Asian Journal of Agricultural Extension, Economics & Sociology
11(2): 1-7, 2016; Article no.AJAEES.24543
ISSN: 2320-7027

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Attitude of Al-Qassim, Saudi Arabian Farmers towards Extension Employees in Leadership Ability and Communication of Innovative Adoption

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Authors' contributions

This work was carried out in collaboration between all authors. Author NM designed the study, wrote the protocol and manages the work. Author SS carried out all laboratories work and performed the statistical analysis. Authors SF and FA managed the analyses of the study. Author NM wrote the first draft of the manuscript. Author SS managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2016/24543
Editor(s):
(1) Rana Ozen Kutanis, Sakarya University, Esentepe Campus, Health Management Department, Turkey.
Reviewers:
(1) S. S. Manabete, Adamawa State Polytechnic, Yola, Nigeria.
(2) Md. Zahidul Haque, Bangladesh.
(3) Saikou E. Sanyang, Regional Agricultural Directorate of North Bank Region, Kerewan, Gambia.
Complete Peer review History: http://sciencedomain.org/review-history/14615

Original Research Article

Received 25th January 2016
Accepted 21st April 2016
Published 13th May 2016

ABSTRACT

The purpose of this study was to determine the attitude of the farming community towards adapting an innovative technology. A sample of 300 extension agents and farmers from the Al-Qassim region of Saudi Arabia completed a self-assessment of two instruments: the educational/experience behavior battery and innovation adoption instrument. Using descriptive statistics and a multiple regression analysis showed that 6% of the farmers had low adoption behavior, 51.31% had moderate adoption behavior, 36% had high adoption behavior, and 3.33% had very high adoption behavior. It was also revealed that the following three variables were significant determinants of the decision to adopt new innovations: trustworthiness, problem resolution, and future incentives. Surprisingly, knowledge and social skills were not significant and were attributed to resentment and

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attitude formation. We recommend the following changes: training and retraining of extension workers on communication, improving incentives provided to extension workers, removal of bureaucratic benchmarks, and involvement of farmers in the planning for extension programming.

Keywords: Extension; leadership; innovation; adoption; farming community.

1. INTRODUCTION

The production of agriculture in Saudi Arabia, as well as the Gross Domestic Product (GDP), has increased over the past five years, however the Saudi government has yet to develop agricultural policies and procedures for the fulfillment of self-sufficiency and security in food [1]. The country heavily relies on its agricultural production through the use of importing, rather than a system of producing its own resources.

The Saudi agricultural policy portrays an optimistic drift in production, primarily through the focus on outsourced products. An increased number of Saudi farmers are beginning to invest in outsourcing products into Saudi Arabia and are able to provide some expansion of greenhouse technology inside the country. The national food security strategy, however, encourages farmers to assist in a self-sufficient system in which technology can be used to increase the production of dates, rather than using the current strategy of depending on imported foods [2]. In addition, an innovative extension system needs to be implemented in order to communicate relevant information with farmers regarding the importing and production of fruit and vegetables [3].

Before implementing a new policy, a few factors that must first be considered is the psychology of the farmers, the interaction between farmers and extension employees, and values and tribal patterns [4]. The current research shows that extension employees come from different backgrounds and lifestyles, which serves as a factor for farmers' lack of shared knowledge with the extension employee [5]. Although a majority of Saudi farmers are illiterate, they are aware of the social values that play a part to protect their farming heritage and traditions. Their perception, depending on the presentation of the more educated, become a cause for delay in solving problems and lead to the deprivation of resources [6]. In addition, this stagnated process hinders the successful delivery of information to transfer toward technology and innovation for the farming community.

The success of an extension employee depends primarily on the Ministry of Agriculture administration's ability to optimize human resources [7]. The concept of Leader-Member Exchange Theory can be applied through effective organizations requiring effective communication with their members and organizational performance will suffer in direct proportion to neglect leadership [8]. Similarly, the effectiveness of the extension agents is largely dependent on the quality of its leadership and effective organizational behavior. This facilitates the attainment of the follower's desire, which then results in effective output in job performance [9]. The extension employees carry the responsibility of a leader because they are responsible for sharing and gathering information that allows for improvement in the farmer's community of agriculture. The extension employees are also provided with different training programs and workshops that assist in their job as a facilitator of leadership to transfer new innovative technology to farmers [10].

