Conference Paper

Individual and Societal Factors Influencing Technology Adaptation of Rice Farmers in Northern Samar

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Abstract

This study examined individual and societal factors influencing technology adaptation of rice farmers in Northern Samar. This study was carried out in purposively selected Barangays in the municipalities of San Roque, Pambujan and Rosario in Northern Samar. Data were collected from selected seven farmers through pre-tested interview schedule. Various qualitative analyses techniques were applied to arrive at meaningful results. Findings show that farmers have very low level of participation in various organizations. Factors affecting adaptation to new technologies included farmers' perception to technologies, education and physical conditions of the area. Personal barriers to their adaptation to new technologies include low educational level and lack of technical knowledge to technologies. Other factors include high cost of technologies and high interest rates of lending institutions. The municipal agriculture office did not provide enough technical support on how to use and acquire farming technologies. Generally, lack of technical skill and high financial requirements hinder farmers in technology adaptation. Mechanization does not even exist in harvesting and post harvesting due to high cost.

Keywords: Farm practices, Adaptation, Personal and Societal Factors

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1. Introduction

Technology has unquestionably brought change to our farms and to the rice farmers. Both directly and indirectly, technology has come to dominate a large percentage of farmers' daily activities. These changes affect most activities such as the mode of planting, land preparation, and controlling pests and diseases. The use of technology in the rice field has been paid considerable attention for its multiple possibilities as well as its potential to support changes in rice farming. However, there is a huge gap between the promises of technology and the reality of its use in the farm. Actual technology use in rice fields has not yet met the expectation that it will enhance

farming activities dramatically. For example, the research of Judson (2006) showed that farmers' teaching activities did not change since they integrated technology into their farming activities.

The problem of technology integration in the field is that farmers' use of technology for farm activities has not yet met others' expectations, and they have not fully utilized monetary benefits of technology (Lee, 2006). Many countries have experienced that although there have been a lot of investments in technology integration in rice farming, there has been little visible effect on the fundamental change of farming activities and financial benefits.

This study was conducted in Northern Samar, a province rich in resources. The government has invested in technological infrastructure, and put in place technology policies and implemented technology professional development to improve the quality of farming through technology integration. However, although most farmers in the province integrate technology into their farming activities, farmers have not changed their economic status with the help of technology. For example, some farmers just use hand tractors to plow lands. Studies (e.g. Baylon, 2008) indicate that farmers in Central Luzon integrate technology for their convenience, not for increase of yield.

Although technologies cannot solve all farming problems, it is widely accepted that technologies can bring financial benefits. For example, studies (Ravitz, 2010) have emphasized that technology enables farmers to adopt a new breed of seeds. Therefore, numerous studies have tried to reveal the benefit of farm technologies and appropriate methods of integrating technology in the rice field.

The study is expected to contribute to the existing knowledge on technology adaptation of farmers in Northern Samar. This study explored the factors that influence why and how farmers integrate technology in rice farming. Furthermore, this study re-examine by aggregating previous separated results between diverse factors influencing farmers' integration of technology in practice. Most importantly, this study attempts to explain the factors that influence farmers' use of technology for their field activities. This study give a good explanation of farmers' decision to use or not to use technology in the field.

1.1. Objectives of the study

This study investigated farmer-related factors which influence the use of technology in their rice field. Specifically, this study determined how farmers' individual, attitudinal, and socio-organizational factors influence their use of technology in practice. In

addition, farmer-related factors at the farmer level and farm level were explored. In short, this study included the complex nature of farmers' perceptions and background by investigating the following specific objectives.

1. determined how personal background influence farmers' use of technology in practice.

2. determined how attitudinal factors influence farmers' use of technology in the field.

3. determined how socio-organizational factors influence farmers' use of technology in practice.

