Development strategy of rice farming in coastal area of Maros Regency

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Abstract. This study aims to formulize the strategy of developing rice farming in Maros Regency. A sampling of the study area used the census method by taking the entire population into a sample of 23 farmers who were members of the Pajalayya Baru Farmer Group and key informants as many as two people consisting of village officials and extension workers. The results showed that the rice farming development strategy that could be applied in Kuri Caddi Hamlet, Maros Regency, namely utilizing labor to cultivate land given to farmers, proposed agricultural technology such as tractors, threshing machines, seeds, fertilizers with the support of farmer groups, improving the quality of human resources with become an active member of the Farmers Group, conducting comparative studies in areas with more advanced agriculture, carrying out mitigation actions such as maintaining the stability of the coastline, maintaining the balance of nature, not destroying coral reefs on the coast, making new innovations to develop farming, and cooperating with farmer shops to procurement of agricultural inputs.

1. Introduction
Indonesia is an archipelago that has a different geographical location, for example, the difference between the high and low places of residence of a community. The existence of differences in natural factors that can affect the climate and weather is also different, which results in different livelihoods in Indonesian society, such as farmers, fishers and plantations. Indonesian people who live in mountainous areas make a living in plantations, low-lying areas in agriculture and those in coastal areas as fishermen. Indonesia is also referred to as an agrarian country that relies on nature for its business continuity in meeting its needs [1].

Agriculture as one of the pillars of the country's economy, the agricultural sector, especially those in areas that have a superior potential for agriculture is expected to increase regional income mainly from rural populations who are still below the poverty line. According to Pratama [2], the majority of the poor population work in the agricultural sector. For this reason, various investments and policies have been made by the government to encourage growth in the agricultural sector. Therefore the development of irrigation, agricultural extension and various forms of investment in the form of subsidies and others must be generally done by the government.

The utilization of non-agricultural land into new agricultural cultivation is one way to increase the area of arable land. It is expected that the amount of agricultural production will increase. One form of use of non-agricultural land into cultivation land is to create land in coastal areas as farmland. Farmers
in Maros Regency, especially in Marusu Subdistrict, Kuri Caddi Hamlet have used the land in the coastal area as rice farming. However, in its implementation, the increase in land productivity in coastal areas is constrained by the marginal conditions of the land itself and the limitations that are owned by farmers. Those make rice farming in the coastal areas undeveloped so that many farmers only do planting once a year. That is because the farmers in the Kuri Caddi Hamlet rely solely on the rainy season for their farming activities. Besides, an unavailable irrigation system in the hamlet is a major problem for farmers in conducting their farming because irrigation water is the main requirement for rice. This supports the opinion of Putriani, Rustinsyah and Haryanto [3–5], who said that the farmers’ need for irrigation water is increasing in line with the demands to produce quality crops.

As a coastal area, ponds have become the main livelihood for people in coastal areas. Rice farming activities are very rarely found in coastal areas. Furthermore, those coastal communities are known for their low economy because they only rely on sea products to fulfill their daily lives. It also depends on the weather when at sea, even the community capital used when at sea sometimes does not return. So the community must find other jobs to supply their income such as by conducting rice cultivation. Additionally, the people sometimes do not know how to cultivate rice properly, especially in the maintenance section so that the yield obtained for one season is relatively low. Thus, it is necessary to have a strategy to develop rice farming in coastal areas.

2. Methods
This research was conducted in the Kuri Caddi Hamlet, Nisombalia village, Marusu District, Maros Regency, South Sulawesi, from February to March 2019. The selection of the research location used purposive sampling considering the area is one of the areas that carried out rice farming in the coastal area. The population in this study were all farmers who work in 23 paddy farming in coastal areas and were members of the Pajalayya Baru Farmer Group and two key informants from village officials and extension agents. The research sample was chosen based on the opinion of Sudjana [6] the census method occurs when every member or characteristic in the population is subjected to the research. This is because the population was less than 30. To identify the problems faced by farmers in the Kuri Caddi sub-village, qualitative descriptive analysis was used.

