Empowering Farmer’s Wife Makes Catfish Feed (Pellet) in Nagari Limau Gadang Pesisir Selatan District, Indonesia

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Abstract. The life of Nagari Limau Gadang, Pesisir Selatan District, West Sumatra, Indonesia is poor. They conduct economic activities in Kerinci Seblat National Park (TNKS), so that TNKS become damaged. Catfish farming can serve as the main effort to increase family income. Economically catfish farming is very profitable. Catfish farming is not difficult and can be done by farmers who do not usually cultivate freshwater fish. The right family member is empowered to improve the family economy through the cultivation of catfish is the farmer's wife. Farmers' wives in Nagari Limau Gadang tend not to improve the family economically, they play the role of taking care of children, doing housework and sometimes delivering food to the fields and to the fields. How to research, selected 20 poor farmer's wife, then trained to make ponds and pellets. The pool made are the main pond, spawning pond, nursery pool and pond enlargement. Pellet made from raw trash fish, quail feces, fine bran and cassava. The pellet formulation is made of 4 kinds. Each formulation produces a quality pellet. Based on laboratory test produced pellet contains very good nutrition for enlargement catfish. The nutritional range of protein is 21.79%-34.60%, fat is 1.95%-2.32% and carbohydrate is 26.55%-39.65%. The goal to be achieved in this research is for the wife of farmers can contribute to improve the family economy. Specific targets to be achieved in this study is the wife of skilled farmers cultivate catfish.

1. Introduction
Conducting economic activities (earn a living) in TNKS high risk because the distance to pick up wood to the TNKS area reached 14 km and the terrain is very dangerous. Based on interviews of researcher with 20 residents, who carry on daily activities as transporters of processed wood, all of them say bored to the forest, but circumstances force. Conducting economic activities in the village is not sufficient to meet the needs of life.

According to the researchers, Nagari Limau Gadang residents can survive economic activities outside TNKS if the government or the care of TNKS is able to create a choice economic business, such as poultry farming, gardening outside TNKS and freshwater fish farming. All these businesses are very promising to increase the economy of the population.

The right family member is empowered to improve the family economy through the cultivation of catfish is the farmer's wife. Farmers' wives in Nagari Limau Gadang tend not to improve the family economy, they play the role of taking care of children, doing housework and sometimes delivering food to the fields and to the fields. The activities of the farmer's wife are only fulfilling the wife's obligation to the husband in married life. Farmers' wives are economically unproductive in improving the family economy. Generally their activities only stay at home and only help cultivate the land at any
given time.

The role of the wife can be utilized to improve the family economy. Economic activity that can be done by a farmer's wife is catfish farming. Catfish farming is not complicated and can be done by the farmer's wife while taking care of the household, generally the farmers have a decent land to be used as a catfish pond. Catfish farming is quite profitable. Fish farmers are profitable enough. The benefits of cultivation can still be improved if farmers can make their own feed. The profit earned will reach 40-50%. If using factory feed gain is only 20-25%.

Specific objectives to be achieved in this research is for the farmer's wife can contribute to improve the family economy. The urgency of this study, if the family economy increases then TNKS avoid the pressure of the population. Innovative findings found in the study are appropriate formulations and qualified self-feeding skills.

2. Literature Review

This study focuses on determining the right formula to make a quality catfish (pellet) feed. This fish pellet is expected to be made by farmer’s wife. Wife of farmer who has skilled to make feed will be able to cultivate catfish. Cultivation of catfish by the farmer's wife will increase the farm household's economic. The cultivation of catfish by the farmer's wife will improve the farm household's economic. Increasing the family economic will reduce farmer visits to TNKS [1].

Women (farmers' wives) do not contribute directly to the family's income to support households. The wife of the farmer always helps the husband to do the job as a farmer. Economically, farmers 'wives do not ease the burden of husbands' earnings.

The activities of Nagari Limau Gadang residents to earn a living in TNKS, such as farming, hunting and gathering of natural resources will damage the ecosystem and cause disaster. As evidence of ecosystem damage TNKS Nagari Limau Gadang, there have been flash floods in 1987, 1997, and 2005. According to [2] damage ecosystem of TNKS can be overcome by way of economic activity. One of the economic activities that can be done by the community is freshwater fish farming, because land and water resources are very supportive. Yusran, [2], said that fish farming will improve people's economy so they will not enter the forest area.

Poverty can literally be said to be a state of not having enough. In various views, there are three types of poverty that are often expressed are structural poverty, relative poverty and absolute poverty. Structural poverty is understood as poverty arising as a result of government policies and corporate behavior that make the poor, have little or no access to the productive economic. Relative poverty is a poverty that arises not only in terms of income alone but also living conditions in the social environment, while the absolute poverty according to [3] is poverty measured from the level of ability to finance a minimum living in accordance with the dignity of human life.

