EFFECT OF PADDY CULTIVATION ON ECONOMY OF NGAPUTAW TOWNSHIP, AYEYARWADY REGION

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Abstract

The paper tried to present paddy cultivation of Ngaputaw Township from the geographical point of view. Ngaputaw Township is one of the twenty six townships in Ayeyarwady Region and major economic activity of the area is paddy cultivation. In the area, the sown area of paddy increases yearly and paddy productivity differs from one variety to another. There are eight major paddy varieties in the area and price slightly differs one from another. The objectives of the paper are to analyze cultivated area and production of different paddy varieties in Ngaputaw Township, to examine the rent return of paddy cultivation caused by price fluctuation and to predict future prospect of the paddy cultivation in Ngaputaw Township. To present this paper, primary data will be mainly applied and it includes price, variety, inputs, etc. Primary data will be collected through interviews, questionnaire and focus group discussion with farmers, staff of agriculture department and authorities concerned. Secondary data such as climatic data, population, paddy cultivated area and productivity will be collected from departments concerned.

Keywords*:* paddy cultivation, varieties, economic return, price,

Introduction

Agriculture is still major economic activity in developing countries. Paddy is the most important food crop of Asian people. Cultivation of rice probably originated in the monsoon areas of South-East Asia.

Globally, paddy is a very important food crop. It is an ancient crop consumed as healthy and staple food by more than half of the world population (Shabu, Gyuse, Abawua, 2011). Paddy is consumed by over 4.8 billion people in 176 countries and is the most important food crop for over 2.89 billion people in Asia, over 40 million people in Africa and over 150.3 million people in America (Daramola, 2005).

Agriculture is the backbone of the Myanmar economy: the sector accounts for about 30% of GDP, over 50% of total employment and

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approximately 20% of exports. Cultivated land, covering 12.8 million hectares, has the potential to be increased by nearly 50%. As in neighbouring countries, smallholder paddy production dominates Myanmar's agricultural economy: paddy production accounts for roughly half of all cropped area (Agriculture in Myanmar, 2016).

Since 1970s, a substantial number of high yielding rice varieties (HYV) have been developed and released for rainfed lowland and irrigated ecologies. During the 1970s and early 1980s, the popular varieties were Shwe War Tun and Seintaly. Recently, Thi Htat Yin, Shwe Thwe Yin, and Sin Akari-2 (released after 1990) varieties are popular in rice-rice systems. More than 70 percent of lowland rice crops in 1994-95 were planted with new varieties (FAO, 2005). After cultivation new high varieties, productivity of paddy became higher and economic return of paddy cultivation gave higher income to the local people. But, income varies from one farmer to another due to different paddy productivities of new yields.

Ayeyarwady Region is known as rice granary and most of the agriculture land is occupied by paddy. But, many varieties are cultivated due to difference in soils, farmers' attitude and different productivity and price of paddy varieties. Although there are 37 varieties in Myanmar, eight paddy varieties: Palethwe, Sinthukha, Theehtupyin, Manawthukha, Pawsan, Meedone and Ngasein are cultivated in Ngaputaw Township. They give different yield per unit area and different economic return. To study different yield per unit area and different economic return of new paddy varieties from the geographical point of view, Ngaputaw Township was selected.

Study Area

Ngaputaw Township is one of the townships in Pathein District, Ayeyarwady Region and it lies on the south western-most part of the Region. It has an area of 3636.82 square kilometer and is the largest township among the 26 townships in Ayeyarwady Region. It is composed of 3 towns and 83 village tracts. Like other townships located in the deltaic area, it also has tropical monsoon climate that gives sufficient rainfall for monsoon paddy cultivation. 8 types of soils that are suitable for paddy cultivation are found in the study area.

Research Question

How do cultivated areas of paddy varieties differ from one to another?

Aim and objectives

The aim of the paper is to present the ways that support local farmers through paddy cultivation.

The objectives of the paper are:

- to analyze change in cultivated area in Ngaputaw Township
- to explore different production of different paddy varieties in Ngaputaw Township,
- to examine the rent return of paddy cultivation caused by price fluctuation and
- to predict future prospect of the paddy cultivation in Ngaputaw Township

Methodology

To collect primary data, 8 village tracts were chosen from 83 village tracts. Then, one rice farmer from each village tract was interviewed and 160 questionnaires were distributed to eight village tracts. Data collected from field observation, interviews and questionnaire survey such as size of rice farms, rice yield, income, and cost of farm inputs including fertilizer, pesticide/herbicide, seeds, labour and capital were applied. Secondary data were mainly used in presenting the paper and geographical methods are also used to illustrate changes in paddy cultivation. As analytical method, qualitative – quantitative mixed method was applied.

