Collaborative Model to Increase Empowerment of Dryland Farmer (Case Study West Halmahera District, North Maluku Province)

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Abstract. Agricultural development policy focused on irrigated paddy fields (which are found mostly on Java Island), has abandoned the development of dryland agriculture, particularly the empowerment of dryland farmers. The study aimed to describe characteristics of dryland farmers and their access to environmental resources, therefore developing a collaborative model to increase dry lands farmer empowerment. The study was designed as a quantitative method and used descriptive explanatory. Data collection was carried out by survey methods and the analysis technique used descriptive statistics. The results of the study showed that the characteristics of dryland farmers have productive age, having low education, but have long experience in farming is more than 14 years, also have a large area of land and an average income of farmer more than the average national and the number of family members is more than four. Farmers’ access to environmental resources is a low category, namely access to production inputs and agricultural equipment, capital supporting and financial facilities, marketing, infrastructure, and transportation, as well as the availability of agricultural information and innovation sources. A collaborative empowering model was proposed to increase farmer empowerment. The collaboration model involved multi-stakeholders.

1. Introduction

Agricultural development has not increased farmer empowerment. Most of the farmers are low-income and classified as poor, including farmers on dry land. According to Saragih (2013), 80 percent of severe poverty is found in rural areas and half of the world’s starvation is felt by the farmer. Agricultural development policies tend to be fewer pro-farmers. The weak governmental support towards dry lands farmer can be identified through the decrease of input subsidy, the weak agrarian policies and market protection, the lack of provision of information and innovation, the low development of farming human resources, and the lack of agricultural infrastructure (Wahono 2011; Machfoedz 2011).

In line with this phenomenon, the development of agriculture focused on irrigated paddy fields (which are found mostly on Java Island) and has abandoned dry-land development and farmer productivity on producing food crops (Purwanto et al., 2012). This has closed the opportunity to make dry land a mainstay of agriculture in the future. In North Maluku, the productivity of farmers in producing food is low because most farmers tend to produce plantation crops (coconut, cloves, nutmeg, cocoa) while food crop production is carried out traditionally and subsistence. This condition has an
impact on the low availability of local food, which causes high dependence on food from the other region, as a result, food prices are expensive and less affordable for most low-income households.

Previous research on the capacity of dryland farmers conducted by Pranadji (2006) focused on developing dryland farmers' social capital. Rahman (2020) discusses the prospects of implementing conservation agriculture to improve soil quality and dry land productivity. This study began with the idea that drylands farmers can be empowered to overcome poverty if the empowerment process is carried out by the right approach. Hence the objectives of this study were to describe characteristics of farmers and their access to environmental supporting, therefore developing a collaborative model to increase farmer empowerment.

2. **Conceptual Framework**

Empowerment has various meanings, but in this study, it refers to the definition of empowerment according to Ife (2008), which is “providing people with the resource, opportunities, knowledge, and skill to increase their capacity to determine their future and participate in and affect the life of their community”. Referring to this definition of empowerment, the nature of the empowerment of peasants is the effort to improve the capacity of peasants so that they have more capabilities, strength, and access towards development resources to improve and develop their quality of life. Empowered farmers have knowledge and skills, participate in decision making, and can manage and overcome agricultural business problems.

Dryland is a stretch of land that has an aridity index in the range between 0.05 and 0.65 (UNCCD,2000). The empowerment of dryland farmers means allowing farmers to obtain and utilize access to and control over relevant resources. According to Lionberger and Gwin (1982), the social change process (empowerment) for farmers needs variables as follows, the availability of input supplies, marketing, credit provision, information, and the availability of facilities (warehouses) and infrastructure. Following this opinion, Mosher (1978) stated that if agriculture is to be developed, then farmers have to be supported by the provision of service facilities which are known as the main requirements of agricultural development, which consist of: produce market, ever-changing technology, locally available production infrastructure and equipment, production stimulus for farmers, and transportation. Based on a study in Indonesia, Fatchiya (2010) states that there is a relationship between production and support systems in agricultural development, namely: (a) provision of production inputs (seeds, fertilizers, pesticides, labor), (b) bank credit, (c) processing industry units, (d) marketing agencies, and (e) research and development institutions to create and develop the latest farming technology as well as support for information systems.

