Mini Review

Value Creation and Addition of Rice and Its Significance to Thai Culture

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Summary For Thai people, rice is not only regarded as a staple food but a sacred plant with a spirit, a life and a soul of its own. Many exquisite cultural traditions and customs associated with rice and Thai people are usually performed nationwide from sowing to harvesting such as the Royal Ploughing Ceremony, Morale Blessing Ceremony to Phosop. During the 2007–2016 period, while the planted area (72,217,000 rai), harvested area (68,332,000 rai), production (32,874,000 ton) and yield (480 kg/rai) varied slightly, the price (10,232 Baht/ton) and value (337,849 million Baht) at farm gate steadily decreased. To raise the farmers’ income, rice strategy must be changed to create higher value from exports of rice-based products by using innovation instead of exporting a high volume of commodity-grade traded at a low price. Various kinds of value-added healthy processed rice-based foods are accessible in the markets as well as food supplements, food ingredients, cosmetics and medicinal products. In Thailand, rice is mainly consumed as normal cooked rice or glutinous rice and processed into flour, noodle, alcoholic drink, snacks, baked foods, desserts and beverages. Recently, organic rice, pigmented rice and low glycemic index rice with higher price and nutritive value have been available as an alternative choice for health conscious consumers and people with non-communicable disease. Innovative and functional products from that premium rice have been widely encouraged. This will help to support Thai rice farmers and help in strengthening and leading to sustainable Thai economy.

Key Words rice, value addition, rice products, rituals, Thailand

Rice is believed to have first been being cultivated in Thailand around 3,500 B.C. (1). It is a major staple food and the most important economic crop grown in abundance in all parts of the country. In 2014, Thailand was the world’s 6th largest rice producer and the largest exporter with an export of 10.3 metric ton, accounting approximately a quarter of the total rice export in world market (2). In 2015, Thailand was ranked the 2nd country that exported the highest value of rice (3). In 2017, the total volume of Thai rice exports was 7,395,579 metric tons with the value of 3,324.03 million USD (4).

The most suitable rice production areas are at the central plains and the lower north of the country where it is abundant of water or good irrigation system with 5–6 crops/2 y. The northeast is considered moderately suitable production area where the rice can be cultivated once a year due to using of rainfall water. Rice occupies more land than other food crops, accounting for about 11.3% of the entire area of the country. 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. There are about 3,500 varieties of rice available in Thailand ranging from wild rice, local varieties, and new breeds (5). Thai rice can be classified according to amylose content into 2 types: regular or non-glutinous rice (20–30% amylose content) and glutinous or waxy or sticky rice (0–2% amylose content). It also can be classified according to colour of the outer layer of the unlopped rice into 2 types: non-pigmented (or white rice) and pigmented rice (or colored rice). Pigmented rice has recently become a popular alternative for health conscious consumers due to its rich source of commercially-important bioactive phytochemicals and antioxidants.

There are a few organizations that responsible for the country’s rice policy and related issues. The National Research Council of Thailand, is an organization that substantially responsible for determining research policy. The Thailand Development Research Institute constructs an impact assessment system to evaluate the research outputs. The Rice Department, Ministry of Agriculture and Cooperatives is responsible for the administration of rice policies, irrigation, promotion and development of farmers and cooperative systems.

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The Rice Department has 27 Rice Research Centers and 23 Rice Seed Centers located across the nation that have major roles in providing academic services, technology, rice seeds and current issues on rice to local farmers or other stakeholders in rice supply chains, as well as to conduct research and development related to rice.

Thai people usually consume rice 3 meals a day in various forms such as cooked normal rice, steam glutinous rice, fried rice, rice noodle or pan-fried noodle. A typical Thai meal involves many complementary dishes, which are served together with rice. This indicates the impact and a close bond of rice with their way of life. Furthermore, rice is not only a main food but also plays a very significant role in the history, culture, society and economy of the Thai nation. Consequently, there are many rituals and cultures associated with rice and Thai people that are performed nationwide throughout the rice growing season. The objective of this article is to review the production, value, and significance of rice to Thai culture. The future trends of rice in Thailand is also mentioned.

