

## Urban Floating Farming Implementation: Introduction of Techniques and Modification as an Alternative to Farmers in the Acid Peatlands of the Suburbs

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### Keywords:

alternative farming  
techniques,

floating farming  
modification,

urban farming,

wetland farming,

suburbs farmer

### ABSTRACT

Peatlands - as a wetland area with distinctive characteristics - have its own challenges and difficulties for farmers to grow rice, especially in the *Anjir Pasar Seberang* area which is one of a suburban area of South Kalimantan, Indonesia. The planting and harvest period can only be done once a year when the land experiences a receding period during the dry season. Thus, farmers need other income alternatives to fill the vacancy during the high season. Floating farming which is the local wisdom of the people in several countries in Southeast Asia is one alternative that can be used when the high tide arrives. Several studies on the modification of this method on a household and urban scale have been carried out. Therefore, it can be one of the solutions for the farming community. The introduction of the modified Farming Methods and Techniques was carried out to provide farmers with other income options besides conventional farming. The local community is interested in this method because of its ease of handling

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## INTRODUCTION

Land use changes and degradation of riparian zone had been proven to have effects on water quality (Sapis, Noweg, Nyanti, & Grinang, 2018). Agricultural and other land uses on tropical peat swamps typically lead to reduced vegetation biomass and water table drawdown (Jauhiainen, Page, & Vasander, 2016). but the problem is, the people in Anjir are very dependent on their livelihood on agriculture, even in conditions where farming does not provide a decent profit.

Paddy fields in the form of swamps can only be used for rice cultivation when approaching the dry season so that the potential of the paddy fields cannot be maximized. Therefore it is necessary to develop agricultural cultivation technology to take advantage of these puddles (Triyanto, 2018). Floating rice maybe produces low yields, but provides good opportunities for diversifying into profitable upland crops when used in combination with rearing cattle. Financial benefits of several combinations of floating rice-based farming systems can provide greater financial benefits than other intensive high yielding rice crops (Nguyen, Vo, & Huynh, 2015). that is why combination and modification for this method to be simple and applicable even for household-scale is needed so every family member of a farmer can do it even in their yard (Rahmani & Wahyunah, 2019).

The objectives of developing floating aquaculture technology include (1) optimizing the potential of existing land, (2) empowering local farmers, (3) improving the welfare of local farmers, and (4) producing organic harvests with floating farming (Triyanto, 2018). In the existing floating rice-based farming systems, farmers rotate sticky corn, baby corn, chili, or cassava on the same land after harvesting the floating rice in December. Some farmers then grow three crops of corn. Others cultivate one chili crop and one short term leaf vegetables, or one cassava crop. Comparing to high yield intensive rice crops, floating rice farmers are more diversified in their farming activities involving upland crops (Nguyen, Vo, & Huynh, 2015). based on that - in the case of Anjir Farmer - it is really necessary to introduce new alternative methods and variations of agricultural crops out of their usual routine.

## METHODS

This activity consists of several stages. The preparation stage, oral delivery, and practice of using the method on a miniature scale. The activities were carried out at Anjir Seberang Pasar 2 village hall, Barito Kuala Regency, South Kalimantan Province, Indonesia. The floating farming modification method used is the result of a prototype study for the scale of urban settlements (Rahmani & Wahyunah, 2019) and studies have been carried out on community perceptions and preferences in the Kuin riverbank settlements, Banjarmasin City, Indonesia (Rahmani & Caesarina, 2019). But before the activity, Focus Group Discussion (FGD) is conducted with local farmer group (*Gapoktan*) to gather information about problems faced by local farmers in the area.

### Preparation

The preparations made were the materials used, coordination with the village head and coordination with the head of the farmer group. The materials prepared are used recycled drinking glass and bottles, used basins, water plants such as *salvina molesta*, water hyacinth, coconut fiber, and taro. The use of recycled goods aims to show that this method can use items that can be found every day and does not cost a lot of money. The key is, this method has been based on sustainable development.

### Oral Delivery

Oral presentations are carried out with the help of slide presentations. The aim is to provide a general description of the method to be introduced. Furthermore, this stage also provides an overview of the advantages and disadvantages of this method.

### Practice

Demonstrations and training in making planting sites are carried out on a small / household scale. This activity aims to make farmers clearly see the manufacturing process and can practice it.