3. **Method**

The study was designed as a quantitative method and used descriptive explanatory (Singarimbun 2011) to describe characteristics of farmers and their access to environmental support, therefore to develop a collaborative model to increase farmer empowerment. The unit of analysis in this study was the heads of farmer families on dry land. The studied villages were located within the West Halmahera District, North Maluku Province, Indonesia. West Halmahera Regency was chosen because (i) is a fertile area and agricultural areas as a buffer zone for the food needs of the capital city of North Maluku Province (ii) The community has a farming culture. The studied population was 538 heads of household of the farmer who had less than 2 hectares of land. They spread in four villages namely: Tuada, Todowongi, Bukumatiti, and Taba Campaka. The total number of samples is 162 heads of household of the farmer. Population and sampling techniques are presented in Table 1.
Primary data was collected directly from the farmer through questionnaires which fulfill validity and reliability requirements Table 2. Data from other sources (key informants) such as formal and informal leaders in the village and government officials were obtained through in-depth interviews. Data processing and analysis were done using descriptive statistics (Statistical Product and Service Solution/SPSS 16).

Measurement indicators using 1 to 4 parameter scale, where the minimum value of the index transformation (0) could be achieved when every single parameter indicator measured 1 point. While it has a maximum value (100) when every single parameter indicator value in 4 points, therefore distribution data shows an interval scale with values ranged from 0 to 100. 4 (four) level were used: "very low" for values between 0 dan 25, "low" for a value between 26 and 50, "middle", for a value between 51 and 75 and "the high" category for values between 76 and 100.

4. Result And Discussion

1. Characteristics of farmers and their access to environmental support

1.1 Characteristic of Farmer

Based on the results of statistical analysis in Table 3, it is known that the characteristics of dryland farmers in the study area are as follows.
The data above showed that most of the farmers are of productive age. The productive age of farmers around 40 years with only a low formal education level (averaging 7-9 years). The productive age allows farmers to participate and be actively involved in empowerment programs and can absorb various information and innovations to be applied when farming. One of the obstacles to farm management in the study area is the ability of farmers, so the productive age is one of the supporting factors to increase crop production because with productive age farmers have more opportunities to learn and apply technology and new ideas in managing their farming.

The average education level of farmers is low. The length of education for farmers ranges from 7,8 years. This educational structure implies low literacy, limited insight, and creativity which in turn will reduce farmer productivity. Educated farmers can understand the potential and problems around them also they can adapt to change and overcome problems more easily.

The land cultivated by the farmer was quite large, reaching on average 1.5 hectares. It is relatively large when compared to the national average. According to the Central Statistics Agency (BPS) (2015), there are more than 16 million small farmers with land ownership below 0.5 percent. Farmer with large land can help them to increase the production of crops if they have the ability to managing farms. This is an interesting phenomenon. According to Bambang and Pranadji (2002), on the one hand, society (agriculture) is faced with land starvation; on the other hand, the available dry land outside Java is still relatively large. The relatively extensive dryland resources outside Java await the touch of skilled hands from agricultural experts and a flow of investment.

The farming experience is relatively long, averaging 14 years. Long experience in farming caused farmers to know more, be careful, and understand the various farming problem, also farmers have a learning process that can solve their problems better.

Their level of income amounted to IDR 20,963,850 per annum. Although the income per capita of the farming household is an average of IDR 436,747 per month, higher than the average nationwide, namely 233,740 per capita per month, but not sufficient to fulfill food and non-food needs of family farmers in a month because the food prices are relatively expensive.

The number of members in a farmer household ranges from 4 to 5 people (average 4 people). A large number of family members causes a high burden of household responsibilities. This can be related to the economic conditions of a household. Low-income households find it more difficult to meet the food needs of family members

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\begin{array}{c|c|c}
\text{Number of family members (people)} & \geq 1 & 0 \\
\text{range} & 0 & \text{26- <50 low, 51- <75 high, 76-100 = very high} \\
\text{4-} & 6 \text{9} & 7 \\
\text{6-} & 2 \text{8} & 4 \\
\text{0} & 1 \\
\end{array}
\]

1.2 Access and environmental support
The farmer's ability to access production input, credit, marketing, and information and innovation were within the low category with an average score of 24.3, 33.93, 39.3, and 15.7, respectively. The results of the access dan environment support analysis are presented in Table 4.