Geographical Background of Ngaputaw Township

Ngaputaw Township included in Pathein District, Ayeyarwady Region, lies on the south western-most part of the Region. It is situated between latitudes 15˚49'N and 16˚44'N and longitudes 94˚16'E and 94˚44'E. It has an area of 3636.82 square kilometer (1404.18 square miles). Ngaputaw Township is made up of 3 towns (7 wards) and 83 village tracts (420 villages). It is compact in shape.

As it is located on alluvial plain of the Ayeyarwady Delta, the area is suitable for agricultural activities. In the study area, although the western narrow coastal strip and area occupied by Rakhine Yoma and its Spurs are suitable for paddy cultivation, alluvial plain covering over half of total land area has an elevation of less than15.24m (50 feet) above mean sea level is suitable for paddy cultivation. The main drainage of Ngaputaw Township is the Ngawun River and other small Streams are Thandwe, Panmawadi, Hteik Thaung, Sinma, Thabyu, Shwe-O, Sinmon, Phoungdo, etc.

The annual mean temperature in Ngaputaw Township is 27˚C. The monthly maximum mean temperature is also highest in April with 36.9˚C and lowest in August with 30.5˚C. The monthly minimum temperature is lowest in January with 17.6˚C and highest in the May with 24.9˚C. Rainfall is received from May to October from the southwest monsoon and the mean annual rainfall is 3030.8mm (119.32 inches) and the rainy days were 131 days. The existing temperature and rainfall conditions support paddy cultivation.

Eight types of soils: Meadow Gley Soil, Meadow Swampy Soil, Meadow Swampy Meadow Soil, Dune forest and Beach Sand, Saline Mangrove Forest Soil, Red Brown Forest Soil, Yellow Brown Forest Soil and Saline Swampy Meadow Gley Soil are found and among them, meadow soil group is favourable for paddy cultivation in Ngaputaw Township.

The population of Ngaputaw Township in 2017 was 327 272 persons. It includes urban population 28,298 persons (9%) and rural population 298,974 persons (91%) in 2017.

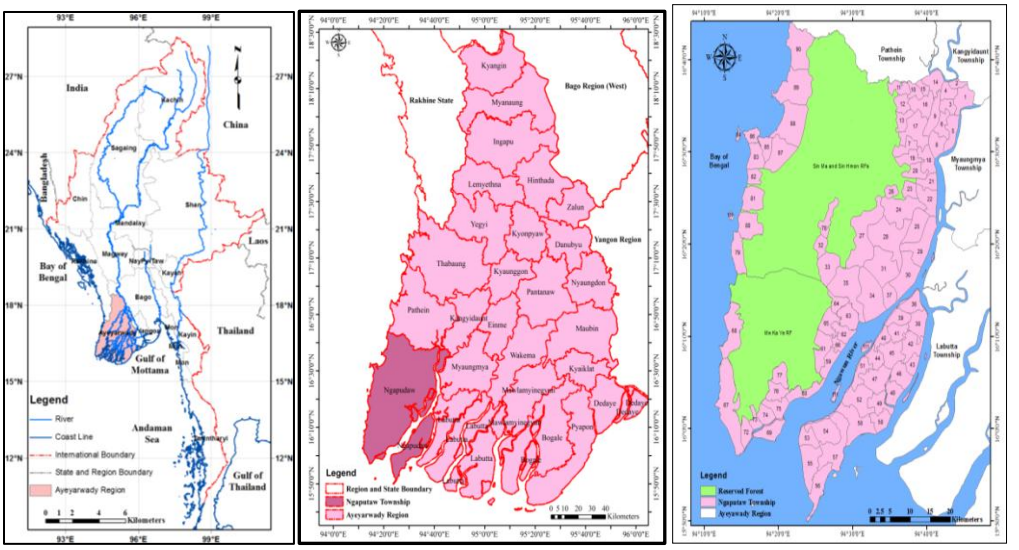

Figure 1: Location of Village Tracts, Ngaputaw Township, Ayeyawady Region

Source: Survey Department, Pathein

In 2017, the total population was 327,272 persons of 52 percent were engaged in agriculture, animal husbandry, and fishery. Agriculture land uses include le, kaing, garden and dhani land and le land ranked first with 84778 ha or 79 percent of the total agriculture land. Area of le land supports paddy cultivation, major crop of the study area.

