

Diversity of Local Rice Varieties in Nai Muang and Sai Ngam District, Kamphaeng Phet Province

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Abstract

The aimed of this research was to collection of local rice seeds, seed conservation and investigates area of local rice crop in Nai Muang and Sai Ngam district, Kamphaeng Phet province. The data was performed by surveying and collection of local rice seeds. The unstructured interview and in-depth interview with farmer's plant local rice from Muang and Sai Ngam Districts for rice conservation. Quantity data was analyzed by content analysis and descriptive analysis methods. The local rice crop was used Global Positioning System (GPS) coordination and areas of local rice crop were carried on using Geographic Information System (GIS). The results found that Nai Muang district contained 10 local rice cultivates, Khao' Jao Hawm Dawk Mali Daeng, Khao' Jao Khao Gaw Diaw 35, Khao' Jao Khao Tah-kleuap, Khao' Jao Leuang Pratan, Khao' Jao Soh Maa Lee, Khao' Jao Hawm Su-rin, Khao' Jao Hawm Nil, Khao' Niew San-pah-tawng, Khao' Niew Leuang Noi and Khao' Niew Dam, respectively. Three local rice cultivates were found in Sai Ngam district, Khao' Jao Hawm Dawk Mali Daeng, Khao' Jao Hawm Nil and Khao' Niew Dam, respectively. The GIS data indicated that Nai Muang district had areas of rice planting more than Sai Ngam district. The principle of sufficiency economy was used by the farmers Nai Muang district for rice planting, the rice production for family consumption, selling and their activities, while Sai Ngam district rice planting for family consumption and selling. In addition, Local rice conservation, farmers cropped rice in agricultural plot and gave rice seed to theirs members and kept rice seed in zip-lock plastic bag or packed in the small cloth bag to protect against insect and animal before planting in every year.

Keywords : Diversity, Local Rice Varieties, Conservation

1. Introduction

Rice (*Oryza sativa L.*) is the most important staple food crop and a main food source for more than a third of the world's population. More than 90% of the world's rice is produced and consumed in Asia-Pacific region, where more than 56% of the world's people live (Minas K. et. al., 2000). Rice grown in Thailand is the *indica* varieties which are characterized by a long, oval grain. There are about 3,500 varieties, ranging from wild rice, local varieties, and breeds newly created by man. Of the cultivation land utilized by farmers in the Central Plains and the Northeast possess larger areas of rice cultivation land, followed by the North and South respectively. Each region grows different types of rice, depending on its geographical conditions that is useful (Rice-Sustaining and Shaping Thai

Life, n.d.). At present, farmers begun to planting rice varieties from market demand and to encourage the planting of rice, it's resulted in a loss of rice diversity. In addition, the lifestyles of farmers have changed to plant hybrid rice which is the high productivity and grow throughout the year. Modify area boundaries Irrigation to increase productivity or take advantage of others including the modern technology in the production of rice, make rice.

Srisuvoramas and et al. (2013) have been studies the rice is the identities in the North of Thailand that is local rice cultivar such as Khao' Kam Phayao, Chun, Phayao province, Khao' Hom Bai Toei, Uthai province, Khao' Khao Gaw Diaw, Phichit province, Khao' Paya Luem Kaeng, Phetchabun province. Which is this rice is on the market such as department stores and international markets because of it are delicious, soft and high nutritional value. Currently these local rice exporters have signed contracts with foreign traders for local rice production to sales to foreign countries. But productivity is not enough so should study how to collect a local rice varieties. The local rice varieties are still grown in farmers' field in many areas of the country. It's remaining a key component of many rice-based agroecosystems in the country, especially in the North of Thailand, where lies in the heart of the primary centre of diversity for rice. Kamphaeng Phet province is the north of Thailand, where remains some local rice varieties. Suphatpong, and Wallop (2010) have been studied the situation of local rice by used geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. The research found Mueang district is suitable for planting floating rice in medium rate, planting lowland rice is in low to medium rate, planting upland rice is in low to negligible rate, Sai Ngam district is suitable for planting floating rice in medium rate, planting lowland rice is in medium to high rate, planting upland rice is in medium to low rate. The 35 varieties of local rice planted in Nai Muang and Sai Ngam district, Kamphaeng Phet but only 23 varieties of local rice to be known.

