practices: The data in Table 5 shows the distribution of respondents by factors influencing adoption of improved farm practices. The data is classified into following groups:

Table 4: Distribution of women farmers by adoption of improved farm practices

Improved technologies	Frequency	Percentage
Application of fertilizers	160	100.00
Use of crop residue	160	100.00
Use of the whole package of barley planting	90	56.25
Milk processing techniques	160	100.00
Planting of improved vegetable varieties	150	93.75
Spraying of herbicides	60	37.50
Use of uterus synchronization sponges	30	18.75
Feed blocks	134	83.75
Incorporating vetch in the crop rotation	150	93.75
Planting spineless cactus	160	100.00
Adding or and injecting vitamin (AD3E)	40	25.00

Table 5: Distribution of women farmers by factors influencing adoption of improved farm practices

Factors affecting Adoption	Frequency	Percentage
A. Characteristics of Innovation		
1. Cost	160	100.00
2. Relative advantage	160	100.00
3. Technical appropriateness	150	93.75
4. Simplicity of application (i.e. complexity)	160	100.00
5. Divisibility	140	87.50
B. Characteristics of Adopters		
1. Technical skill	160	100.00
2. Attitude towards change	160	100.00
3. Attitude towards taking risk	160	100.00
4. Income level	160	100.00
5. Farmers exposure	150	93.75
6. Land tenure system	160	100.00
7. Years of farming experience	120	75.00
8. Educational level	160	100.00
9. labor availability	160	100.00
C. Cultural Factors		
1. Belief	160	100.00
2. Norms	160	100.00
3. Taboo	160	100.00
D. Characteristics of Change Agents		
1. Communication ability	130	81.25
2. Competency	160	100.00
3. Credibility	160	100.00
4. Confidence	150	93.75
E. Government Policy		
1. Government Policy	160	100.00
F. Environmental factors (Weather condition)		
1. Environmental factors (Weather condition)	160	100.00

characteristics of the innovation, characteristics of the adopters, cultural factors and characteristics of the change agent, government policy and environmental factor.

Characteristics of Innovation: A hundred percent each identified cost relative advantage and complexity about

Table 6: Relationship between factors influencing adoption of innovation and adoption

Factors affecting Adoption	Percentage
A. Characteristics of Innovation	
1. Cost	-0.359*
2. Relative advantage	0.247*
3. Technical appropriateness	-0.399*
4. Simplicity of application (i.e. complexity)	0.368*
5. Divisibility	0.277
B. Characteristics of Adopters	
1. Technical skill	0.073
2. Attitude towards change	0.134
3. Attitude towards taking risk	0.123
4. Income level	0.172
5. Farmers exposure	0.115
6. Land tenure system	0.319*
7. Years of farming experience	0.091
8. Educational level	0.113
9. labor availability	0.119
C. Cultural Factors	
1. Belief	-0.269*
2. Norms	-0.316*
3. Taboo	-0.131
D. Characteristics of Change Agents	
1. Communication ability	0.254*
2. Competency	0.059
3. Credibility	0.469*
4. Confidence	0.179
E. Government Policy	0.082
F. Environmental factors (Weather condition)	0.109

*Statistically significant

93.75 percent identified technical appropriateness, while 87.75 percent picked divisibility.

Characteristics of adopters: A hundred percent each of the women farmers identifies technical skill, attitude towards change, attitude towards taking risk, income level, land tenure, educational level and labor respectively. About 93.75 percent identified farmer's exposure, while 75 percent identified years of farming experience.

Cultural factors: A hundred percent each identified belief, norms and taboos respectively.

Characteristics of change agents: A hundred percent each identified competency and credibility as factors of change agents that influence adoption of innovation. About 93.75 percent identified confidence, while 81.25 percent identified communication ability of the agent as one of the factors.

Other factors: A hundred percent each acknowledged government policy and weather condition respectively as factors influencing adoption of improved farm practices among women farmers.

Relationship between factors influencing adoption of innovation and adoption rate: The data in Table 6 show the relationship between factors influencing adoption of innovation and adoption rate. The data showed that credibility ($r = 0.469$), cost ($r = 0.359$), land tenure ($r = 0.319$), divisibility ($r = 0.277$), communication ability ($r = 0.254$) and relative advantage ($r = 0.247$) had positive and significant relationship with adoption of innovation. However, technical appropriateness ($r = -0.399$) and belief ($r = -0.269$) had a negative but significant relationship with adoption. Other factors with positive but insignificant relationship are confidence ($r = 0.179$), weather condition ($r = 0.109$), attitude towards change ($r = 0.134$), farmer exposure ($r = 0.115$), income level ($r = 0.172$), level of education ($r = 0.113$), competence ($r = 0.059$), technical skill ($r = 0.073$), government policy ($r = 0.082$) and years of farming experience ($r = 0.091$). Only Taboo ($r = -0.131$) had a negative but insignificant relationship with adoption.

CONCLUSIONS

Majority (81.75%) of the women farmers are in the age range between 21-50 years. About 83.75 percent are married while 10 percent are illiterate. Majority of the women farmers are small scale with mean farm size 15 donums. Many of the farmers had years of farming experience ranging from 6-20 years. A number of factors influenced adoption of improved farm practices hence the extension agent should critically look at all these factors especially those that had significant relationship with adoption and make sure that those variables were used to the advantage of the farmers.

Innovations which are costly and complex for the farmers to apply will not receive the good will of the farmers hence their rejection. Therefore; the extension agent or agencies of agriculture should make sure that the innovations taking to farmers must be relatively affordable so that it would be within the economic reach of the farmers. It should also be simple for the farmer to understand and use by themselves without much external assistance. Also innovations to be introduced must conform to norms and the belief of the people.

RECOMMENDATIONS

Based on the result of the findings, the following recommendations are made.

- The characteristics of the extension agents goes a long way to affect the decision of the adopters hence they must be given adequate training before and on the job to improve upon their characteristics such as communication ability and credibility.
- The innovations to be passed on to the farmers must have good relative advantage and should not be expensive for the farmers to afford.
- Agencies of agricultural development should be very conscious of the existing culture when designing innovation for development.

ACKNOWLEDGEMENTS

The author would like to acknowledge the support and encouragement of Jordan Badia Research and Development Center, grant number 56/97.

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