2. Materials and Methods

2.1. Research design

The study adopted a qualitative research design whereby data were collected using interviews. The qualitative data on personal and societal factors affecting the adoption of technology were collected by using participatory appraisal. The key informants were farmers themselves. The key informants were requested to evaluate the advantages and disadvantages of the technologies.

2.2. Sampling procedure

Random sampling was employed to select the farmers in the province. Farmer-respondents from the municipalities of Pambujan, San Roque, and Rosario considered. Specifically, three informants were selected from Barangay Cababtuan in Pambujan, four from Barangay Balnasan in San Roque, and two from Barangay Salhag in Rosario.

2.3. Procedure

The study involved qualitative data collection methods. There were collected through personal interviews. Data were recorded using a mobile phone and transcribed.

3. Results and Discussion

Most farmers defined technology as to how to cultivate a crop successfully. This success can be obtained by knowing how to apply fertilizer, control pests, and take care of plant for its healthy and good growing. The group of farmers from Balnasan said that technology refers to what crop varieties and what kind of fertilizers that are suitable for the soil. Other definition from farmers in Salhag is that technology is what introduced by scientists. "This is knowledge". Technology is in cohesion with arts. This means that it is flexible depending on soil and habits of farmers. They prefer the technology with low input but high benefit, and ensure high productivity.

Farmers in Cababtuan believed that technologies are good to farmers. They believe on technologies because they give good efficiency in terms of high yield, less pest, and more benefit. Technology is important in agricultural production. Farmers' learning of technology, training, adoption and diffusion. Farmers did not aspire to be trained for most of technologies related to agricultural production. The farmers were trained by the municipality's Agricultural Technician on technology of Pest Management (PM), veterinary in pig raising, and fish production.

Farmers who attended in training had talks to other farmers about what they learned from the courses. It was called as private oral transmission. This kind of information diffusion usually occurred in coffee shop through gossips. Therefore, most of men got information from trained farmers. The level of practices the information from oral transmission is not known. The effectiveness depends on kind of technology and the place where it takes place. This kind of diffusion happened spontaneously, if there is intervention at this step, the effectiveness of technology diffusion must be higher. Some production activities were not learned from formal classes. For mushroom cultivation, farmers have not learnt any technologies from agricultural technician yet.

For fruit tree, farmers are afraid of weather problems. Farmers want to be trained on treatment for flowering, technologies for increasing rate of sitting fruits. For rice, farmers in Balnasan want to have intensive course for pest management. Though training courses for rice were already organized, most of the farmers do not believed that training is the most important factor for adoption of technology. Since 2004, farmers in Cababtuan and Balnasan have been trained on Pest Management in rice production from municipal agricultural technician office. So far, there have been 40% of farmers who attended PM training in Cababtuan, Pambujan. The adoption of this strategy was only 20%. The rest did not. However, PM technology was used by most

of farmers in Salhag by applying the simple rule of not spraying insecticide before 30 days after sowing.

For those farmers who adopted low seeding rate and less fertilizer through using leaf color chart to reduce nitrogen fertilizer in rice because they found that low seeding rate and less fertilizer application reduce rice disease infestation. Half of farmers adopted of row seeding. The rest are afraid of low yield from row seeding due to low seed rate in this technique. Farmers from Balnasan are afraid of golden snail attacking the rice field with low seed rate, then there is nothing to compensate. Farmers easily adopt Jasmin rice variety because this is good quality rice and can be sold high price at harvest.

At the beginning, farmers practised fish cultivation based on their own experience. Later, training was organized by technicians from LGU. This technology was adopted easily by farmers. Provincial Agricultural Office in co-ordination with Municipal Agriculture Office guided farmers in aquaculture and farming. However, there are not many farmers having aquaculture because of the following reasons:

- There is not yet dikes constructed to prevent water during flood season, and
- They lack of capitals for constructing dikes to raise fish, buying fingerlings and other materials.
- Pig raising is mostly at household level with very small extent (1-2 pigs per household). There is only guidance on medicine for pig raising through training or meeting. The new pig varieties were also introduced. Farmers like pig variety to shorten duration of rearing and fast increasing of weight.

