

Factors Associated with the Continuity of Agricultural Innovation Adoption in Sabah, Malaysia

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Abstract

This field investigation was conducted in order to determine the factors associated with the continuity of agricultural innovation adoption among rural populace in Sabah, Malaysia. This qualitative study was carried out in the rural areas in Kota Marudu, Sabah, Malaysia. The findings of this study revealed five main factors that were associated with the continuity of agricultural innovation adoption, namely demographic and socio-economic, psychological and cognitive, leadership attribute, communication, provision of inputs and technical assistantship. Based on the findings, it is highly recommended that all parties especially the relevant and appropriate stakeholders would specifically take all these factors into account when they aim to effectively deal with the rural agricultural innovation adoption in Sabah, Malaysia.

Keywords: Innovation adoption, Rural development

1. Introduction

Success in reducing the poverty profile in any country is normally due to the rapid economic growth enjoyed by the nation (Yaakub, 1991). There is either negative or even positive correlation between economic growth and incidence of poverty. In accordance, this relationship must be seen as a major factor that needed to be determined by the government as an effort to eradicate poverty profile in Sabah especially in rural areas. The poverty eradication effort must be intensified in rural areas as in general the problem of poverty in Sabah has been viewed essentially as a rural problem (Zulkifly, 1989; Yapp et al., 1988).

Moreover, the poverty incidence in Sabah has been highest and more prominent in the backward rural areas. The existence of poverty has been widespread, particularly in traditional agriculture sector and subsistence rural economy. The lack of effective economy exchange in this sector, the polarized development with the limited benefits trickling beyond the economic enclaves, and the slow take of traditional and subsistence agriculture and related rural activities in the first decade of independence have done little to address the poverty problem (Ishak, 1995). The incidence of poverty therefore has been widespread and concentrated among paddy farmers, rubber and coconut smallholders, shifting cultivators and fishermen (Zulkifly, 1989). The major ethnic groups or households traditional agricultural sector and the subsistence rural economy, the Kadazandusun households have the highest incident of poverty. They accounted to 64.2 percent of poor households in the rural sector and the majority is involved in various rural production productivities.

According to Yaakub (1989), the significant decline in poverty profile in Sabah is reflected from the development of the agricultural sector. It includes the transformation of some section of the traditional subsistence rural and agricultural sector into an advanced and modern component such as the large-scale land development areas by using many types of agricultural innovation. However, the incident of poverty in rural areas remains high as compared to urban areas (see Table 1).

In addition, the researchers believe that the rural poverty in Sabah, if not checked properly and immediate action will lead the state into the discontentment and socio-political instability. These problems then would bring about rapidly increase of rural-urban migration that is later will lead to overcrowding of major towns in Sabah such as Kota Kinabalu, Tawau and Sandakan. Besides that, decreasing in the rural population will lead to further decreases in productivity and underutilization of resources in the rural areas.

In accordance, the Sabah state government has actively promoted agriculture and rural standard of living improvement in Sabah. These programs have generally stimulated the process of reorganization of the structure of traditional agricultural sector, the subsistence rural available physical and human resources, and facilitated the

gradual transition in production activities from finally subsistence to united, diversified and specialized farming. However, traditional agricultural practices are still seen as major economic activities in Sabah. The modernization of agriculture practices is evident that they have yet to be sufficiently satisfactory to have a significant impact on poverty and efficient resource utilization. Modernization of the sector has yet to be widespread while the existence of inherent socio-economic constraints has been acknowledged. The continuing accelerated development is deemed essential and pertinent to facilitate reorganization of rural and agricultural economic structure, enhanced utilization and productivity of physical and human resources, and promote gradual transition in production activities. Continuing development efforts should be comprehensive to include not only physical, economic and social aspects, but also changes in attitude and behavior of the general rural populace. All these aspects are the important topics to be examined.

Hence, this study aimed to examine local attitude and behavior through new farming system, which is viewed as the most suitable in itself to bring about rural standard of living improvement that ultimately would lead towards rural society transformation into new rural society. Whether the new rural society is more developed or not as compared to the previous rural society that is based on the success of the agricultural development activities is the focal point. Therefore, this study would concentrate on the acceptability of the contract-farming system as a tool for agricultural commercialization and rural standard of living improvement effort that would bring about changes in the rural society structure.

2. Methodology

This study attempt to investigate the main factors associated with the continuity of agricultural innovation adoption among rural populace in Sabah, Malaysia. The information or data for this qualitative research were gathered through field investigation as well as gathered data through personal investigation. The information gathered through personal investigation was interpreted by the researchers and supported by an opinion and suggestion from recent research.