Research has shown that technology and innovation are two successful factors behind the specialized agricultural extension employees. The Saudi government suggests farmers to use the latest technology and innovation towards their farming practices in order to adopt the sustainable agricultural production model. The farmers are not able to adopt innovational practices due to the lack of communication and commitment by the extension employees [11]. In Saudi Arabia, in order to bring the farmers toward sustainable agricultural practices, the role of the extension employees must reflect the leadership qualities to understand the concerns of the farmers and help them through innovation and technology. The innovation adoption behavior in farming community reflects the leadership qualities of extension employees. The qualities that will be studied in this paper include: future incentives, intelligence, problem resolution, communication, and knowledge based on trust.

1.1 Objective

The main objective of this study was to ascertain the leadership skills and qualities found in

extension employees that are used to communicate adoption of innovational behavior to farmers.

2. MATERIALS AND METHODS

This research adopted a field instrumentation survey that consisted of a random sample of 300 farmers from three main agriculture areas of Al Qassim: Burydah, Onizh and Arss. These three agricultural zones are known for the largest production for date fruit and medjool date palm trees. The data was collected from analyzing responses on two sets of questionnaires: a leadership behavior scale and an innovation adoption scale. The leadership scale consisted of several questions measured on a Likert Scale that were used to indicate leadership behavior style and attitude towards leadership qualities. The questionnaires had various selected norms based on the number of question items: Future Incentives, 24; Intelligence, 64; Problem resolution behavior, 84; Innovation adoption behavior scale has a norm of 64. The adoption behavior was classified as follows: Very Low (19-43); Low (44-63); Moderate (64-83); Very High (104-124). These questionnaires were completed by Saudi farmers to identify the perception and attitude towards leadership skills of extension employees.

2.1 Hypotheses

This study was guided by the following hypotheses:

H1: There is a significant influence between intelligence, future incentives, communication skills and trustworthiness on innovation behavior.
H2: Leadership qualities determine innovation adoption behavior of farmers.

3. RESULTS AND DISCUSSION

The data from the questionnaires was analyzed using a multiple regression analysis and descriptive statistics. To measure descriptive statistics, mean values were calculated from total responses on each scale. To calculate the multiple regression, the categorical form of regression model was mentioned using the following equation:

$$Y = b + b\,X1 + b\,X\,2 + b\,X3 + b\,X4 + b\,X5 + e$$

Where:

Y = Innovation adoption attitude of farmers
b = Intercept
b' = Coefficients of the parameter estimates
X1 = Intelligence
X2 = Future incentives
X3 = Problem resolution behavior
X4 = Communication skills
X5 = Trustworthiness

The results presented in Table 1 indicate that 8% of farmer's demonstrated low attitude towards innovation and technology, 52.55% of farmers showed moderate attitude towards innovation behavior, 36.43% showed high innovation attitude towards adoption behavior, and only 3.02% showed very high innovation attitude towards technology adoption. The mean innovation adoption attitude of farmers was 81.47%. The results indicate that there needs greater effort to raise farmers' attitude towards the adoption of innovation.

3.1 Impact of Farmers Intelligence on Innovation Adoption Behavior

The results in Table 2 show that intelligence had no significant effect on the innovational adoption behavior of farmers, therefore this was taken out from the stepwise regression. The finding does not support the point of view of Sawada, Matsuda and Kimura who state that the perceived intelligence, reliability, and knowledge of the extension employees gives credibility of the source of extension information [12]. These results clearly show that credibility is not based on the intelligence of the extension employees, but rather on other factors. In traditional societies such as Saudi Arabia, a majority of its citizens live a normal lifestyle and do not have a difference in behavior towards others who display a higher level of intelligence and knowledge. One suggestion as to why the attitude towards innovation and technology may be resisted is due to the fear of the unknown and the loss of power. Farmers may believe that adopting a new, innovative method of farming will disrupt the conventional way that their ancestor's practiced farming, and in return, the old method may be lost over the years.

