Advances in Social Science, Education and Humanities Research, Volume 525
Proceedings of the 2nd International Conference on Social Sciences Education
(ICSSE 2020)

The Influence of the Watering System on Pasang Surut Rice in Sungai Sahurai Village, Kecamatan Rantau Badauh, Barito Kuala District, 1980-2000

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ABSTRACT
Rice is an agricultural crop and until now it is the main crop in the world. Since ancient times, among food crops, rice has been the main crop of Indonesian farmers. Rice can be planted in dry land or wet land or commonly called rice fields. The majority of farmers in Indonesia are small farmers or smallholders with a narrow farm area. Among the narrow land, not all of them are in the form of rice fields. Most of it is dry land planted with various crops, fruits and vegetables. In the 1980s to 2000s the soil content of the tidal fields in Sungai Sahurai Village generally depended on the properties of the soil and water in this tidal land, namely acid sulphate soil with pyrite compounds. In contrast to the tidal irrigation system used in the Sungai Sahurai Village area, namely by using a one-way flow system. The implementation of this system depends on the agreement on setting the floodgates. If one of the tertiary channels functions as an intake channel (irrigation), then the tertiary channel next to it is used as a drainage channel. The inlet channel is provided with a water gate that opens inward, so that at high tide the water can enter and the water cannot come out at low tide. And in this research method using heuristic techniques, verification, interpretation and historiography. The advantages and disadvantages of this local variety of rice have long been known to the local farming community in Sungai Sahurai Village, and it was under these conditions that their local knowledge of rice management in tidal lowland was developed. Each type of tidal paddy overflow in Sungai Sahurai Village also has its own peculiarities, in addition to various basic similarities in its cultivation techniques. These differences also give birth to various local knowledge of the types of tidal rice fields. The cultivation system of local varieties of rice in tidal rice fields includes land clearing, land cultivation, variety selection, nurseries, planting, plant maintenance, to harvesting and post-harvest activities. besides the various basic similarities in cultivation techniques. These differences also give birth to various local knowledge of the types of tidal rice fields. The cultivation system of local varieties of rice in tidal rice fields includes land clearing, land cultivation, variety selection, nurseries, planting, plant maintenance, to harvesting and post-harvest activities. besides the various basic similarities in cultivation techniques. These differences also give birth to various local knowledge of the types of tidal rice fields. The cultivation system of local varieties of rice in tidal rice fields includes land clearing, land cultivation, variety selection, nurseries, planting, plant maintenance, to harvesting and post-harvest activities.
Keywords: *Irrigation, Rice Fields, and Tides*

1. INTRODUCTION

Rice is an agricultural crop and until now it is the main crop in the world. Since ancient times, among food crops, rice has been the main crop of Indonesian farmers. Rice can be planted in dry land or wet land or commonly called rice fields. The majority of farmers in Indonesia are small farmers or smallholders with a narrow farm area. Among the narrow land, not all of them are in the form of rice fields. Most of it is dry land planted with various crops, fruits and vegetables. In general, farmers cultivate their own land without government assistance. The farmers work together to build a village irrigation network. Based on the irrigation system, rice fields in Indonesia can be divided into six types, namely technically irrigated rice fields, semi-technical irrigated rice fields,

For lowland rice, irrigation is very important because it greatly affects its productivity. About 80 percent of Indonesia's rice production is produced from irrigated rice fields, both in Sumatra and outside Sumatra.

Technically irrigated rice fields yield the highest rice yields per hectare compared to other lowland rice yields, but the increase in rice production did not last long. This is because the total area of agricultural land, especially irrigated rice fields, did not increase but decrease. This situation is influenced by the growing population, so that a

lot of land is used for housing or industry/infrastructure, while water for irrigation is used for household needs. Recently,

For some of these areas, including South Kalimantan, with its distinctive topography of the region concerned, rice fields are a potential and promising resource for agricultural activities if managed properly. Rice fields that are really potential for agriculture in Indonesia reach 9.5 million ha; 5 million of them have already been opened. According to Noor in Ahmad Yousuf Kurniawan, the potential for tidal rice fields in South Kalimantan is 17,828 hectares and 80 percent of them are dominated by acid sulphate soils. This acidic sulfuric soil is scattered in several districts such as Barito Kuala, Banjar, Tanah Laut and Tapin Regencies. Barito Kuala Regency is one of the areas in South Kalimantan with a large tidal area potential. and has been used for the development of 99 food crops. 234 hectares or about 10.97 percent of the area of South Kalimantan. 95,144 hectares of land have been utilized [3]. Likewise with the natural conditions of Sungai Sahurai Village, Rantau Badauh District, as well as the Barito Kuala district in general, is an area of rice fields and peatlands. The land on the banks of the Barito River has a maximum height of 5 meters above sea level. From a geographical point of view, farmers' agricultural land in the Barito Kuala area is categorized as type A tidal rice field, which is land that is always overflowing with water during high and small tides. Agriculture in tidal lowland type A is the first area developed by local farmers. Since hundreds of years ago, farmers in type A tidal fields have been cultivating local varieties. Areas that fall into the type A tidal category are generally located on the coast or on the banks of the Barito river [4].