3.1. Reasons for not adoption of technology

- Farmers did not believe because it was new to them.
- They have not yet seen the demonstration fields.
- They worried of low yield
- Low education
- Old age farmers: did not believe new technology and only believe their own experience.
- Old behavior of cultivation practices embedded in farmers for long period: were not persuaded to use new technology. They only practised by their own practices such as using high rate of seeds in directly broadcasting and spraying pesticide for prevention of insect occurrence.

- Large land holding farmers: Farmers are feeling that it is not so sure about new technologies, particularly to those farmers have large land. They said if the yield loss due to new technologies in larger field, the amount of loss will be greater. According to Lazaro et al. (1993), farmers usually overestimate the yield loss caused by insects rather than the actual loss.
- Problem in applying technologies: not totally believe in technologies, and lack of capital. Labor is not difficult in application of technologies because farming is seen as their work for the food.

3.2. Reasons for adoption of technology

- These farmers are progressive farmers. They believe on science and technology.
- Education: They went to school. They know how to read and write (most are men).
- Age group: They are young, less than 40 years old.
- Recognition of saving money and health from IMP strategy.
- Those farmers having stable in economy believe in technologies. Farmers who are old and conservatives do not.

3.3. Adaptation of technologies

The technologies can be used flexibly. For example, timing, quantity and kind of fertilizer for application can be modified according to climate or weather, the level of silt deposit after flooding period.

3.4. Reasons for changing in using of technologies

- Introduction from technicians, attend technical training
- Trust on technicians
- Observe demonstration fields, and believe that it is effective and then decide to change
- Change in soil fertility: silt deposition in flooding period Farmers found that if a technology give them more benefit, more effective in income, they will change to use that technology. For example: change from normal rice to quality rice to sell higher price.

3.5. Gender issue

Gender in training: Most of women do not have access to technical training. They are busy with household chores and caring of children. They had no time to attend the training. They obtained low education and they were not invited. For example, in Barangay Cababtuan, there is only 10 % of women who attended PM training in the last two years. In Balnasan, the rate of women participation in technical training was also 10%.

3.6. Gender use of technology

Most of technologies were used by men. PM technology is mostly used by male farmers. Regarding animal technologies, male farmers followed new technologies for animal raising meanwhile female farmers followed traditional practices because their education was lower than men which limits them in adoption of new technologies. They gradually change to new technologies from the traditional practices husband knows technologies more than wife. Wife usually practises in the field.

3.7. Pest management strategy

The advantages of pest management included input cost reduction (saving from less seed and pesticide use); benefit increase, and environment protection. However, the extent of PM application was low due to the disadvantages as its complexity leading to difficulty to be applied by farmers. PM comprises of many measures, which are not well acquired by farmers' educational limitation. The conditions, which are necessary for farmers to follow PM included increase of farmers' technical knowledge by training, farmers' understanding the usefulness of PM by witness of demonstration fields. Farmers should obtain certain education level and well associate with rice farming to be enthusiastic in learning new technology. The well-organized mass media and people associations play important role in farmers' adoption of PM.

The municipal agriculture office staff' knowledge and updated knowledge and their satisfied wages can increase PM adoption. The agriculture office staff at community level should know well farmer cultivation schedule to arrange suitable timing for training. The staff should teach PM by the stages of rice plant and let farmers discuss themselves. The staffs do practices together with farmers. The training also should

be organized in the remote villages to have chance for remote rural farmers to attend. The materials distributed to farmers should be easy to understand by farmers.

The main reasons of non-adoption of PM included weak perceptions of PM and low education of farmers, weak teaching capacity and limited knowledge of extension staff, not-well organization and management of extension programs, limitation of concrete conditions of local area and fund. Some measures in PM cannot be applied in certain locations such as water management to control pest in special conditions of rice areas in Balnasan. Thus, farmers only applied some measures in the integrated measures in PM. Moreover, the incomplete irrigation systems led to difficulty in water management to control case worm in Salhag.