Nevertheless, the viewpoint of Sawada, Matsuda and Kimura should not be overlooked because there are benefits of adopting an innovation. Extension agents possess new knowledge of how to increase production and benefits of fruits with less strain to the farmer, but this message has to be delivered in the correct way. Extension employees must be able to deliver the message in a way to where farmers feel that their

viewpoint is being respected and that they are being allowed the opportunity to choose to adopt a new method of farming. Message delivery is important in developing confidence and trust among extension agents and farmers.

Based on these findings, we can confirm the importance of training extension employees within their areas of expertise in order to improve the skills of the farming community. If the information related to the current innovation in the agricultural extension is not perceived by the farmers as beneficial, then it will be difficult for extension services to introduce new technology. The innovation adopted by the farmers will result in the lack of confidence with extension employees due to prior innovational experience [13]. Therefore, an extension employee must gain more knowledge in regards to farmers in order to deliver the intended information to the farming community of Saudi Arabia.

3.2 The Importance of Future Incentives on Innovation Adoption Attitude of Farmers

The findings in Table 2 show a significant relationship between extension employees' future incentive and the attitude towards innovation of farmers. Farmers recognized that extension employees carry future predications and contributed about 36.43% to innovation adoption. This is an important attribute in the ability to lead the efforts of extension agents and go above the expectations of the farmers. The results show the commonality in the findings of Oladosu who mentioned that a majority of

Table 1. Classification of innovation adoption attitude of farmers

Adoption attitude description	Number of respondents	Mean	Percentage (%)
Very low	0	0	0
Low	21	55.97	8.00
Moderate	151	70.24	51.55
High	120	89.15	37.43
Very high	8	109	3.02
Total	300	64.872	100%

Table 2. The relative influences of leadership qualities on innovation adoption behavior of farmers

Model	Unstandardized coefficients	Standardized coefficients		T-statistics	
	B	St. error	Beta	t	Sig
X5	29.24	6.04	.79	9.54	0.00
	.59	.04		10.42	0.00
X5, X2	15.78	3.32	.284	4.44	0.00
	.31	.04	.265	.76	0.00
	.39	.05		6.67	0.00
X5, X2, X3	18.67	3.67	.30	5.63	0.00
	.68	.09	.48	6.02	0.00
	.64	.08	-.10	5.67	0.00
	-.24	.08		-2.30	0.03

Table 3. The relative influence of innovation adoption based on trustworthiness, future incentives, and problem resolution behavior

Model	Unstandardized coefficient	Standardized coefficient		T-statistics	
Constant	B	Std error	Beta	t	Sig
X5,X2,X3	18.674	3.667		5.626	0.000
	.676	.088	.301	6.022	0.000
	.643	.077	.483	5.668	0.000
	.238	.080	-.098	-2.303	0.033

Adj R^2 = .055 (F = 79.3) (P = 0.00)

farmers were under the impression that extension agents were not interested in the problems of the farmers, as presented through one-sided communication and lack of care towards the need of farmers [12].

The results directly translate into low organizational commitment towards performance. The enthusiasm of the farmers may be opposite of their expectations for the extension employees. An extension employee who is not self-motivated and lacks devotion regarding their duties towards the farmers can hardly influence the farmers to make a positive decision about adopting an innovation and technology into their farming practices. The extension employees can fulfill their duty towards the extension services by delivering a message to the farmers on innovative practices, however this will not fulfill the needs of the farmers.

3.3 The Impact of Extension Workers Problem Solving Resolution towards the Innovation Adoption Attitude of Farmers

The findings from Table 2 show the communication skills delivered by the extension employees had no significant impact towards the innovation adoption attitude of farmers, and therefore these were excluded in the stepwise regression results. Extension employees were not from the same tribal areas as the farmers and this may have had an effect on communication with the farmers in terms of their local cultural practices of farming. Another factor that plays a critical role is the technical language barrier between the extension employees and farmers. There is a limited vocational educational background in order to deliver the innovation and technology, yet at the same time, if the process of communication is delivered in a manner to where farmers feel that their knowledge of farming is not being considered before receiving the training, then there is a chance that farmers may not adopt the innovation due to lack of mutual respect [14]. This can create barriers for extension employees to introduce any innovation in the farming community. Ahlam, Shinn and Briers suggest the quality of interpersonal communication is important in any organization, and good communication skills helps the process of innovation as a group and promotes innovation related decisions; this process also helps to improve the individual's efforts with less developed abilities [15]. It is important to have a performance-based index of an individual based on communication in the field of extension towards the effectiveness of knowledge to introduce the process of innovation and technology in any given context.