3. Findings

Agricultural innovation adoption is considered as a significant and necessary component in agricultural development activities. The continual adoption of new innovations or ideas will in itself improve the methods of human problem solving (Fakolade & Coblentz, 1981) and ensure that the development objectives by promoting new innovations or ideas will be effectively achieved. Thus, in this study, several main factors were found to determine the continuance or discontinuance adoption of new agricultural innovations or ideas in rural areas in Sabah, Malaysia. All these factors have been categorized into five main factors, namely demographic and socio-economic, physiological and cognitive, leadership, communication, and provision of production inputs and technical assistantship.

3.1 Demographic and Socio-economic Factor

The researchers discovered that one of the main factors which associated with the continuity of agricultural innovation adoption is namely demographic and socio-economic factors. According to Kamaliha (2003) demographic and socio-economic factors include age, marital status, length of residence, education attainment, income, membership in social group and training attended. Meanwhile, Sanun (1997) recited that age, income, employment, educational and organizational memberships were the demographic and socio-economic factors. Therefore, age, marital status, length of residence, education attainment, personal income, number of dependent, membership in social group and training attended were selected as demographic and socio-economic factors in this study.

Okonofua (1995), and Okonofua et al. (1992), found a strong relationship between demographic and socio-economic factors, and the people adoption of new innovation (ideas). An empirical study by Bhattacharjee-Anol (2000) also indicated a positive relationship of cash income and education.

Moreover, in regard to local adoption of new innovation for rural agricultural development effort, Roger (1995) found that age had no direct effect on attitude and intention towards using the new innovation or ideas. However, Saljoughi (2003) in his study about adoption of E-commerce in Norway found that age, education, and income have a relationship with the way people use of product, service and facilities that are available for them in their environment. Therefore, age had indirect effect towards local continuance or discontinuance adoption while education and income had direct effect.

Hence, in this study, demographic and socio-economic factors which were found as one of the major factor associated with the agricultural innovation adoption included age, personal income, education attainment; numbers of dependents, length of residence, training attended and organizational membership. All these

demographic and socio-economic factors were potentially affected either continuance or discontinuance adoption of agricultural innovation or ideas among rural populace in Kota Marudu, Sabah, Malaysia.

3.2 Psychological and Cognitive Factor

Adoption of any improved technology or ideas involves a process in which awareness is created, attitudes are changed and favorable conditions for adoption are provided (Ghosh et al., 2005). Based on Roger's model, an innovation is defined as an idea, practice or object that is perceived as new by the individual or the adopter (Rogers, 1995). To adopt a new technology, individual attitudes towards the technology play an important role in determining the level of adoption of the new innovation. Most Psychologists agree that a person's behavior is guided by his perception of the world he lives in. In other words, man's behavior is influence by his belief, expectation, aspiration and attitude. Whatever he does is based on what he knows, feels and thinks of the situation. Alternatives are chosen according to his cognition.

The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) proposes that individual beliefs influence attitudes, hence, creating intentions that will generate behavior. According to Katz et al. (1995) attitude is one of the most important concepts in Modern Social Psychology. The attitude of a person is a particular way they reach towards ideas, objects or other people. Attitude is classified into general and specific attitudes as result of people's belief that attitude are one of the most important determinants human behaviors, adoption.

Sanun (1994) recited that general attitudinal are: (1) obligation to adoption, (2) a general perception of instrumental value of innovation, (3) format group preference and (4) service orientation. Similarly, Smith (1986) as mentioned by Sanun (1994) found the specific attitudinal dimensions were related to innovation adoption: (a) a perceived reward of adoption, (b) social support from within the organization, (c) attractiveness of the innovation, (d) perceived personal fitness with the innovation, (e) commitment to the innovation, (f) felt obligation to adopt the innovation (g) support from significant others to adopt the innovation, and (h) perceived efficiency of the innovation.

A study by Samah et al. (2010) identified that the relationship between attitude and farming methods is positively significant. Thus if an individual has favorable general and specific attitudes, his or her level of adoption of new innovation will be higher. The empirical studies also confirm this statement. Ogwa (1989) found that farmers had positive attitude towards the concept of communal irrigation project, which was indicative of the respondent's high adoption level of the project concept. The intention to accept or reject a particular technology is based on a series of tradeoffs between the perceived benefits of the system to the user and the complexity of learning or using the system (Ramayah & Muhamad, 2004). Hence, it is generally believed that individual who have positive attitude towards a new innovation particularly in agricultural innovation will readily accept the new innovation.