In Cababtuan, farmers understood wrong meaning of PM. They understood that PM is associated with no using insecticide meanwhile PM is the integration of different methods including proper and timing application of sowing operation. Some farmers in Balnasan cannot apply row seeding because of saline, shallow, dry soil with large cube and difficult water management. Farmers in these areas also traditionally practice dry seeding. They did not use low seed rate because of bird, rat attack and bad weather. The other reason for not adoption of row seeder related to water. Water was a problem in the area because the field was dry for 10 days without water to supply or the standing water of 20cm depth in the field without way for drainage. The cost of row seeders was high as compared to the farmers' pockets. The available row seeders were not sufficient for synchronic row seeding for all fields. Farmers were afraid of pest attack as golden snail, thus they still preferred to use high seed rate, especially in wet season.

3.8. Certified seeds and new rice varieties

Training farmers on seed technologies and dissemination of information on advantages of using certified seeds are necessary conditions to increase adoption of certified seeds. The increase of fund support for farmer field school and demonstration helps farmers self-evaluate the efficiency of using new rice varieties and certified seeds. Farmer group for seed multiplication should be strengthen to produce sufficient certified seed amount for local farmers under the supervision of technical staff. There were many reasons for not using certified seeds by farmers. Farmers often kept certain seed amount from the rice harvest for the next rice planting season. They mostly did not care about certified seeds. They self-produced or bought seeds from the neighboring farmers with lower cost than the cost of certified seeds. In fact, the certified seeds in

seed markets were not sufficient to supply as demand. Some farmers spent for transportation to buy certified seeds from seed centers or research institutions because there was no place selling seeds at their local area. The transportation may increase cost of rice inputs, thus they were unwilling to go far to buy seeds.

3.9. Harvesting by machine

Mechanization in rice harvesting does not exist. Farmers find the cost of machine as high.

3.10. Rice dryer

Rice dryer could reduce grain loss from sun drying and pressure of hired labor at post harvest. It could also increase rice quality better than those of sun drying, especially in rainy season. However, the cost of drying by dryer was higher than those of sun drying. Farmers also paid for transportation from their house to the place of dryer service. Large investment for dryer service and getting back money slowly due to dryer operating mainly in the wet season was obstacle in adoption.

4. Conclusion and Recommendations

Main factors affecting farmers' adaptation of technologies were their perceptions of technologies, knowledge level of municipal agriculture staff, methods of organization and management of the farming program and local conditions. Low education, low perception, lack of capital, small land, not good infrastructures and limited capacity of agriculture staff led to low technology adaptation. Local government program and information for farmers in the barangays transmitted orally among trained farmers were not enough to increase adaptation. Technologies with complicated components or required more time and labor were difficult for farmers to apply.

The farmers have been using traditional and modern technologies in order to cope with the challenges of climate induced changes. Various practices were used by the farmers in response to altered farming resulting from experienced environmental degradation due to events associated with climate change. The results showed that some of the indicators have either positive or negative impact on the adaptation of improved farm practices. Several factors such as communication score and total cultivable land have positive effect on adoption of the farmers and total land area

affected due to drought or flooding has negative effect on technology adaptation of the farmers. Proper evaluation of these factors will help to further dissemination of technology. This study represents a preliminary insight into understanding the factors influencing farmer's adaptation of improved farm practices. It widens the space for further in-depth research on socio-economic influences which can inform policy makers of the province how to shift in farming for ensuring agricultural development under increasingly adverse climatic conditions.

Based on the findings, it is recommended that Municipal Agriculture Officers should disseminate information to farmers regarding new technologies in farming. Local government officials could provide training for farmers on new technologies and local chief executives should fund farmers for travels in other farms to observe modern farming.

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