Results and Findings

Paddy Cultivation of Ngaputaw Township

Like other townships in Ayeyarwady region, not only monsoon paddy but also summer paddy are cultivated in the area. Traditional rain fed monsoon paddy cultivation is practiced in the rainy season and summer paddy is cultivated as double crop on le land where irrigation water is available. Existing streams support irrigation water for summer paddy cultivation. Water is pumped from nearby streams but water requirement on sandy soils is high. In most areas, summer paddy is not cultivated due to high cost caused by high diesel use for irrigation.

Table 1: Change in Paddy Cultivated area in Ngaputaw Township

Year	Paddy Cultivated area (ha)	Year	Paddy Cultivated area (ha)
2007-2008	75642.3	2013-2014	75671.8
2008-2009	75641.0	2014-2015	79511.1
2009-2010	75641.0	2015-2016	82195.1
2010-2011	75641.0	2016-2017	82225.8
2011-2012	75671.8	2017-2018	84236.5
2012-2013	75671.8		

Source: Agriculture and Land management Statistics, Ngaputaw Township, 2017

Monsoon paddy and summer paddy cultivation

Monsoon paddy cultivated area was 204038 ha and summer paddy cultivated area 4109 ha in 2017. Most farmers whose paddy field located on the soils containing high sand content do not cultivate summer paddy due to high diesel cost. Therefore, in the area, monsoon paddy cultivated area is much higher than that of summer paddy.

Table 2: Monsoon and Summer Paddy Cultivation in Ngaputaw Township

Items	Cultivated area (ha)	Matured area (ha)	Yield per ha (ton)	Production (ton)
Monsoon Paddy	204038	204038	3.5	707093.689
Summer Paddy	4109	4109	4.3	17621.4465

Source: Agriculture and Land management Statistics, Ngaputaw Township, 2017

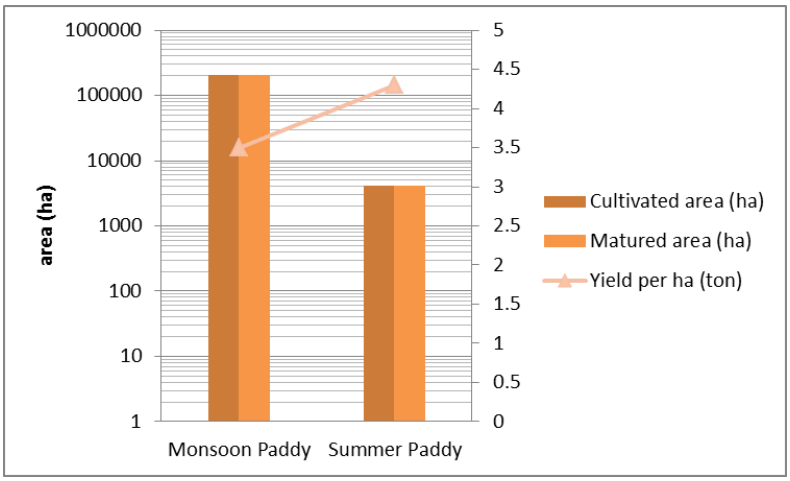

Figure 2: Monsoon and Summer Paddy Cultivation in Ngaputaw Township

Source: Table 2

Yield per unit area of monsoon paddy is lower than that of summer paddy in Ngaputaw Township. Monsoon paddy productivity is 3.5 ton per ha and that of summer paddy 4.3 ton per ha. High summer paddy productivity is due to higher input uses, less risk caused by untimely rain, etc.