Furthermore, the preliminary work found 52 varieties of local rice were collected for conservation, which are Khao Niew of 30 varieties and Khao Jao of 22 varieties but they are not know which local rice varieties have been plant in Nai Muang and Sai Ngam district, Kamphaeng Phet. The some great features of local rice varieties were such as resistance to diseases and pests and resistance to environmental. There are also several useful and enrich with vitamin and mineral such as Vitamin E, Copper, Zinc, Iron, β -Carotene, dietary fiber, Antioxidant activity, GABA, etc. (Zhou and et al., 2004). Furthermore, local rice is healthier; reduce the risk of getting cancer, cardiovascular, Alzheimer, anemia and anti-aging. This research aims to collection of seeds, seed conservation and to investigate area of local rice crop in Nai Muang and Sai Ngam district, Kamphaeng Phet province. The study how they collected local rice seed for conservation by used snow ball and purposive sampling. The investigate area of local rice crop by GIS. The information in this research was useful for local rice varieties, guideline for the collection and selection of local rice varieties for the plant and collects local rice seeds for conservation in the future.

2. Research Objectives

To collection of local rice seeds, seed conservation and to investigate area of local rice crop in Nai Muang and Sai Ngam district, Kamphaeng Phet province.

3. Research Methodology

3.1 Samples

The local rice grains, local rice crop and local rice conservation were collected from Nai Muang and Sai Gham district. Nai Muang district consists of 16 sub-districts such as Khonthi, Khlong Mae Lai, Trai Trueng, Song Tham, Tha Khun Ram, Thep Nakhon, Thammarong, Nakhon Chum, Na Bo Kham, Nikhom Thung Pho Thale, Nai Muang, Lan Dokmai, Wang Thong, Sa Kaeo Nong Plin and Ang Thong. Sai Gham district consists of 7 sub-districts such as Sai Gham, Maha Chai, Nong Khla, Nong Thong, Phan Thong, Nong Mae Tang and Nong Mai Kong.

3.2 Research Instruments

A combination of snowball and purposive sampling procedures was used in selecting the sample for this study. Unstructured interview and In-depth interview was used for local rice plant and local rice conservation. The Global Position System: GPS (longitude and latitude) and Geographic Information System (GIS) were used to investigate area of local rice crop in Nai Muang and Sai Ngam district, Kamphaeng Phet province.

3.3 Data Collection

The samples were collected data into three parts: 1) local rice varieties, 2) local rice position and 3) local rice conservation.

3.3.1 Local rice varieties and local rice position

The local rice varieties were performed by surveying and collection of local rice seeds from farmers plant local rice with snowball technique for reference friend their friend and purposive sampling for cover all sub-district and district in Kamphaeng Phet province. The local rice seeds were collected 1 gram per cultivate and the local rice seeds position was record by GPS in the acquisition of spatial data for the mapping.

3.3.2 Local rice conservation

The local rice conservation used unstructured interview and in-depth interview with farmer's plant local rice. The first place was in-depth interview at the local wisdom learning centre, key informant interviews, discussion with rice growers in Nai Muang district, Kamphaeng Phet province that they reference to. Data collection conducted until enough data are gathered to be useful and cover all sub-district for research.

3.4 Data Analysis

Diversity of local rice varieties. The Local rice seed and local rice positions were analyzed by using summarizes and percentage (%) for all of local rice seed that found in Nai Muang and Sai Ngam district, Kamphaeng Phet province.

Creating the GIS maps. The coordinated of location of local rice planting for creating the maps using high precision GPS receiver (Garmin etrex 30). The coordinates of local rice plant were incorporated into geo-referenced digital map of the study area. The spatial data, attribute data, location of rice plant area, soil group, and infrastructure were incorporate into the maps. Check the accuracy of all the data and update the database to the same standards of the map. The attributes were carried on using Geographic Information

System (GIS). The spatial data were analyzed using Arc view 3.2 to investigate the area of local rice crop in Nai Muang and Sai Ngam district, Kamphaeng Phet province.

