

**M YAMIN**

Sriwijaya University, Indonesia

**RICE FARMER'S HOUSEHOLD STRATEGY USING SUSTAINABILITY LIVELIHOOD CONCEPT IN ORDER TO FACE THE ECOLOGICAL DISASTER OF FLOOD AS A IMPACT OF GLOBAL CLIMATE CHANGE IN INDONESIA****Abstract:**

Flood on wet rice fields led household income of rice farmer susceptible. This condition shifted main income sources, from on farm to non farm. Therefore, an income strategy was required in order to deal with household income susceptibility in flood condition by integrating the concept of sustainability livelihood, through which sustainability of farmer's income in flood condition was expected. This research aimed to identify rice farmer's household strategy using sustainability livelihood concept in order to face the ecological disaster. The research was carried out in three Indonesian regions, namely Central Java, East Borneo and South Sumatera Provinces. Survey method was used in which data were collected from both primary and secondary ones. The data of household strategies, using sustainability livelihood concept, to deal with the income sources susceptibility on flood condition, were analyzed qualitatively. The results should give recommendation strategies needed for facing various pressure and susceptibilities on income source as effects fo the ecological disaster that repeatedly took place on wet rice fields. The results showed that farmers did not posses strategies for the flood condition. They sook only unpermanently other jobs to fulfill the household needs, such as building workers and laborers, both inside and outside of their living areas. To start growing the rice again after the flood, they got seed and fertilizer from government. At the same time, they sold their harvest or lent money to their relatives. In addition, they had strategies to diversify their income sources, including animal husbandries and fisheries. They repaired irrigation and drainage facilities on wet rice fields through community self-help to prevent flood. On perspective of sustainabilty livelihood strategies, they strengthened financial, physical and social capitals

**Keywords:**

ecological disaster, flood, wet rice field, sustainability livelihood strategy

**JEL Classification:** A14

## I. Introduction

Nowadays most of the people still depend on agriculture productivity and income levels are relatively low, that poverty, unemployment and food insecurity are common in the rural area. This condition indicates that the fight against poverty, unemployment and food insecurity has to do with agriculture and rural development, with all the characteristics and specifications of the problem is almost evenly spread throughout the rural areas (Bappenas, 2010).

the other problem in the agricultural sector began to be felt and tends to be more serious is climate change, Global climate change is a serious threat in agriculture. The most frequent threats haunt farmers are hydrometeorology (floods, droughts and tornados). Climate change may worsen the environment or ecosystem, lower productivity, and increase the risk of crop failure. Such conditions would threaten national food security (Riyono, 2013).

Fundamental problem faced by agricultural sector in the present and future is the environmental degradation and global climate change. One kind of them a flood ecology disaster on paddy fields. Land is the most important asset for the farmer households as a source of family food and livelihood-based on the land. Therefore need a strategy in anticipation of flooding ecological disaster. The household income sources Vulnerability due to flooding caused farmer households have to find income sources alternative in a variety of flood conditions, in order to survive on vulnerabilities source of income, therefore still able to provide sustainable livelihood.

Income strategies needed to handle the stresses and livelihood vulnerability in recurring ecological flood disasters conditions at paddy fields, and requires the completion recommendations as the instrument for policy makers in the agricultural development and flood mitigation in Indonesia.

## II. Literature Review

In the household economics theory by Nakajima (1969) and Backer (1976), is the pioneer of the household economy theory and Yamin (2003) which assumed the activities of production and consumption is a unity or households as producers as well as consumers. At the farm household double play models can be found recursive or non-recursive behavior. Recursive behavior characterized by production decisions affect consumption decisions through household income, but not the contrary. Whereas non-recursive behavior is characterized by the production and consumption decisions influence each other. The assumptions used to define recursive models generally restrictive, among others: 1) all markets are perfectly competitive, ) 2) transaction and communiting cost is zero, 3) family labor and wage in the production function perfectly substitutes and 4) the outpouring of labor outside the family farm and farming perfect substitutes in the utility function.

Sustainable livelihood approach to development style is contemporary development approach that attempted to correct modernization development style approach that is known not familiar to the environment. Sustainable income approach trying to reach fulfilling the needs of social, economic, and ecological as fair and balanced manner. Achievement level of social welfare is approached through a combination of activities and utilization of existing capital the revenue procedure (Ellis, 2000).

Water availability spatially and time is fundamental in the development of farming. In other words, the availability of water for crops and livestock is a determinant of the level farming success, especially in the dryland farming area. Availability of water to support the success of the farm, still influenced by: a) environmental management pays little attention to the conservation of water catchment areas, which causes flooding and drought, b) the shift of the season as the impact of global warming resulting in the occurrence of extreme climate change such as the El-Nino and La-Nina that can threaten national food security, and sustainability of agricultural development (Ministry of Agriculture, 2012).

One of the environmental functions of farmland to hold the rainfall temporary, naturally absorb and running it from the upstream to the downstream watershed (water buffering capacity). Conversion of farmland without taking into account the loss of buffering capacity of water will cause flooding as the region's ability to resist and absorb rainfall decreases, while the amount of rainfall is relatively fixed, especially if it increases (Irawan, 2007).

### **III. Research Method**

Studied using qualitative methods that interpretive with the aim for described and interpreted social phenomena that occur in the environment. This method is used for understanding the meaning of an event and interpreting the interaction of humans and the environment. The analysis was conducted using indept interviewe at the respondents and key informants related and represent a sample population in this study.