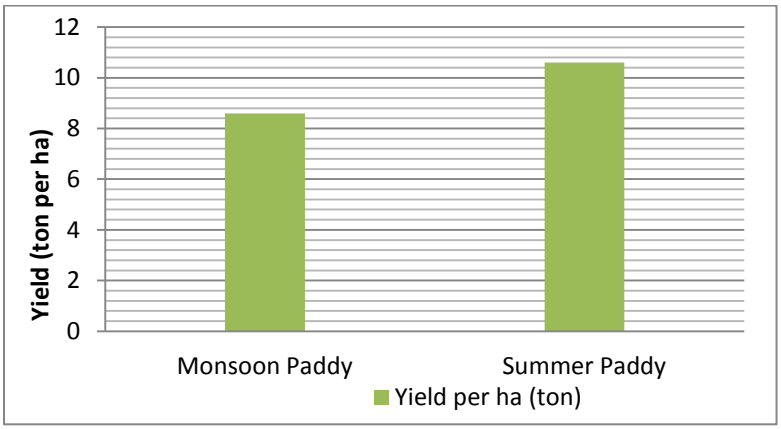

Figure 3: Productivity of Monsoon and Summer Paddy in Ngaputaw Township

Source: Table 2

Major paddy varieties and production

In the study area, major paddy varieties are Palethwe, Sinthukha, Sinthwelatt, Theehtupyin, Manawthukha, Pawsan, Meedone and Ngasein. Palethwe, Sinthukha, Theehtupyin and Manawthukha are high yield varieties. Manawthukha ranked first in paddy cultivated areas with 28495 ha of Ngaputaw Township.

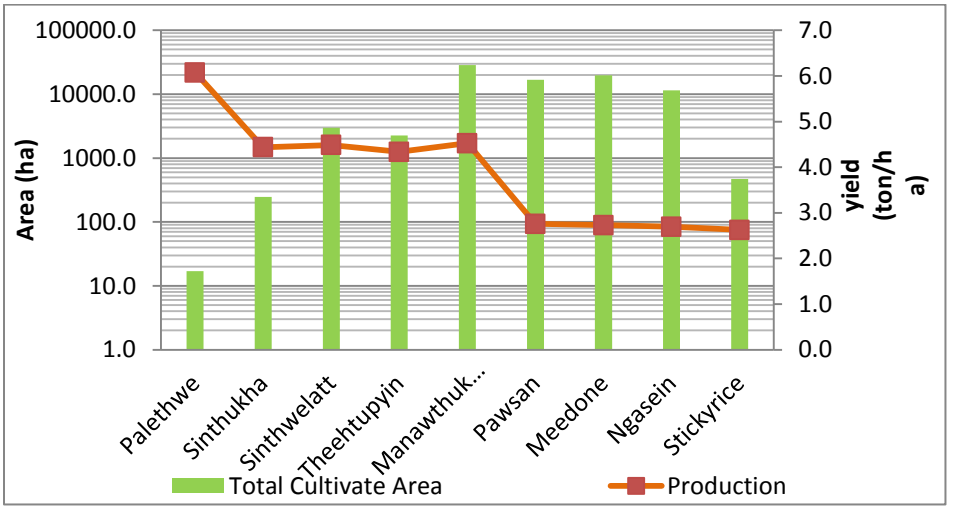

Figure 4: Cultivated area and yield per area of different paddy varieties in Ngaputaw Township

Source: Data of Agriculture and Land management Statistics, Ngaputaw Township, 2017

Local farmers mainly cultivate Manawthukha due to high yield. Local farmers think that existing soils are suitable for Manawthukha. Cultivated area of Meedone was 19707 ha and it ranked second because of high local demand. Palethwe ranked last in paddy cultivated area because of high cost of seed and high investment although productivity of it is high with 6.1 ton per ha. Productivity of Manawthukha ranks second with 4.5 ton per ha. Therefore, local farmers cultivated it due to suitability of soils, less investment and high productivity.

Price of Paddy (2009-2017)

In 2009, price of paddy was low with 220000 kyats per 100 baskets due to price instability caused by rice traders. Then, it gradually increased to 425000 kyats per 100 baskets in 2015. But, in 2016, paddy price distinctly decreased to 330000 kyats per 100 baskets due to price speculation created by rice entrepreneurs. *Prices* for monsoon *paddy rice* decline 10-per-cent compared with the price of 2015 (Eleven Myanmar, 2016).