Environmental damage is caused by many factors, especially human activities that are not friendly with the environment itself. Humans should be responsible for preserving the environment, but they are destroying the environment. They tend to take the natural wealth at will, causing damage and pollution. Once the natural wealth is used, they do not care about the needs of future generations who also have the right to enjoy it. Needs often encourage people to take TNKS natural resources on a large scale regardless of the impact. One of the main factors causing the destruction of TNKS environment is poverty [3].

Many experts argue that poverty is one of the main causes of environmental destruction in TNKS. The environmental damage caused by the poor tends to be influenced by their mindset because they are squeezed by poverty, their minds are focused only on the food they can get to survive today. It is this narrow mindset that drives them to damage the environment and deprives the natural resources without allowing time for nature to renew its resources [4].

Associated with fish farming, fish farmers have problems in getting cheap feed, because fish feed prices tend to increase. According to [5] if the breeder uses artificial feed from factory, its value can reach 70% from all cost component. One effort that can be done for successful freshwater fish cultivation is to make their own feed. Most fish feed raw materials are available in Nagari Limau
Gadang.

Based on research that researchers have done about the cultivation of tilapia as a model of economic activity options overcome the dependence of the population on TNKS. The results showed that the activity of tilapia farming can decrease the level of population visit to TNKS [1].

Researchers have also conducted training to make pellets for tilapia against youth and women in the village of Nagari Limau Gadang. The results showed 95% of the participants trained to be skilled at making the feed [6].

Researchers have conducted a study on the ratio of the effect of homemade feed to artificial feed to the weight of tilapia. The results showed no difference means the influence between homemade pellets with factory-made pellets [7]. Listening to the findings of relevant research, which once proposed to do, the catfish cultivation research is very possible to improve the family economy.

Research activities conducted are to guide, train, test and compare to get the best quality pellet. The best quality pellet produced is used as feed for catfish cultivation. To understand the implementation of the research it is necessary to understand about catfish and feed ingredients in need. Catfish began to be known in Indonesia around 1986, the catfish live wild in swamps, freshwater rivers, but now the cultivation has been carried out intensively because it turns out this fish has a high nutrient content that consists of 17-37% protein, 4 , 8% fat, 1.2% minerals, 1.2% vitamins and 75.1% water, rapid growth, the fans are increasing due to the delicious and delicious taste [8].

One of the most crucial elements of the growth and mortality of the nourished fish is the element of adequate feeding availability, in addition to the existing natural feed, so to increase or accelerate the growth of fish should be given nutritious feed. Provision of nutritious feed can increase the production of fish maintenance up to three times compared with that is not given nutritious feed.

The nutrient feed given to fish contains at least protein, carbohydrates and fat. All three of these substances will be converted into energy that is necessary to perform its activities, but the protein contained in a feed more determine the growth of fish than carbohydrates and fats [9].

The function of nutritious food for fish is to maintain the body, replace the damaged cells, after which the remaining excess feed is used for growth. In line with Dewi's opinion, [10] says that the protein present in the feed is needed by the fish as a source of energy, to replace damaged cells and to grow.

Feed has a very important role in the growth of fish. To obtain optimal growth required amount and quality of feed available in sufficient condition. The purpose of feeding is to produce as much meat as possible in the shortest time possible. Giving of nutrient feed can increase the production of fish that is kept up to 3 times, compared with that is not given nutritious food, then added by [8] that with the feeding of nutritious, fish weight gain can be 25-35% every month from the beginning.

Raw materials used to make catfish pellets are raw materials are widely available in Nagari Limau Gadang and in the surrounding Nagari. This raw material in collect into catfish feed. The raw materials needed to make catfish pellets are (1) Trash fish. Trash fish is a fish that is not used. Trash fish can be used as a source of protein to make fish feed (pellet). Trash fish contains proteins that can be standard as a source of protein for fish and poultry feed (Rinoto, 2014). (2) Quail quail. Quail's feces. High protein and carbohydrate content contained quail feces, then quail feces can be used as a source of protein and carbohydrates to make fish feed. (3) Cassava is the raw material prioritized in this research, because it is easy to obtain has never been used as a feed raw material. In addition to raw materials, cassava also serves as a glue [7]. Cassava used is a smoothing of cassava that has been boiled.

It is stated that the nutritional cassava is: protein, 1.2%, fat 0.3%, carbohydrate 34.7%, water 63% [11]. (4) The selected bile has a fine texture (grain), not moist, no musty odor, and has a fresh color. Fine bran contains nutrients: 11.35% protein, 12.15% fat, 28.62% carbohydrate, 10.5% ash, crude fiber 24.46% and water 10.15% [10].