The sampling method was used purposive sampling at key informant that were considered to be representative of the farming households population, and communities was able to provided opinions on the study conducted. The criteria for the sample in this study, that is:

- 1 Paddy Farmers
- 2 Experiencing flood disaster on farmland
- 3 Local Government and relevant institution

### **IV. Result**

#### **4.1. The Level Of Farmers Household Income Sustainability Affected By Flood Ecological Disaster**

From the results of data retrieval has earned an overview the sources level of farmers household income sustainability that affected by flood ecological disaster, which the level of sustainability has begun to be threat due to the flood that recently occurred that at January-February 2014, was the largest flood and resulted in substantial losses of farmers household income, which resulted in submerged paddy crop failure due to flood, as well as the threat of the growed rat after receded flood.

Capital constraints are also a threat for the farming sustainability, because after flood the farmer households require return of capital to start planting and cultivating paddy fields that have been submerged in the flood. The absence of capital is certainly a threat for the farming sustainability have done. Therefore the vulnerability of farming income sources during the flood and after the flood fairly worried and needs to get attention in prevention strategies for continue the paddy farming. Existing

conditions the farmer households trying to get capital loans from relatives and family, to restart their farming after being hit by flood and this causes the households debts has still not been paid, and usually increasing amount of the debt, due to floods every year.

The farmer was familiar with the flood, therefore they can adapt with the flooding condition. It is shown from the farmer strategy to anticipate the flood with saving the paddy reserved or rice that enough for a long year, that make farmer no food shortage although flood. Furthermore the farmers provided more seeds to anticipate the crop failure by flood, that can be replanting repeatedly until it was not flooded again. Find another side jobs during the flood for added the household income and provided farming capital. The local government give the seed assistance and fertilizers so that farmer still continue the farming whether in the flood conditions.

Households needs that still to be fulfilled in many conditions including in flood conditions requires household income alternative from other sources. Because the main livelihood get shock due to the flood. If the flood condition allowed to repeated, then every year the farmer household face the stress, shock and vulnerability of income that must be covered by another source. If allowed to then the flood disaster can affected the livelihood transition from on farm to another sector is Non farm. That the effort to prevention and anticipated the repeated flood need to be done early. However the conditions now is no action was done by the society, government and institutions to prevent the flood in paddy farming.

#### **4.2. Vulnerability Of Household Farmer in Flood Condition**

At the Floods the farmer households did not do any activity and effort to solve it, because the limited of knowledge and fund that have, then only wait until the flood recede itself. Household income source that depend on the harvest from the paddy farming course failure. The household must be find another livelihood source by another income alternative. For many farmers in Central Java Indonesia they work at peanut company as factory workers, and the young are go to the city to find another job. This shown that the vulnerability was happened in the farmer household income cause by the flood on the paddy fields.

In Central Java, Many district became flooded area at the beginning of 2014, the big losses by the flood are the destruction of young paddy, and old paddy and harvest failure. Crop failure in this area affected by flood in paddy field make the vulnerability of household income in this area.

Flood condition has become habit for rice farmers. Farmers responding to flooding that is not too big impact on the household economy is to provide enough rice for consumption during the year so there is no shortage of rice even though rice planting or crop failure due to flooding. Thus enough staple food available all year round so it does not affect the consumption of staple food of rice farming households. In addition, if there is no activity in the fields because of flooding, farmers are looking for jobs as laborers, carpenters and others that still have a household income. Farmers can utilize their yards are relatively not affected by flooding by planting that have high economic value such as vegetables and poultry.

The result from the indept study in East Borneo, Indonesia. The paddy field in this area was cropping twice in a year. The cultivation was made by the hand tractors in four days for one hectare, and use the urea 200 kg and TSP 100 kg and the pesticide Rp. 400.000,- a season. While the harvest do by mutual cooperation and paddy thresher used the thresher machine with the wage for the labour Rp. 60.000,-

for each sack of paddy. Beside the flood, the farmer also face by Walang Sangit Pest. When it is condition without flooding, the land productivity is 60 sack, with the average one sack is 70 kg, that productivity is 4,2 ton/ha. The price is Rp. 5.000,- per kg, then the farmer acceptance for each hectare is Rp. 20.000.000,- in a season. But when it is flood the productivity is zero and sometime 40 kg, therefore the farmer acceptance only Rp. 200.000,-/ha in a season.

From the information above that the paddy fields was affected by flood, farmer income experienced significant changes. With the side business like chickens, that average 15 tail and the duck 20 tail and another alternative of job, like construction worker and trade then the household economic stress can be decrease and can be continued the farming in the next season.

#### **4.3. Identify Causes of Flooding**

Flooding always occurs during the rainy season, where the rain falls in days, when the flood occurred in the month of February 2014 and it rained for 4 days, whereas in the previous year in this area of rice fields are not flooded at all, because the rain fell only a short, so it does not was pooled.

From the results of research in the field is known that the cause of flooding in the study area due to heavy rains resulting river floods, and the hills around the village were bare, so the water coming down from the mountains directly, without buffering again, this is what causes the condition in the village valley quickly flooded when it rained in days.

#### **V. Conclusion**

The conclusion of this study :

1. Farmers Strategies in anticipation the flooding by stored paddy or rice reserved sufficient for one year, farmers provided more seeds in anticipation of flood and find a second job during the flood of other household income to increase capital and prepare rice farming
2. Because of the flood, Farmers income have significant changes. While with the side business such as chickens with the average is 15 tail and the 30 tail of duck and the find alternative of jobs such as constructions workers, trader, then the farmers household economic shock can be solve and they can continued their farming in the next season.
3. The Causes of flooding, that is due high rainfall resulted in river floods, and the hills around the village were bare, so the water coming down from the mountains directly, without any buffer.

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