Besides attitude, another important factor in adopting any improved technology is one's knowledge about the concept of the new innovation. According to D'Silva et al. (2011) knowledge is defined as organized or processed information or data, is fundamental in enhancing the understanding of someone towards something as it's accumulation and application will drive people's perception. In a study carried out by D'Silva (2010), he proved that a significant relationship between acceptance and knowledge exists. D'Silva et al. (2011) further cited that in a study carried out by Man (2008) it was identified that the level of agricultural knowledge with regards to farming practices among farmers has the potential to be enhanced. At the end of the day, farmers expect that the new technology will eventually provide an economic return. Knowledge about a new technology will reduce uncertainty and thus will induce adoption of the new technology (Feder & Slade, 1984). Thus, this means that the level of knowledge is important in explaining adoption behavior of a new technology in regards to agricultural technology. In the opening speech by the Chief Minister of Sabah in the Conference of Global Food Security: The Role of Science and Technology organized by the Commission on Science and Technology for Development (CSTD, 2009), he mentioned:

"Malaysia is basically an agriculture-based country; therefore, agricultural and food technologies have received greater emphasis. To ensure adequate food supply, the Government of Malaysia has implemented various agricultural programs. Under the National Food Security Policy, a sum of RM5.6 billion has been allocated to enhance agricultural activities. The Government has also allocated RM300 million to increase fish landings, and will provide 220,000 paddy farmers with incentives to increase paddy production, involving an allocation of RM1 billion."

In the final session of the conference, one of the resolutions and action plans suggested for the CSTD member is to assist farmers directly by providing technological knowledge to improve food productivity and indirectly

improve the farmers' life quality - subsistence farmers need help to step up food yield but also other factors to address poverty.

Thus, in general, psychological (attitude) and cognitive (knowledge) factors have its influence towards the continuance and discontinuance of innovation adoption. This means, psychological and cognitive factors, which included belief, expectation, aspiration, attitude, knowledge and level of understanding describes the contract production continuance and discontinuance.

3.3 Leadership Attribute Factor

Leadership also found as one of the main factors associated with the adoption of agricultural innovation among rural populace in Sabah, Malaysia. Leadership is an important resource for all activities (Norith, 1997). Leadership quality, which refers to the style and behavior of a leader, is considered as the most significant factors in order to ensure maintained innovations adoption.

In community development project, which are externally motivated, people's level of adoption depend to a large extent on the influence of the promoter of the project. In the implementation and the operation of the projects, supervisory role of local leaders is imperative in sustaining the adopter interest and motivation. In this context, personal characteristics and approach of the leaders become important determinants for the success of the projects (Norith, 1997).

Saraf (1994) recited that leadership style plays a very crucial role in determining the effectiveness of leader. Leaders with flexible of style can bring about rapid change for their community which it meet the needs of the group. Wilson and Hanna (1993) found that effective leadership which affects the level of adoption results from adopting democratic style. This is because democratic approach is a matter of control by a careful planning of plan asking by the group to evolve a task structure on its own. In contrast, autocratic style generally tries to impose their control on a group. Hence, this leadership style will bring about confusion when member feels left out from the organization and is bring not-taken into account.

Hence, Langone (1992), Jago (1982), and Lester (1975) also found that leadership is one of the main factors that determine the success of any program such as rural development. A leader can be as an innovation promoter, advisor and are supporter for those adapting the innovations or ideas. In short, effective leader which have attractive leadership styles and its good behavior will meet others' need especially their followers. Finally, the effectiveness of leaders would bring about continuity of innovations or ideas adoption.

3.4 Communication Factor

Undoubtedly, communication is one of the central components in adopting new ideas innovation. Information about an innovation or idea must be communicated from one individual to another. This communication can be executed via mass media or interpersonal communication. Rogers (1995) defined adoption and diffusion as inherently social processes, which can be transmitted via interpersonal channels; that is, an individual will adopt an innovation or idea on the basis of a subject that is published in the newspaper and broadcasted in television and radio.

To further illustrate this circumstance, one can use Bass Model (1968). This model assumed that there are two types of communication channels that influence the continuity of innovation adoption, namely mass media and interpersonal. In Bass Model, word-of-mouth effect is likely to increase, decrease or remain constant over time. This is called as interpersonal influence. The other source of adoption is from external influences such as newspaper, magazine, television, and radio.

Effective communication may serve as a conveyer and transmitter of meanings, ideas, and thoughts. At the same time, this may reduce one's doubts and illusions, which often clouds one's judgment and decision to act or to respond. From the forgoing, it can be postulated that when more people receive "good" or "useful" information relative to innovations or ideas, they are more likely to adopt it. In contrast, the more they receive "bad" or "useless" information, the more they are likely not to adopt the innovations or ideas. Hence, in order to encourage positive response and minimize negative reaction, effective communication must continuously be prevailed or maintained (Sanun, 1994).