Table 3: Price of Paddy (2009-2017)

	Paddy price (kyat per 100 baskets)	**Paddy price (kyat per ton)**
2009	220000	105465.0
2010	290000	139022.1
2011	310000	148609.8
2012	335000	160594.4
2013	380000	182166.8
2014	370000	177373.0
2015	425000	203739.2
2016	330000	158197.5
2017	540000	258868.6

Source: Interview with farmers, Ngaputaw Township

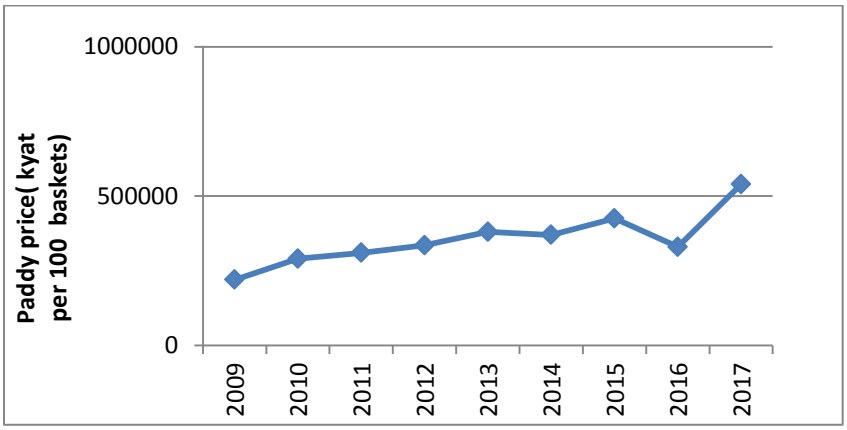

Figure 5: Price of Paddy (2009-2018)

Source: Table 3

Choice of paddy varieties in Ngaputaw Township
Choice of varieties mainly depends on physical factors

In the study area, three types of land: land with suitable water, sandy ridge land and salt intrusion area that are used for paddy cultivation. Area of land with suitable water was106217 ha in 2017 and it ranked first in areas of paddy cultivated land and paddy is cultivated not only in the rainy season but also in the dry period. Salt intruded paddy land was an area of 60354 ha and paddy is only cultivated in the rainy season. But, crop loss is found due to salt intrusion in the end of rainy season. Sandy ridge paddy land occupied area of 37466 ha and monsoon paddy is mainly cultivated because summer paddy is not grown in the area due to high diesel cost on sandy soils.

Palethwe, Sinthukha, Theehtupyin, Manawthukha varieties are suitable in land with suitable water areas and sandy ridge paddy field and short lived varieties such as Manawthukha, Pawsan, Meedone and Ngasein are suitable in salt intrusion areas.

Cost and Economic Return of Paddy Varieties

Cost and economic return are major factors affecting choice of varieties. Economic return of Palethwe is highest but most farmers do not grow Palethwe because of high cost. Palethwe needs many inputs such as chemical fertilizer although yield per unit area is highest among the varieties cultivated in Ngaputaw Township. Therefore, palethwe cultivated area ranks last in cultivated area of different varieties. In Meedone and Ngasein cultivation, low investment is needed but it gives low yield and low economic return. Because of low productivity and low return, there are small Meedone and Ngasein cultivated area in the study area. Theehtupyin and Manawthukha are mainly grown in the area due to less risk, low investment and high productivity.

Table 4: Cost and Economic Return of Paddy Varieties

	Cost (kyat per ha)	Economic return (kyat per ha)
Palethwe	790720	1359050
Sinthukha	691880	988400
Sinthwelatt	617750	1037820
Theehtupyin	617750	1037820
Manawthukha	543620	988400
Pawsan	469490	840140
Meedone	420070	741300
Ngasein	420070	741300

Source: field interviews (2017)