3.4 Trustworthiness Behavior towards the Innovation and Adoption Attitude of Farmers

The findings in Table 2 shows that there is a significant influence of trustworthiness of extension employees towards the adoption of technology and innovation on the farmers. This clearly shows that farmers will have high levels of confidence on extension employees. The findings also indicate that the mistrust of farmers may lead to resentment of extension employees who do not take their time to plan the extension activities and instead use ready-made procedures. This shows that the attitude of extension employees towards farmers may not be as authentic as portrayed, indicating that the extension employees may be abiding by their role and delivering a message rather than truly wanting to help the farmers in learning a new method of farming. The farmers may be able to feel the sense that extension employees are like a tool that assists in performing a task rather than as problem solvers who work to teach farmers new skills [16].

In this research, some farmers trusted the extension agents as a necessity due to this being the only choice they had to have their problems solved and in order to receive updated information regarding farming, similar to what was found in the work of Shinn and Briers [13]. In addition, our study confirms the work of Shinn and Briers and shows that extension employees need to be involved in workshops based on innovation and technology to improve their skills, rather than perform their current duty and earn a negative reputation that extension employees do not perform duties beyond the scope of the tasks assigned by the extension services. Once farmers are able to see the role of an extension employee beyond their work scope, they can form a positive opinion of a leader who they can trust to solve their problems [17]. In field of psychology, one's cognitive behavior towards adoption that is mainly rooted in trust, which consists between an interaction between two people and builds over time. When farmers create a role model who can lead them in the direction to that of extension employees, then behavior towards innovation and technology is most likely to occur. Otherwise, farmers will not

choose to adopt the innovation based on their experiences.

The multiple regression analysis indicates that there is a significant joint predictive effect of the following independent variables: Trustworthiness, future incentives, and problem solving. These variables lead to innovation adoption while attitude of farmer, intelligence, and communication skills were excluded due to non-significance, R=0.537; R^2 =0.445; *Adj* R^2 =0.442; F=79.376; $P < 0.05$.

4. CONCLUSION

The implementation towards innovation for farmers has far reaching effects. The decision for the farmers to adopt any technology and innovation is important and depends on the dynamic environment in which they produce other social factors. The results of this research show that farmers are willing to make decisions based on innovation and technology. Since farmers base their likelihood to adopt a technology on how much trust they have towards extension employees, the extension employee would have the ability to deal with problem resolutions attitude and future incentives while explaining their rhetoric to the farmers. The results of this research demonstrate that farmers are not willing to collaborate with extension employees if the employees are not knowledgeable on the technology that they are delivering and have inadequate communication skills. The results of this research suggests that any agricultural related innovation that relates to the livelihood of farmers must be delivered from an extension employee who carries a leadership personality and who farmers come in contact with on a regular basis. Farmers must be able to feel that the employee in the leadership role as an extension employee has solutions their concerns and problems. If the farmers can feel the deficiencies in the basic skills set and competencies of extension employee, then this may affect the interaction of farmers and extension employees.

5. RECOMMENDATIONS

The purpose of this research was to enhance the quality of communication between extension employees and farmers to create an attitude of technology and innovation adoption among farmers. This researcher would like to advance these efforts through the following suggestions:

1. The extension employees are under the supervision of the government ministries. This creates deficiencies due to complicated bureaucratic system and procedures, and instead, there need to be a design to create a reward system for extension employees.
2. Government agencies related to agricultural practices need to bring awareness about extension employees' work and their ability to help farmers through the mass media and social media. This will help to be eliminate any resentment or negative perceptions of farmers towards extension employees.
3. Farmers need to be involved in the decision making process by the agricultural ministries in order to feel that they have ownership in the innovation and technology that is being administered.
4. Extension employees should present workshops on effective leadership skills on an annual basis. This will help the extension employees in effectively delivering innovative technology to farmers.
5. Extension employees should come from the same region as the farmers and carry similar values in order to ensure a higher chance of free flowing of ideas.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/14615