3. Research Methods
The 20 poor peasants' wives are grouped into four groups and designated as catfish farmers. They are
nurtured and directly involved in research. Research activities in Year I: 1. Cultivating groups of cultivators (poor farmer's wife) to create a holding pond. The parent’s pool is made permanent with 2x3 meter size as much as two pieces. One for the male parent and one for the mother of the female; 2. Creating a permanent spawning pond with a size of 2x3 meters as much as one fruit; 3. Creating a pond nursery (not permanent) size 5x10 meters as much as two pieces; 4. Make a permanent magnification pond with the size of 5x6 meters as many as four pieces; 5. Make fish feed with raw materials, trash fish, quail stool, fine bran and cassava. All raw materials except cassava are dried and mashed. The cassava is boiled, then all the ingredients are put together into dough and printed using the printing press. Printed dough, dried in the sun; 6. Evaluation of guidance and guidance to group of farmers. If it doesn't succeed, the coaching will continue until it is complete. In Year I was also done to formulate the nutritional content of pellets and laboratory test. To test the quality of pellet to the growing power of catfish will be done in Year II.

In Year II conducted research activities: 1. Fostering a group of farmers formulates the nutritional content of fish feed; 2. Creating catfish feed based on formulation; 3. Practice making formulated feed; 4. Test the effect of homemade feed on weight gain of catfish. In this activity look for the right formulation to get protein, carbohydrate and fat levels. By considering the nutrient content of raw materials. To obtain a protein content of about 22.92% (minimum protein requirement of catfish by 20%) in one kilogram pellet, 30% trash fish required, 45% quail feces, 15% fine bran, 10% cassava, with the provision of trash fish protein 40%, 20% quail stool, 12% fine bran and 1.2% cassava.

Variations of nutrient content formulas are made as many as 4 kinds:
(a) 30% trash fish: 45% quail feces: 15% fine bran: 10% cassava
(b) 35% trash fish: 40% quail feces: 15% finely bran: 10% cassava
(c) 40% trash fish: 35% quail feces: 15% fine bran: 10% cassava
(d) 45% trash fish: 30% quail feces: 15% fine bran: 10% cassava

Of the 4 variations, one of the best variations will be compared to the factory-made feed. The main requirement of artificial pellets should contain high nutrition, easy to process and does not contain toxic, easy to obtain, affordable price. Ordinary pellets made with bran or rice bran, mas snail, salted fish BS Super, papaya leaves, vitamins, concentrates, yeast tempe. How to make pellet:
a. take the trash fish, quail stools, fine bran, cassava mixed into one and stir evenly, then added with tempe yeast as much as 3 tbsp or 125 gram. Stir gently and evenly;
b. dough closed tightly, let stand all night for the fermentation process can take place well;
c. fermented dough that has been settled one night mixed with salted fish and papaya leaves that have been ground first, then stir evenly;
d. prepare the pellet printer, and enter the dough. The resulting pellets are cut into a maximum of 1.5 cm, then dried;
e. the pellets are then dried in the sun by using a wide container to dry them all, drying under direct sunlight;
f. the dried pellets are placed in a plastic bag to be waterproof, then store in a room with good air circulation.

The third’ year, conducted research activities to spread the seeds of catfish to pond enlargement. In the third year activity comparative influence between the best formulation of homemade feed with factory-made feed. Each group of farmers is required to compare the effect of homemade pellets with factory-made pellets. Each pond contains as many as 2000 seeds of catfish. Then we analyzed the difference of the effect of homemade pellet with the factory-made pellet by using T-Test formula, if the result show that the effect of homemade pellet with factory-made pellet does not mean or better, so homemade pellet is suitable for catfish farming.

4. Results and Discussion
Research in the first year is to prepare the facilities and infrastructure for research year II and year III. The result of research in the first year is 1 unit of spawning pond, 2 units of nursery pond, 2 units of parent pond and 2 units of enlargement pond. During the year I also produced a variety of pellet
formulas, the level of caught and the skills of farmers' wives to make ponds and pellets. Percentage of farmer's wife who understands and does not understand in making a pond and pellet (feed) before being built, can be seen in Table 1.