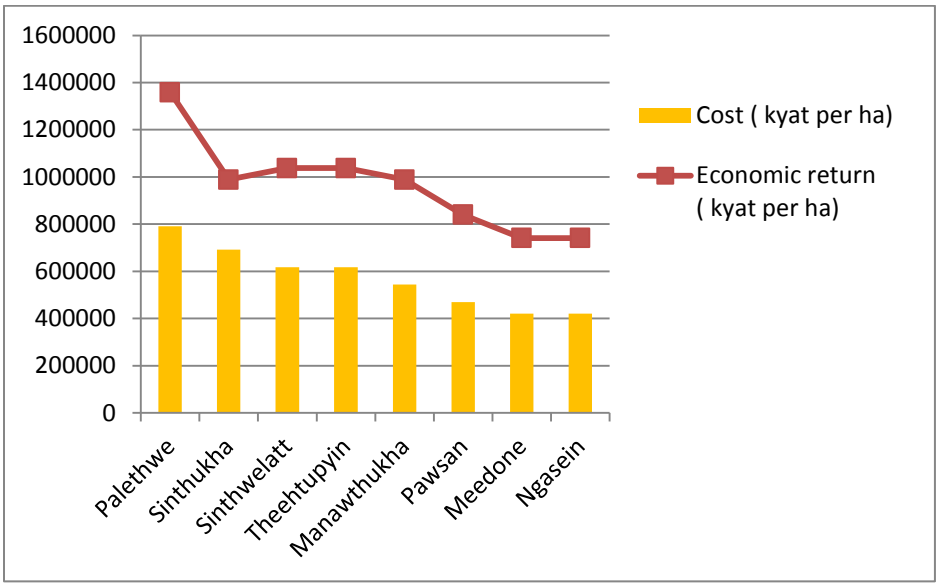

Figure 6: Cost and Economic Return of Paddy Varieties
Source: Table 4.

Problems on paddy cultivation in Ngaputaw Township

The major problems concerning paddy cultivation of Ngaputaw Township include seed availability, seed price, high input cost, etc.

Seed Availability

According to semi-structured interviews, more than 82 percent of the local farmers want to cultivate high yield varieties. The seed availability is one of the problems on paddy cultivation and it is difficult to get seeds from agriculture department. Therefore, they use the seeds from nearby farmers or relatives and it affects crop yield.

Seed Price

Seed price is one of the major problems in paddy cultivation. As the loan from agriculture bank is insufficient for paddy cultivation, farmers reduces the paddy cultivation cost. The high price of paddy seed is high and most farmers cannot afford to buy it. Therefore, they use local seeds and it is one of the factors causing low yield in paddy cultivation. According to semi-structured interviews, 63 percent of the local farmers said high price of seed is major factor affecting paddy production in the area.

High Input Cost

High input cost is also one of the major determinants on high yield varieties cultivation. High yield paddy varieties need sufficient fertilizer to get high yield. Most local farmers especially small holder farmers have low investment because of insufficient loan. On the other hand, price of input especially chemical fertilizer increases from 18000 ks per bag in 2015 and 22000 kyats per bags in 2018. According to semi-structured interviews, 91 percent of the local farmers said insufficient investment and high input cost are the problems in paddy cultivation.

Conclusion

Ngaputaw Township is located in deltaic area which is one of the best cultivated lands in Myanmar. Existing physical condition support the paddy cultivation. Topographically, it lies on low land suitable for paddy cultivation. The temperature and rainfall received are favourable for paddy cultivation. Most areas are covered with meadow soils that support paddy cultivation in the study area. Higher proportion of rural population support agriculture including paddy cultivation.

In the study area, monsoon paddy and summer paddy are cultivated and paddy cultivated area increased due to staple food and major economic activities. Monsoon paddy cultivated area is larger than that of summer paddy because of water availability and salt intrusion in the rainy season. Major varieties cultivated in the area are Palethwe, Sinthukha, Sinthwelatt, Theehtupyin, Manawthukha, Pawsan, Meedone and Ngasein of whcih Palethwe, Sinthukha, Sinthwelatt, Theehtupyin and Manawthukha are major high yield varieties. Manawthukha ranked first in paddy cultivated areas because farmers want to cultivate Manawthukha due to high yield. On the other hand, existing soils are suitable for Manawthukha.

Although productivity of Manawthukha ranks second with 4.5 ton per ha, it is mainly cultivated due to suitability of soils, less investment and high productivity. Price gradually increased in the study period and it is one of the factors supporting and choosing high yield varieties in the area. Paddy is cultivated on existing land with suitable water, sandy ridge land and salt intrusion area.

Palethwe gives high economic return but most farmers do not grow Palethwe because of high cost. Theehtupyin and Manawthukha are mainly grown in the area due to less risk, low investment and high productivity. Major problems concerning high yield varieties cultivation are seed availability, seed price, high input cost, etc.

In the future, the importance of paddy cultivation increases with increasing population and decreasing le land. Therefore, to get higher productivity, high yield varieties seeds should be provided to local farmers with reasonable price. It is important to get the help from the agriculture department of Ngaputaw Township for the purpose of getting technology for new varieties cultivation.

Further researches on input requirement and production, high yield seeds and their related problems such as pests, etc should be studied for the intention of getting better way to cultivate high yield paddy varieties to get higher economic return that supports local people economy.

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