Thus, communication factors in this study were mass media exposure and interpersonal communication. Exposure to the mass media and contact with interpersonal sources (information sharing with change agent) were found to be strong indicators of a person's communication behavior. It means people who read more newspapers, magazines, journals and books and attend more movies, lectures and plays, are more likely to respond positively.

The study of family planning adoption in a Korean village by Rogers, and Kinchaid (1980) support the claims mentioned above that people who are frequently in contact with interpersonal sources such as change agents and other peoples who have previously adopted any ideas is more likely to adopt family planning. Rogers (1995) also found that the more frequent the contact with extension agents and other peoples, the more positive is the attitude score.

In term of usefulness of the media message, Kaufman et al. (2000) and Walden et al. (2002) asserted that good or useful information is easily adopted than a less useful one. The information, which is relevant to people or target group problems, is easily adopted than irrelevant information. Similarly, Suleiman, and Fadzilah (1980) found that effective community development occurred when there is a situational relevance and information that motivate people in adopting available innovation.

Adams (1982) also found that extension agencies in developing countries have used a variety of mass media methods to change attitudes and behaviors and technical new skills such as newspaper, bulletins, leaflets, exhibits, shows, radio and television. Of these, radio and television, if rightly used, can be the most versatile tools for non-formal education. Similarly, Sanun (1994) reported that the farmer's perception found to be positively related to the usefulness of the radio program after a study was conducted in Thailand in relation to farmers' perception on farm radio programs in Thailand.

Hence, communication factors, namely media exposure (external influences), and personal communication (internal influences) are associated with adoption of new innovations or ideas, continuously or discontinuously. In a word, communication factors must be intensified in order to sustain the adoption of innovation.

3.5 Provision of Input and Technical Assistance Factor

The provision of agricultural production inputs and technical assistantship is an importance approach adopted in rural development that is generally aimed at promoting the well being of agricultural production. The service programs, which is include production inputs and technical assistantship are supportive in nature and some are non-target specific but all of them are essential components in development program.

However, Marsh and Runsten (1995) stated that input can be expensive to farmers. They have higher costs production inputs hence more income is at risk in the event of production activities. In addition, adopters need much money to provide inputs themselves and should face with the more risky resources availability. In view of the important of production assistantship especially financial assistance, which is considered as useful for providing fertilizers and pesticides, new seeds, irrigation systems and mechanical power, Sarma and Gandhi (1990) recited that availability of the financial assistance influence the innovation or ideas adoption. It means that the provision of production assistantship influenced farmer's interest to adopt continually adopt the new agricultural innovations.

Lacks of technical skills and less basic knowledge of the related tools among adopters also positively influence the local adoption. In accordance, Anderson and Dillon (1992) recited that adopter's difficulties in technical skills would lead about adoption discontinuity of new innovation or ideas. In contrast, if they have the technical skills needed to operate the related tools they will continue to adopt the innovations or ideas. Hence, if training programs are provided to ensure that the farmers are able to operate the related tools and ideas the ability of farmers can be improved.

Hence, provisional of agricultural assistantship services would bring about the continuity of innovations or ideas adoption, because adopters in early stages are generally aims for the external help when they have no input capability and technical skills.

4. Conclusion

The main impetus for change always comes from new ideas. Indeed, one of the pressures is come from the new ideas in agricultural sector (Chiro, 1994). Neither social relationship nor the population structures is changed. The change was caused by some kinds of pressure.

In short, in a rural society, its components are not static and stability is always relative. On the other hand, societies in the modern world changed as a consequence of the various ideas or innovations. In the third world, most of them experienced change as a reflection of the agricultural sector development. Moreover, increase in agricultural production has its capability to improve people's income and simultaneously it would reduce the out-migration to ensure the maintenance of the population composition. Thus, continuity in agricultural innovation adoption must be maintained by carefully examining the factors associated with it.

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Table 1. Poverty profile in sabah

	1993			1995			2000		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Poverty Rate (%)	33.2	19.8	36.8	28.5	14.5	32.4	20	6.3	27.3
Number of Poor Households ('000)	123.9	15.8	108.1	121.4	13.5	107.9	84	9.6	74.4
Total of Households ('000)	373.1	79.9	293.6	425.9	93.3	332.6	419.8	147.3	272.5

Source: Yearbook of Statistics, Sabah (2001); Outline perspective plan of Sabah (1995).