2. METHOD

The method used in this research is the historical method, namely using a set of systematic rules in an effort to collect historical sources, evaluate critically and then present them in a historical writing. Furthermore, the steps in the historical method are carried out in four research steps, namely Heuristics, verification, interpretation and historiography [5].

3. RESULTS AND DISCUSSION

In the period 1980-2000, rice in tidal rice fields developed by farmers in Sungai Sahurai Village was generally local rice with a long life of 9-11 months so it could only be cultivated once a year. This type of rice generally has a high tolerance for the main obstacle in tidal rice fields, namely high soil acidity. However, the productivity is low (generally only in the range of 2.0 to 3.5 tonnes / ha) compared to the high yielding varieties grown outside the tidal lowland areas [6].

According to Noor Fianti, during the period 1980-2000 water management in tidal rice fields, especially in the land of Sungai Sungai Sahurai Village, which contained acid sulfate, played an important role in increasing land productivity. In further development, a Tembokan (surjan or bed) is made, which is a part of the land that is elevated by filling the soil into the raised bed area. This section will later function as a place to grow vegetables, fruits or hard plants such as coconut. In addition, this raised bed also functions as a place to raise the mud which annually enters and is buried in the type A tidal rice fields. The activity of raising mud is called the Malibur Tembokan activity.

In tidal lowland type B, where the tide only enters during high tide (single tide), land clearing or paddy fields printing is followed by making a shipyard which functions as a barrier as well as a tide barrier.

The next development is to make tukung and surjan which can later be used for planting with other types of vegetables, secondary crops and fruit trees such as oranges, rambutan, or mango. In addition, many farmers have also developed micro water systems, namely the construction of channels or worm trenches around the land to keep the water regulation process going well, because high tide cannot enter at any time (only during high tide) [8].

The opening of tidal rice fields in types C and D where the land is not overflowing by high tide, even by large tides (only affects the high and low groundwater level), the construction of shipyards apart from being a land boundary is also more intended as a rainwater barrier. Surjan and support are built not only for the purposes of planting crops and perennials (rambutan, mango, oranges) as well as the part of the land that is dug to fill the soil in the surjan is used as a channel or trench in rice fields. Noor Fianti also explains: “During the period 1980-2000, for water management, especially rainwater, a simple dam was built or what is called tabat at the mouth of the handil or tributary. With this tabat, it is hoped that rainwater can be retained as long as possible for plant growth purposes. Based on the description of a series of land clearing activities for the rice fields. There are two things that become common knowledge for farmers in managing tidal rice fields. Soil layers that contain acidic properties (the presence of a pyrite layer) when exposed or lifted to the surface can cause poisoning to plants." [9].

Then in flooded conditions, this acidity naturally will not interfere with plant growth, therefore water regulation is the main key in the success of managing the land. Farmers' efforts to prevent or reduce soil acidity are also carried out by applying agricultural lime. The application of lime is generally carried out on tidal paddy fields of types B, C, and D, which have heavier acidity problems than type A. Farmers' knowledge about the benefits of lime as an activity that can reduce soil acidity was obtained after the green revolution era and agricultural extension activities were carried out. Intensively [10].

In the period 1980-2000, this plowing tool was effective if the water depth during soil cultivation was

5-15 cm. This tillage system in modern agriculture is known as the minimum tillage. To cultivate the land with this plowing equipment, on average, it takes about 20-30 HKO per hectare. The tillage period lasts from October to February. After pruning, grass, weeds and the remaining stalks of the previous year's rice are left for about 15 days and then collected in the form of baluran or lengthwise in

the fields. Some farmers form it in the form of a ball (in the form of a round pile with a diameter of 30-50 cm). To form baluran or elongated farmers use a tool called kakakar (a type of rake made of wood) [11].

