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Agricultural extension services to foster production sustainability for food and cultural security of glutinous rice farmers in Vietnam

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ABSTRACT

In Vietnam, while glutinous rice farming represents a very small sub-sector of rice production, it plays an important role in the food and cultural security of farming households in many remote areas. This paper examined glutinous rice farming in households, as a food and for cultural security, and the extension services in areas producing glutinous rice. Data were collected from 400 local farmers based on interview schedules and statistical analysis using the percentage, arithmetic mean, and hypothesis testing with logistic regression. It was found that most glutinous rice farmers were small-scale producers, with an average glutinous rice-growing area of 0.15 ha and a yield of 3,200 kg per ha. Local as well as breeding varieties of seeds were supplied. Most farming households had sufficient glutinous rice for regular food and cultural consumption. Other starchy products were also consumed as part of their traditional diets. Supporting extension services were found to be very active and comprehensive, playing a key role in fostering the sustainable production of glutinous rice and helping to ensure local food and cultural security in Vietnam.

Introduction

Vietnam is a country in Southeast Asia well known for its ability to grow rice for food consumption and also for export. It has been a rice export country since 1988, just two years after implementing the “renovation program” (Doi Moi Policy). The volume of rice export (mainly of the non-glutinous variety) has increased over time so that four years after this program started, Vietnam stopped importing rice (Bui, 2010; Nguyên, 2001). Currently, Vietnam is an emerging and fast-growing economy in Southeast Asia.

Vietnamese farmers grow both glutinous and non-glutinous rice, making the country one of the important glutinous rice producers of the Greater Mekong Subregion (GMS), sometimes referred to as mainland Asia or northern Asia. Glutinous rice is culturally preferred as a staple food by the people living in the lower Mekong River basin, particularly the Tai ethnic group. It is also traditionally used for special occasions such as ritual celebrations and Vietnamese ceremonies (Nguyên, 2001; Sharma, 2010; Sikor & Dao, 2000).

In terms of rice production, there are no substantial differences between the glutinous rice and non-glutinous rice cropping systems and which crop is grown depends on the geographical area. However, the production of glutinous rice fluctuates according to the demand and market price. This fluctuation has induced a slow rate of glutinous rice improvement, compared to non-glutinous rice. Consequently, many problems still remain, concerning the limited growing area and farm practices, such as seed quality, pest control, harvesting, and post-harvesting.

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In order to help farmers solve these problems, appropriate technologies from researchers and agricultural extension workers should be transferred to them. Therefore, agricultural extension services are considered to be very important for the development of glutinous rice production, particularly for food and cultural security.

Therefore, it is desirable to conduct field research into the current practices of glutinous rice production and supporting agricultural extension services in key production areas. Thus, the hypothesis of the study was that the agricultural extension services play crucial roles to foster sustainable production of glutinous rice to ensure local food and cultural security. It is anticipated that the study results can be used as a basis for future policy formulation and strategic planning for glutinous rice production to ensure food and cultural security, especially for those who consume glutinous rice.

Literature Review

Two types of rice are grown in Vietnam: 1) non-waxy rice (*Oryza sativa* var. *indica*) also known as ordinary rice or non-glutinous rice; and 2) glutinous rice (*O. sativa* var. *glutinosa*) also known as sticky rice or waxy rice. There are clear differences between the two kinds of rice as the raw grains of ordinary rice are translucent in color and after cooking turn opaque white, but the raw glutinous rice grains are an opaque white color and turn translucent after cooking. Generally, a non-glutinous rice grain contains two types of starch (amylose and amylopectin), but glutinous rice has mostly amylopectin in its endosperm (Sattaka, Latvilayvong, & Padakan, 2013; Sharma, 2010).