2.1. SWOT analysis

| IFAS | Strength (S) | WEAKNESS (W) |
|------|--------------|--------------|
| Opportunities (O) | Determine 5-10 internal strength factors | Determine 5-10 internal weakness factors |
| Threats (T) | Create strategies that use power to avoid threats |

Table 1. SWOT Analysis

| IFAS | Strength (S) | WEAKNESS (W) |
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Sources: David [7]

2.2. Quantitative Strategic Planning Matrix (QSPM)
This technique clearly shows which alternative strategies are best to choose using input from the results of the analysis (EFE and IFE) and the processing (IE Matrix and SWOT Matrix) for further analysis through QSPM.
3. Results and discussion

3.1. Farmer characteristics
As many as 95.7% of lowland rice farmers in Kuri Caddi were at a productive age and 4.3% were unproductive (> 65 years). As many as 74% of farmers were elementary school graduates (which is the most), 8.7% were junior high school graduates, and 17.3% of farmers were unschooled. The experience of rice farming also varied from 3-40 years with an average of 20 years. The number of dependents ranged from 3-6 people, with an average of 5 people. The average area of land owned by farmers was 0.52 Ha.

3.2. SWOT analysis

| Strengths                  | Weakness                                      |
|----------------------------|------------------------------------------------|
| S-1 Human labor is available | W-1 The seeds used are not certified          |
| S-2 Planted land is suitable for rice cultivation | W-2 Unbalanced fertilizer use                 |
| S-3 Farming Experience     | W-3 Land processing that is not timely        |
| S-4 The age of farmers who are still productive | W-4 Farmers find it difficult to accept innovations |

| Opportunity                  | Strategy SO | Strategy WO                                      |
|-----------------------------|------------|-------------------------------------------------|
| O-1 Job creation            | SO-1       | WO-1 Propose agricultural technology such as tractors, threshing machines, seeds, fertilizers with the support of farmer groups (W1, W2, W3, O2) |
| O-2 There are farmer groups that can facilitate the entry of assistance |            | WO-2 Improving the quality of human resources by becoming active members in Farmers Groups (W1, W2, W3, W4, O1, O2) |
| O-3 The cooperation culture is still strong |            | WO-3 Conduct comparative studies to areas with more advanced agriculture (W1, W2, W4, O2) |

| Threats                     | Strategy ST | Strategy WT                                      |
|------------------------------|------------|-------------------------------------------------|
| T-1 Road infrastructure and land transportation are not available | ST-1 Take mitigation actions such as maintaining coastline stability, maintaining a natural balance, not damaging coral reefs on the coast (S1, T2) | WT-1 Make innovations to develop farming (W1, W2, W4, T3) |
| T-2 Natural Disasters (abrasion, flood, tsunami and others) |            | WT-2 Collaborate with farmer stores to procure agricultural inputs (W1, W2, T1, T3) |
| T-3 Pests and diseases      |            |                                                 |
Analysis of table 3 shows that farm performance can be determined by a combination of internal and external factors. The combination of these two factors is shown in the results of the SWOT analysis as follows:

3.2.1. **Strategy S-O (Strength-Opportunities).** This strategy is about labor utilization to cultivate the land given to the farmers. The average coastal community in the Kuri Caddi sub-village has 3-5 families consisting of children and wives. This family can help the farmers to do rice farming. Besides, coastal communities are also still thick with cooperation culture so they can help each other without having to hire workers from outside. Thus, the opportunities such as employment, land and farmer groups that can facilitate the entry of aid, coastal communities can utilize the workforce with all their experience to work on the land.

3.2.2. **Strategy W-O (Weakness-Opportunity).** This strategy consists of (a) proposing agricultural technology such as tractors, threshing machines, seeds, fertilizers with the support of farmer groups. The Farmer Group is an essential organization for the Kuri Caddi Hamlet. The farmer group will be a means of communication between the government and rice farmers. It is easier to know the development of agriculture and can be a means to obtain assistance, (b) improving the quality of HR by becoming an active member of the Farmer Group. The quality of human resources of farmers is needed in the development of rice farming. One of the ways that can be used to improve the quality of farmers' human resources is by taking part in the training provided by extension agents as well as utilizing the group and extension workers and agricultural services as a guiding institution for rice farming on the coast, (c) conducting comparative studies to areas with more advanced agriculture. Another way that can be done in case the farmers still do not want to give their land is one of the influential people in the hamlet such as the head of the Farmers Group must do a comparative study in an area where agriculture is already advanced in order to open people's minds regarding the agricultural technology used.