Conservation of local rice varieties. The unstructured interview and In-depth interview was analyzed by content analysis and descriptive analysis methods for local rice plant and conservation of local rice varieties in Nai Muang and Sai Ngam district, Kamphaeng Phet province.

4. Research Results

The results were presented according to the research objectives as follows:

4.1 Diversity

In Nai Muang district found the 10 cultivates i.e. Khao Hawm Dawk Mali Daeng, Khao' Jao Khao Gaw Diaw 35, Khao' Jao Khao Tah -kleuap, Khao' Jao Leuang Pratan, Khao' Jao Soh Maa Lee, Khao' Jao Hawm Su-rin, Khao' Jao Hawm Nil, Khao' Niew San-pah-tawng, Khao' Niew Leuang Noi and Khao' Niew Dam, respectively. Moreover, 3 cultivates were found in Sai Ngam district i.e. Khao Hawm Dawk Mali Daeng, Khao' Jao Hawm Nil and Khao' Niew Dam, respectively. The samples of local rice seeds shown in picture 1 and picture 2.

The frequency and percentage of local rice varieties were found in Nai Muang and Sai Ngam district as in table 1 present that Hawm Dawk Mali Daeng (20.00 %) have high frequency and percentage follow by San-pah-tawng (6.67%), Hawm Nil (6.67%), and Khao' Niaw Dam (6.67%). At Ang thong sub-district, Nai Muang district found local rice varieties than those in Nai Muang and Sai Ngam district.





Khao'Niew
San-pah-tawng

Khao'Niew
Leung Noi

Khao'Niew
Dam

*Picture 1. The local rice varieties planting found from Nai Muang district,
Kamphaeng Phet Province.*



Khao'Jao
Hawm Dawk Mali Daeng

Khao'Niew
Hawm Nil

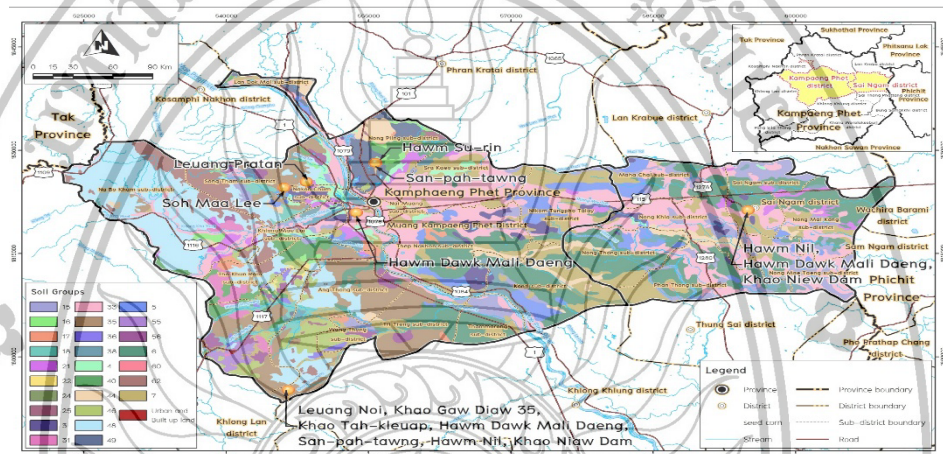
Dam

Khao'Jao

*Picture 2. The local rice varieties planting found from in Sai Ngam district,
Kamphaeng Phet Province.*

4.2 The area of local rice planting and conservation

The obtained GIS data showed that Nai Muang district had rice growing area of 302,959.41 Rai which more than Sai Ngam district of 207,255.55 Rai (Land Development Department, 2007). Which is a farmer plant local rice variety in Nai Muang district more than Sai Ngam district? The GPS coordination of local rice varieties were found in Nai Muang and Sai Ngam district include of soil groups showed in picture 3.