**Production and Value of Rice in Thailand**

The planted area, harvested area and production of the major and second rice in 2007–2016 are shown in Fig. 1. The planted area ranged from 63–83 million rai with the average of 72 million rai (1 rai = 0.40 acre). For the major rice (main cultivation of the year which relies solely on rainfall and is normally cultivated during June-November), the northeast region had the largest planted area, followed by the north, central and south, respectively. For a second rice (second round of cultivation of the year which relies on irrigation system), the north had the largest planted area, followed by the central, northeast and south, respectively. The harvested area ranged from 60–76 million rai, averaged 68 million rai (7). The lower 4 million rai of the harvested area than the planted area was due mainly to flooding or drought or shifting of rice to sugarcane. The production was 27–38 million ton with the average of 32 million ton. The lowest production in 2015 was due mainly to drought. The yield was 456–510 kg/rai, averaged 480 kg/rai (Fig. 2). The highest yield was obtained from the central, followed by the north, south and northeast, respectively for both the major and second rice. The amount of rainfall played a major effect on the yield. The farm gate price (the actual price sold by farmers) was 8,615–11,358 Baht/ton, averaged 10,232 Baht/ton (30 Baht = 1 USD) (Fig. 3). The farm gate value (value of rice according to the actual price sold by farmers) ranged from 257,840–432,763 Million Baht, averaged 337,849 Million Baht (Fig. 4) (7).

It should be noticed from Figs. 1–5 that while the planted area, harvested area and yield were varied slightly during the 2007–2016 periods, the farm gate price and value were steadily decreased. This was probably due to decreasing of export price of rice (7), drought and decreasing worldwide demand for rice (8). The decrease in farm gate price and value had a negative direct effect to the farmers. In order to raise the farmers’ income, rice strategy must be changed to create higher value from exports of rice-based products instead of
exporting a high volume of commodity-grade products traded at a low price (9). In addition, as the price of brown rice (50,000 Baht/ton), particularly pigmented rice (50,000–100,000 Baht/ton) is greater than the milled rice (30,000 Baht/ton) (Fig. 5), encouragement on consumption of brown rice and pigmented rice could be another way to improve the well-being of the farmers.

**Value Creation and Addition of Rice in Thailand**

Recently, owing to the consumers' trend on looking for health products, the higher value creation and addition to rice could be commercially promoted and categorised into 4 major areas namely, refined rice bran oil, food supplements, nutraceuticals and pharma-cosmetics that could contribute to as high as 400 times greater value than that of the rice paddy (Fig. 5), encouragement on consumption of brown rice and pigmented rice could be another way to improve the well-being of the farmers.

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**Rice and Thai Culture**

For Thai people, rice is not only regarded as a staple food but a sacred plant with a spirit, a life and a soul of its own (1). Rice gives the farmers a career and life. They respect and tribute to rice as a mother. Therefore, they must be courteous, gentle, respectful and grateful to rice. Rice is so important that one of the most common greetings is “kin khaao reuu yang” (Have you consumed rice yet?) (10). Many exquisite cultural traditions and customs associated with rice and Thai people are usually performed nationwide from sowing to harvesting. Farmers believe that the Goddess of Rice or Mother of Rice namely “Phosop” or “Mae Phosop” is an angel who protects and gives blessing to the rice field. She helps to maintain a healthy rice and give abundant yield, and ensures that everyone has enough to eat. Consequently, the farmers organize ritual offerings to propitiate the Goddess of Rice all year-round of rice cultivation. It is very appealing that Phosop is featured in the logo of the Rice Department, Ministry of Agriculture and Coopera-
tives of Thailand. The iconographic representation of Phosop is of a beautiful woman wearing full jewelry and a yellow traditional Thai costume, sitting and holding a harvested rice sheaf on her right shoulder (11).

In Thailand, rice rituals are made throughout the year of rice cultivation and can be divided into 3 phases of rice cultivation: before planting, during planting and at harvest. Examples of some well-known rituals that carried out at each phase are detailed as following.

**Before planting**

At the beginning of the rice production, rituals that associate with a request for rain are the most important. Royal Ploughing Ceremony, Cat Procession and Rocket Festival are usually performed.