3.2.3. **Strategy S-T (Strength-Threat).** This strategy is about taking mitigation measures such as maintaining coastline stability, maintaining a natural balance, not damaging coral reefs on the coast. Some of the biggest threats to coastal agriculture are abrasion, floods, tsunamis, and other natural disasters. Coastal abrasion can harm agricultural land because it can cause damage to infrastructure specifically in a barrier between the sea and agricultural land such as roads. Additionally, when the road continues to experience erosion, seawater will be more natural to enter the land. Therefore, farmers must anticipate taking mitigation measures such as maintaining the stability of the coastline, maintaining the balance of nature and not damaging the rocks that exist along the coast.

3.2.4. **Strategy W-T (Weakness-Threat).** This strategy consists of (a) make innovations to develop rice farming. The application of agricultural innovation technology plays a role in developing rice farming. When farmers want to develop their farming in this case to increase rice production, farmers must be able to open themselves to receive new innovations provided by extension agents such as the use of certified seeds and changing the planting method into the planting method of legowo rowing, one of which is to reduce the threat of pests and diseases in plants and saves the use of fertilizers, (b) collaborating with farmer shops to procure agricultural inputs. One of the obstacles to farming is the unavailability of agricultural inputs such as seeds, fertilizers, pesticides in the area so that farmers will find it difficult to buy these inputs because they have to go out of town or across the ocean. Besides, the farmers cannot go through the sea due to the waves at the sea influenced by the uncertain weather. As for land routes, the farmers are limited by vehicles. Therefore, the Farmer Group can provide agricultural inputs by collaborating with farmer shops.
### 3.2.5. The priority of strategy

After analyzing using the QSP matrix, the alternative strategies produced are:

a. **Alternative WO-2 Strategy:** improving the quality of human resources by becoming an active member of the Farmer Group. This alternative strategy is expected to be able to improve the quality of farmers' human resources related to rice farming in coastal areas with regular meetings conducted by the Pajalayya Baru Farmer Group, utilizing extension workers, and related agencies to provide innovation to the farmers including teaching, guiding and training. Through this activity, farmers can increase knowledge to develop their farming by following all the activities provided by the instructor such as training. Training can help the farmers in their farming activities particularly about the use of balanced fertilizer, planting, making organic fertilizer and so forth.

b. **Alternative WT-1 Strategy:** carrying out innovations to develop farming. This alternative strategy is expected to be able to develop rice farming in the Kuri Caddi coastal area by changing people's mindsets about distrust of agricultural innovations that can improve production yields. This can become the output from the results of the learning or training provided by the instructor. It is expected that the farmers can directly practice their land innovatively by developing their farming such as replacing the types of seed varieties used with certified ones, changing cropping patterns, and controlling the use of fertilizers and pesticides so that the level of agricultural production in the Kuri Caddi Hamlet can increase.

c. **Alternative WT-2 Strategy:** working with farmer stores to procure agricultural inputs. This alternative strategy is expected to facilitate farmers in obtaining agricultural inputs such as seeds, fertilizers, and pesticides. This cooperation can be managed by one member of the farmer group by providing the input in his shop/shop and considering that the people in Kuri Caddi Hamlet are limited to land transportation and only depend on sea lanes as the access to get out of the city. If the weather is deteriorating, all land and sea access are difficult to pass so farmers will be hampered in the process of planting or maintaining plants. Therefore, by working with a farm shop will minimize all the possible obstacles.

### 4. Conclusion

Based on the results of the research, it can be concluded that there are a number of strategies that can be applied in the Kuri Caddi Hamlet, Maros Regency, namely utilizing labor to cultivate land granted by the government, proposing agricultural technologies such as tractors, threshing machines, seeds, fertilizers with group support farmers, improving the quality of human resources by being an active member of the Farmer Group, conducting comparative studies to areas with more advanced agriculture, carrying out mitigation measures such as maintaining coastline stability, maintaining natural balance, not damaging coral reefs on the coast, making new innovations to develop farming, and collaborating with farmer stores to procure agricultural inputs.

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