In Vietnam, the glutinous rice growing areas are located in the provinces of Ninh Binh, Son La, Phu Tho, Thanh Hoa, Viet Tri, Son Tay in the North; Quang Tri in Central; Vietnam, and Ca Mau, An Giang in the South (Hannah, Dao, & Pham, 2010; Nguyên, 2001; Trudel, 2012). Glutinous rice is a traditional food, even though it is not a staple food everywhere (such as in Laos, where it is eaten at every meal), but it is still indispensible in Vietnam for its unique taste and aroma. However, there are Tai ethnic groups in the North who still consume glutinous rice as their staple food (Sattaka, Pattaratuma, & Attawipakpaisan, 2014; Trudel, 2012). Nguyên (2001) cited records of Vietnamese glutinous cultivars that indicated there were two cultivars that were opaque white, aromatic, and had a sweet grain quality, namely Lúa Nêp Den and Lúa Côm, while some cultivars were opaque white and had an aromatic grain quality, namely Lûa Nêp Huong, Lúa Chúe, and Lúa Cu Nâu. In addition, Lúa Nêp Qua is a black, aromatic and smooth glutinous rice. In recent decades, local glutinous rice varieties grown in Vietnam (Ga Gay sticky rice and Hoa Vang sticky rice) have been supplemented with hybrid varieties such as N97, N98, Dn20. However, the commercial varieties of glutinous rice in Vietnam have both local varieties and breeding varieties, which are Nhung, Ga Gay, Hoa Vang, and N97.

In Vietnam, the household area of rice cultivation is rather small with an average of 0.49 ha, but in the North, particularly in the densely populated Red River delta, the average area of cultivated rice is just 0.22 ha (Nguyên, 1999). With regard to the cropping system used by Vietnamese farmers, Nicholas and Francesco (2000) reported that of the total ordinary planting area, 8.8 percent was triple cropped, 55.2 percent double cropped, and 36.0 percent single cropped. In the North, Eliste and Santos (2012) reported that most of the rice planting area was under single and double cropping. There are three rice planting methods used: transplanting, broadcasting, and direct seedling. Before planting, the seeds have to be soaked in cold water to absorb sufficient water before they can germinate.

To increase glutinous rice production, Vietnamese farmers have to use chemical fertilizers, organic fertilizers, and insecticides, but weed control is more often done using physical methods than herbicides (Pingali, Xuan, Khiem, & Gerpacio, 1998). The ripened rice seeds are harvested 28–32 days after flowering or when 85–90 percent of the rice seeds are ripe, using normal sickles or sickles with saw-like blades, or by machine. If the harvest is cut early or delayed, the loss rate of rice grains will be increased. Following harvesting the rice grains are threshed using human labor or machines, and grains are dried under the sun for a few days and then stored in a dry and airy place. If the storage period is less than 3 months, the grain moisture should be 14–15 percent (Dac, 1996).

By developing their farming system and having access to successful agricultural extension services, the farmers have been able to improve their production efficiency for all major agricultural products to assure optimum food production, especially of glutinous rice. For example, the important agricultural extension measure of rice production in Vietnam was “Three Reductions, Three Gains” project that aimed to reduce the production cost by reducing the amount of seed, fertilizer, and pesticides, whilst gaining a higher yield, better rice quality, and more profit. The mass media used in the project campaign to reach and motivate farmers were television, radio, printed material, and practical demonstrations, and the important services were meetings, training, and learning through practice in their field (Nguyên, Ho, & Le, 2010; Zenaida, Deborah, & Pamela, 2008). The campaign indicated that farmers can improve rice production through appropriate agricultural extension services coupled with credit facilitation and the creation of domestic and export markets for projected farm products. Finally, these services will help to address farmers' concerns regarding food security.

Methods

Study Areas, Population and Sample

The study area consisted of the eight provinces of Vietnam where farmers grew glutinous rice and most of the population consumed glutinous rice, namely, Son La, Phu Tho, Thanh Hao, An Giang, Nghệ An, Dien Bien, Hoa Binh, and Ninh Bình (Hannah et al., 2010; Nguyên, 2001; Trudel, 2012) with a population of 1,690,905 people (General Statistics Office of Vietnam, 2013). Four provinces out of eight province were identified, using a simple random sampling method to obtain 50 percent as recommended by

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