## RESULT AND DISCUSSION

The participant is a member of a farmer group in Anjir Seberang Pasar 2. This village has some problems with farming in the area based on FGD with local farmer group. Some of the main problems are (1) the amount of water discharge for more than half a year, (2) the level of soil acidity is relatively

high, (3) the level of water acidity is also high, and (4) the choice of agricultural crops is limited to plant in the surrounding land.

The area was flooded for most of the year because the area was dominated by peat swamp which was not originally designed for agriculture. Agricultural activities in the region began since the one million hectare land project was carried out in 1995. The majority of people living in this area are transmigrant from other regions. Only a small number of local natives can be said.

High acidity of soil can be seen directly by color of soil and water which shows that it is rich in Fe. The yields also according to local farmers are not optimal because of this high acidity. The Other parameters are plants found generally typical of acidic regions such as water chestnuts (*Eleocharis dulcis*) and Lemidi (*Stenochlaena palustris*) or local people call it *Kalakai*.

The presentation explained the various advantages of this method. There are recommendations for several types of plants (especially vegetables) that are recommended (Table 1). This recommendation is based on the ability to grow, compatibility with water & soil conditions, and increase the variety of crop choices that can be planted by farmers.

**Table 1. recommended variations in types of plants (vegetables)**

No.	Vegetable Name	Advantages
1.	<i>Ipomoea aquatica</i> Forsk.	can grow in various conditions, can grow in rich water soil.
2.	<i>Amaranthus caudatus</i>	can grow in various conditions, absorb Fe as nutrition.
3.	<i>Apium graveolens</i>	Marshland plant, can grow in various conditions, can grow in rich water soil

after the presentation session, the response of interest was shown by the farmers present (Figure 1). the dominant questions that arise are (1) how easy it is to maintain, (2) agricultural problems that may occur, (3) how cheap the total costs incurred from making, planting to harvest and its sustainability, and (4) whether the recommended types of plants are minimally able to cover the profits gained when planting rice.



(a)



(b)



(c)

**Figure 1. Oral Delivery to farmers in the village hall of Anjir Seberang Pasar 2.**

The practice of making floating agriculture on a household scale is carried out after the brief description is given. In this activity, farmers are exemplified in how they are made and practiced on their own (Figure 2). this aims to ensure that farmers at least get a brief experience of the manufacturing technique.

in the practice session, the initial question that arises is "does this technique require a large amount of land?". the answer to this question is clearly "no". Because this method is given in order to make it easier for even all members of the farm family in one house can carry it out even in the courtyard of the house if it does not have a yard. furthermore, farmers feel more interested because it can be combined with fish farming in part of the water. thus, the benefits are multiplied.



(a)



(b)

**Figure 2. Practice of making household scale floating farming**

Questions that arise during manufacturing practice are (1) what material (plants) can be used in the first layer of the planting medium, (2) the length of use or durability of the planting media until it needs to be replaced, (3) the pests that attack, (4) the size planting media, (5) sustainability of water quality if done in containers / artificial ponds / aquariums (other than in submerged land), (6) durability of vegetable plants until new planting is needed, (7) harvest frequency, (8) any goods / materials which can be used for manufacturing, (9) the shortcomings of this method, and of course (10) how cheap the costs are. in addition, it also tells what types of plants are actually able to be planted with this method if the water and soil conditions are more general and stable. Furthermore, to support waste reduction, it was also conveyed and exemplified that this activity could use used goods that are suitable for use. so it is environmentally friendly and supports sustainable development.

in addition, the term "pertanian koler" (Banjar Language) or "lazy farming" was introduced to farmers to give an impression of how practical this method was to be implemented. the term "lazy

farming" was introduced because basically this modification method was designed for urban communities that had a high level of activity. so that it can motivate farmers that even "city people" can and have the time to do this method.

The end result of this activity is the establishment of cooperation in the field of community development in the village of Anjir Seberang Pasar 2. This village farmers group through the head of the group has been interested in working together and become an example of village agriculture development through this introduced method. Thus, this activity became the initiation of the sustainability of the development of floating agriculture for the development of the local community.

## CONCLUSION

In general, farmers were interested in the methods and modifications introduced. This interest was caused by the ease of making and maintaining plants. moreover, it can be modified with other methods that are beneficial

## ACKNOWLEDGE

Thank you to the farmer group leader of Anjir Seberang Pasar 2 for providing opportunities and places for providing information to farmers around. In addition, also to students involved in village community development programs.

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