**Table 1.** Percentage of farmer's wife who understands and does not understand in making a pond and pellet (feed) before being scouted.

| Activities          | Sum of farmers wife | Sum of farmers wife | Not Understand | Percentage of un-understand | Understood | Percentage of understood |
|---------------------|---------------------|---------------------|----------------|-----------------------------|------------|--------------------------|
| Parent Pond         | 20 people           | 18                  | 90%            | 2                           | 10%        |                          |
| Spawning Pond       | 20 people           | 18                  | 90%            | 2                           | 10%        |                          |
| Pond Nursery        | 20 people           | 19                  | 95%            | 1                           | 5%         |                          |
| Enlargement Pond    | 20 people           | 18                  | 90%            | 2                           | 10%        |                          |
| Making Pellet       | 20 people           | 20                  | 100%           | 0                           | 0%         |                          |

Based on the low percentage of the wife of farmers in making a pond of parents, spawning ponds, nursery pools, ponds enlarging because farmers' wives have never / regularly cultivate freshwater fish (catfish). Their work only helps husband to cultivate fields in TNKS and cultivate rice fields. Percentage of farmer's wife who understands and does not understand in making pond and pellet (feed) after scouted, can be seen in Table 2.

**Table 2.** Percentage of farmer's wife who understands and does not understand in making pond and pellet (feed) after being scouted.

| No. | Activities          | Sum of farmers wife | Not Understand | Percentage of un-understand | Understood | Percentage of understood |
|-----|---------------------|---------------------|----------------|-----------------------------|------------|--------------------------|
| 1.  | Parent Pond         | 20 people           | 4              | 20%                         | 16         | 80%                      |
| 2.  | Spawning Pond       | 20 people           | 4              | 20%                         | 16         | 80%                      |
| 3.  | Pond Nursery        | 20 people           | 3              | 15%                         | 17         | 85%                      |
| 4.  | Enlargement Pond    | 20 people           | 4              | 20%                         | 16         | 80%                      |
| 5.  | Making Pellet       | 20 people           | 3              | 15%                         | 17         | 85%                      |

Taking into account the percentage of farmers' wives in making ponds, spawning ponds, nursery pools, ponds of magnification show a very high understanding. The high percentage is strongly influenced by the guidance, attention and seriousness of the farmer's wife facing the guidance and training activities. Interest factor and interest in cultivating catfish to increase family income is very decisive. Good family income will be able to prosper the family.

The completed pond units: a. spawning pond as much as 1 fruit; b. pond main as much as 1 fruit; c. 2 nursery ponds; d. pond enlargement of 2 pieces; e. pellet for laboratory test; f. The best produced product is the formula number.

To produce catfish feed required raw materials containing nutrients. The necessary nutrients are
proteins, fats, carbohydrates and minerals. Raw materials made into pellets are trash fish, quail stools, fine bran and cassava. The result of pellet formulation made from raw material is 4 variation. For more clearly the percentage of raw materials needed to make a quality pellet can be seen in Table 3.

| No. | Trash fish | Quail feces | Finely bran | Cassava |
|-----|------------|-------------|-------------|---------|
| 1.  | 30%        | 45%         | 15%         | 10%     |
| 2.  | 35%        | 40%         | 15%         | 10%     |
| 3.  | 40%        | 35%         | 15%         | 10%     |
| 4.  | 45%        | 30%         | 15%         | 10%     |

To make a quality pellet more preferred protein and carbohydrate nutrients. Trash fish contains 43% - 50% protein, quail faces contains 18% - 20% protein and 11% - 15% carbohydrate, cassava contains 1.2% protein and 34.7% carbohydrate and fine bran contains 11.35 protein % and carbohydrates 28.62%.

Pellets made from 30% trash fish, 45% quail feces, 15% fine bran and 10% cassava obtained pellet containing 22.82% protein and 17% carbohydrate. This pellet is suitable for enlarging catfish.

Based on pellet laboratory test containing very good nutrition for catfish enlargement is pellet made from raw material trash 40%, quail 35% feces, 15% fine bran and 10% cassava.

5. Conclusions
5.1. Conclusion
1. The wife of farmers interested in cultivating catfish and can be fostered to make the main pond, spawning pool, pond nursery, pond enlargement and catfish feed.
2. The wife of the farmer does not have the skills or knowledge to make the pond and feed the catfish.
3. Making pond pond, spawning pond, pond nursery and pond enlargement can be done by farmer's wife with guidance.
4. The wife of capable and skilled farmers to make a quality catfish feed.
5. Raw fish raw materials, quail feces, fine bran and cassava can be made into a high quality catfish feed.

5.2. Suggestions
1. To make a quality fish feed must use high quality raw materials.
2. Raw materials used as fish feed dough should be made smooth using a tool that is able to smooth the raw material.
3. Mixing raw materials into dough, must be done evenly.
4. Form feed, should be accommodated with plywood size 20 cm x 80 cm so that pellets coming out of the print tool do not break.
5. Pellets that have been formed, dried to a minimum water content.
6. Pellet that has been formed, packed in plastic and stored.

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