The remaining piles of weeds and grass are left in the rice fields to rot. To speed up weathering and so that the process is more evenly distributed, this pile or dressing after about 15-30 days is reversed. Usually after turning it over, a month later the grass and weeds are rotten and then spread in the rice fields as organic fertilizer. Farmers have knowledge of how to speed up the weathering of these grass clippings and weeds, namely by turning them. And it turns out that this reversal process can increase and accelerate the decomposition process carried out by aerobic bacteria. Although farmers do not know about the role of these bacteria, their experience and knowledge have provided lessons on how to effectively rot away the weed and grass residues. Applying lime to agricultural land can increase the type, population and activity of soil microbes. Diyono explained:

"If it is due to land conditions and delays in soil processing activities and the weathering process does not take place perfectly, then there will be no stocking in the fields. The twisted form will be transported to the edge of the shipyard and if the form of the pile is in the form of a bundle, it will be left in place and will be stocked in the planting season of the following year. The activity of transporting the remaining pieces of weed and grass is known as transport and is carried out manually or with the help of foot tools. After the weeds are cut or trampled, the rice fields are then given lime with a dose according to the farmers' ability (on average only about 350 kg / ha). In rice fields where the water is rather deep (more than 30 cm), after weeds are cut or trampled and given lime, they are left to rot (about one month). Paddy fields where the water depth at the time of soil cultivation is not too deep (15-30 cm) after weeds are cut or trampled and given lime for 15 days, then turn it over so that the weathering process is evenly distributed." [12].

Another thing that also affects this condition is because farmers generally own rice fields not in one stretch of land type. There are farmers in tidal rice field type A who have three hectares of rice fields, but are scattered in 11 places, even though they are still in the same village. On the one hand, the scattered condition of the rice fields is one of the reasons for the farmers concerned not to participate in mutual cooperation (handipan) activities. This is because with various land conditions (in high to low areas) the farmer can adjust the planting time in his fields, so that the three hectares of land can be planted with labor in his own family (wife and children). Currently, the activities of mutual cooperation or handipan are mostly carried out in small groups (6-10 people) between farmers whose fields are close together or in one handil (water channel). Socially, these gotong royong groups generally still have family ties, so that the arrangements can better accommodate the needs of each member, especially to determine when to start and who will take the first turn and so on to the last. Although it is not a formal group such as a farmer group, this group in Handil has a strong social bond to build togetherness in farming. In this planting activity, women usually dominate more than men, and even their work results are considered better than men. For farmers in tidal lowland type A, planting activities cannot be carried out all the time, only during low tide. In addition, this planting activity can generally only be done for half a day, which is at low tide. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work for half a day, that is, at low tide, if the tide can no longer do the planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. Planting activities cannot be carried out all the time, only when the tide is small. In addition, this planting activity can generally only be done for half a day, which is at low tide. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work for half a day, that is, at low tide, if the tide can no longer do the planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. Planting activities cannot be carried out at any time, only when the tide is small. In addition, this planting activity can generally only be done for half a day, which is at low tide. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work for half a day, that is, at low tide, if the tide can no longer do the planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. In addition, this planting activity can generally only be done for half a day, which is at low tide. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work for half a day, that is, at low tide, if the tide can no longer do the planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization. [13] In addition, this planting activity can generally only be done for half a day, which is at low tide. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work for half a day, that is, at low tide, if the tide can no longer do the planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in

tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work half a day, that is, at low tide, if the tide is high, they can no longer do planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. This was stated by Abdul Hadi that farmers in the Asahi Gampa River area only work half a day, that is, during low tide, if the tide is high, they can no longer do planting. Therefore, if calculated, the number of working days is longer than in other regions). This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13]. This tidal condition also plays a role in regulating the rhythm and mechanism of rice farming in tidal lowland type A, so that not only planting activities can only be carried out for half a day, but also activities such as pest control and fertilization [13].

4. CONCLUSION

Based on the problems and research results, the authors concluded that there was an influence of the irrigation system in tidal rice fields in Sungai Sahurai Village, Rantau Badauh District, Barito Kuala, in 1980-2000. Tidal lowland land is included in the marginal land category due to various biophysical constraints such as low fertility, soil acidity, peat, and others. Even so, Banjar farmers have long used the tidal rice fields in South Kalimantan for agricultural activities, especially rice. Even the development of tidal rice fields for agriculture since the Dutch colonial era.

The discharge channel is provided with a water gate that opens to the outside, so that at low tide the water can come out and water cannot enter when the water is high. The quaternary channel, which is the ownership boundary, needs to be laid out following a There is a local rice farming system in tidal rice fields in Sungai Sahurai Village, Rantau Badauh District, Barito Kuala, in 1980-2000. Rice cultivation in tidal fields such as the Sahurai River requires specific technology and production facilities because the conditions of the land and the growing environment are not the same as irrigated rice fields. Tidal land is different from irrigated or dry land that is well known to the community. The difference concerns soil fertility, water availability and management techniques. This land and water management is the key to the success of farming on tidal lands. With serious efforts, these tidal fields can benefit farmers and the wider community. In the period 1980-2000, The rice in tidal rice fields developed by farmers in Sungai Sahurai Village is generally local rice with a long life span of 9-11 months, so it can only be cultivated once a year. This type of rice generally has a high tolerance for the main obstacle in tidal rice fields, namely high soil acidity.

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