Picture 3. The GPS coordination of local rice varieties include of soil groups

The local rice crop in the early time and now has shown that varieties of some local rice were still grown in the same area. The suitable of soil was nice for rice cultivar in Nakornchum sub-district, Muang district such as Khao Jao Hawm Dawk Mali Daeng and Khao Jao Soh Maa Lee and Khao' Jao Hawm Dawk Mali Daeng, Khao' Jao Hawm Nil and Khao' Niew Dam in Sai Ngam sub-district, Sai Ngam district. In other areas found that the local rice cultivate were suitability of the soil in moderate, soil poorly suited and soil unsuited.

4.3 Conservation of local rice varieties

The conservation of local rice varieties in Nai Muang and Sai Ngam district, Kamphaeng Phet province found that Farmer saving local rice seeds from their own farms plant by themselves, farmers gave local rice seed through their relatives and neighbors to expand the plant area and their collection. The local rice seed can collect 1 year only after that incomplete seed therefore; the farmer will plant every year to get their new local rice seeds for complete seed. The farmer make the pure seed for collected by them and keeps old local rice seed in used zip-lock plastic bag or kept in the small cloth bag to protect against insect and animal as in picture 4.



Picture 4. The method to keeping local rice seed (a) keep in zip-lock plastic, (b) keep on plastic box and (c) keep in the small cloth bag.

5. Discussion

The Local rice crop found in Muang and Sai Ngam district at Kamphaeng Phet province, Thailand for 10 local rice cultivates such as Khaó Jao Hawm Dawk Mali Daeng, Khaó' Jao Khaó Gaw Diaw 35, Khaó' Jao Khaó Tah-kleuap, Khaó' Jao Leuang Pratan, Khaó' Jao Soh Maa Lee, Khaó' Jao Hawm Su-rin, Khaó' Jao Hawm Nil, Khaó' Niew San-pah-tawng, Khaó' Niew Leuang Noi and Khaó' Niew Dam. Which Khaó' Jao Khaó Tah-kleuap, Khaó' Jao Leuang Pratan have been plant in Muang district and Sai Ngam district (Suphatpong and Wallop, 2010). In Nai Muang, farmer plant local rice varieties more than Sai Ngam district because the farmer grow local rice for their self-consumer, some farmer who grow local rice also selected seed from their consumer and like, healthy (don't use Fertilizers and Pesticides), activities such as training, business and farmer school if they have some local rice remain then sell it. "Which farmer concept is self-sufficiency farming." Moreover, some farmers collected local rice seed for conservation, while Sai Ngam district plant rice for the first reason is selling and the second for self-consumer. The local rice seed can collect 1 year only after that incomplete seed therefore; the farmer will plant every year to get their new local rice seeds for complete seed. The seeds stored in natural environment showed lower physiological quality (Elizabeth, Eduardo and Roberto, 2014). The farmer make the pure seed for collected by them and keeps old local rice seed in used zip-lock plastic bag or kept in the small cloth bag to protect against insect and animal

6. Conclusion

Local rice varieties have remained in Muang and Sai Ngam district at Kamphaeng Phet province, Thailand for 10 local rice cultivates such as Khaó Jao Hawm Dawk Mali Daeng, Khaó' Jao Khaó Gaw Diaw 35, Khaó' Jao Khaó Tah-kleuap, Khaó' Jao Leuang Pratan, Khaó' Jao Soh Maa Lee, Khaó' Jao Hawm Su-rin, Khaó' Jao Hawm Nil, Khaó' Niew San-pah-tawng, Khaó' Niew Leuang Noi and Khaó' Niew Dam. The farmers crop local rice in agricultural plot and gave rice grains to theirs members and kept rice seed in zip-lock plastic bag or packed in the small cloth bag to protect against insect and animal before planting in every year for conservation.

7. Recommendations

The following are some recommendations based on the research results:

7.1 The information in this research can be useful for local rice varieties, guideline for the collection and selection of local rice varieties for the plant and collects local rice seeds for conservation in the future.

7.2 Further studies should be conducted for other districts to search for local rice varieties which cover all of Kamphaeng Phet province.

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