**Royal Ploughing Ceremony.** It is an ancient royal rite held in many Asian countries to mark the traditional beginning of the rice growing season. It usually takes place annually in early May at Sanam Luang near the Grand Palace in Bangkok. In the ceremony, two sacred oxen are hitched to a wooden plough and they plough a furrow in some ceremonial ground, while rice seed is sown by court Brahmins. After the ploughing, the oxen are offered plates of food, including rice, corn, green beans, sesame, fresh-cut grass, water, and rice whisky. Depending on what the oxen eat, court astrologers and Brahmins make a prediction on whether the coming growing season will be bountiful or not (12). During this colourful ceremony, the amount of rainfall to be expected in the coming season is also forecast. At the end of it, people scramble to collect the auspicious rice seeds from the furrows in order to increase their luck. It has been a public holiday since 1957 (13).

**Cat Procession.** It is an ancient tradition occurring in times of severe drought and asking for the rain by Thai farmers. In rainy season, if the rain does not come as expected, the farmers will organize a feast of cats with the belief that a crying cat can bring rain. It consists of a particularly fine feline being paraded around in a basket while villagers toss water at it (14). Some people believe that the cats represent drought. If the cat is splashed water until it is wet, it is to expel drought out of town. In addition, some believe that cats are mysterious creatures that can summon rain.

**Rocket Festival.** A merit-making ceremony traditionally practiced near the beginning of the wet season. It is a sign of starting a new farming season. The Northeast people believe in the god of rain, to worship with fire, is a way to make him please. By sending fireballs to worship this god, then it will bring the rain down. The fire-balls are decorated with various colored papers.

The rocket festival is a noisy celebration that uses a volatile mixture of bamboo and gunpowder to convince the sky to send rain for the new rice season (14).

**During Planting**

At this stage of rice production, Morale Blessing Ceremony to Phosop is normally conducted.

**Morale Blessing Ceremony to Phosop.** It is believed that both humans and animals have “morale.” Rice also has morale, therefore it is necessary to nourish the morale to keep them stay. If it is away, the rice will die. The ritual is conducted to satisfy and dedicate to the mother Phosop at the time of the rice begins flowering (pregnant) and again after the rice is harvested and put in the barn.

**At harvest**

At harvest as to celebrate the productivity, Ceremony to the Morale, Barn Closing Ceremony and Barn Opening Ceremony are normally carried out.

**Ceremony to the Morale.** It is a ceremony to satisfy the mother Phosop before harvesting and after harvesting. There are 2 rituals in this period. Firstly, to give the massage to the mother Phosop and ask for the permission to harvest the rice. Secondly, after harvesting, to invite the mother Phosop from the field to the barn.

**Barn Closing Ceremony.** This ceremony is performed when the threshing is finished and the rice is brought to the barn. After the ceremony is completed, the barn will be closed.

**Barn Opening Ceremony.** This ceremony is simply by asking the mother Phosop to stay in the barn and allow the farmers to take the rice grain out of the barn for consumption or sale.

It is remarkable that all rituals are primarily intended for the abundance of rice. It is also illustrated how the farmers believe in and make offers to the mother Phosop during the rice cultivation. Despite, some rituals may be cut off or shorten due to advanced technology, limited time and younger generations’ perspectives and beliefs, a lot of Thais, particularly farmers who strongly believe in the mother Phosop and realise the important of the rituals, are willing to continue performing and preserving the rice culture and religious rituals. Furthermore, it is one of the responsibilities of the Ministry of Culture and the Rice Department to promote and preserve those exquisite rice rituals to be more sustainable.

**Future Trends of Rice in Thailand**

Along with advanced or emerging science and technology, there are several promising future trends of rice in Thailand. First, a continuous financial support on research and development in rice from the Thai government through the National Research Strategy on Rice. Second, encouragement of value creation and addition of rice and its co-products from both the government and privates sectors. Third, production and process development of organic rice, pigmented rice, unpolished rice or brown rice. Fourth, production and consumption of low glycemic index rice such as RD43, Phitsanulok80 cultivars. Fifth, research and development of more nutritious and healthy products from rice such as functional foods, baby foods, elderly foods and foods for people with non-communicable disease (NCD).

Finally, in rice production and processing industry, despite large quantities of rice straw and husks are produced annually in rice farms and processing mills, they are economically underutilized. They are usually used as fertilizer additive and for the production of thermal and electric energy through steam boilers. The alternative use of these products as a sustainable source of bio-products and renewable energy should be encouraged.
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and promoted.

Disclosure of State of COI
The authors have no Conflict of Interest.

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