The farmer' access to production input, such as seeds, fertilizers, pesticides, and farming machinery was low. According to farmers, the price of production inputs is very expensive. Farmers consider government support through production input aids is difficult, due to the limited assistance so that not all farmers have ever received seed and agricultural equipment assistance.

Mostly, Banks and cooperative agencies are perceived as having difficulty in providing loans to farmers. Farmers admit that they have a complicated procedure and farmers are required to have collateral. Besides, farmers still have difficulty paying bank interest that is due at times when they have
not received money from the agricultural business. While the cooperative agency has an easy procedure (KTP-Identity Card only), it is difficult for farmers to pay high-interest rates. On the other hand, it is easy for farmers to obtain capital from middlemen or what is commonly called "subscriptions" because they do not go through complicated procedures and they are certain that the farmers can afford to pay. Also, there are several middlemen in each village, so farmers don't have to bother leaving the village. It's just that in this way the farmers are bound to sell their crops, on the other hand, the middlemen determine the market price.

Farmers have difficulty marketing their crops. Most of the farmers rely on traditional markets in the district capital to sell their crops. Unfortunately, this commodity is often not sold out. If they are not sold out, farmers usually entrust them to sellers or sell them at very cheap prices (lower prices), because they do not have storage facilities. The other problem is the high transportation cost so that they sold their crops to the collectors who came in their field during the harvest to buy the crops at a cheap price.

Farmers find it difficult to obtain agricultural information and innovation from formal information sources such as extension agents, officers, or researchers. Information and agricultural innovation are easier for farmers to obtain from middlemen (customers), their families, neighbors, and fellow farmers. For example, farmers in Taba Campaka Village in East Sahu Subdistrict obtained information on cultivation techniques from transmigration farmers from Java Island at Goal. Agricultural research institutes rarely inform farmers of innovations through outreach or collaborating with farmers to adapt the resulting technology.

| Table 4. Farmers' perception of environmental access and support |
|-------------------|-------------------|-----------------|
| Aspects           | Category          | Farmer (%)      |
| Input availability| Very Low          | 68              |
| Production        | Low               | 31              |
| Agricultural      | High              | 1               |
|                   | Very High         | 0               |
| Average           |                   | 24.3            |
| Capital/Facilities| Very Difficult    | 23              |
| Finance           | Difficulty        | 72              |
|                   | Easy              | 5               |
|                   | Very Easy         | 0               |
| Average           |                   | 33.9            |
| Market availability| Very Difficult    | 6               |
|                   | Difficult         | 60              |
|                   | Easy              | 34              |
|                   | Very Easy         | 0               |
| Average           |                   | 39.2            |
| Information and   | Very Low          | 82.7            |
| Innovation        | Low               | 17.3            |
|                   | High              | 0.0             |
|                   | Very High         | 0.0             |
| Average           |                   | 15.7            |

Note: 0-<25 = very low; 26-<50 = low; 51-<75 = high, 76-100 = very high; 0-<25 = very difficult, 26-<50 = difficult, 51-<75 = easy, 76-100 = very easy. ** very significant p<0.01 and * significant p<0.05

2. The Collaborative Model

The collaborative model is proposed to increase the empowerment of dryland farmers. This proposal is based on the idea of the importance of government intervention in an integrated manner in overcoming farming problems, which is presented in Figure 1. This model was developed based on a study of the low access and support of the farming environment. The collaborative model involves stakeholders, namely:

(1) Farmers, represented by farmer groups as executors of farming an agreed commodity at the group level or group association in the village or sub-district. The group applies technology that is adaptive
to local conditions and according to farmers' needs. The technology applied by small farmers can come from BPPT, local universities, or local wisdom.

(2) The government designs agricultural development policies based on local resources. The government has also increased the capacity of farmers through participatory learning and extension services and facilitating stakeholder who builds a partnership. The capacity of farmers is increased to change mindsets and business patterns as well as to develop entrepreneurial behavior. It is important to eliminate farmer behavior on government assistance.

(3) Extension workers, researchers, and assistants play a role in facilitating the running of farmer group businesses. They pay attention to business assistance for farmer groups. Researchers and extension workers collaborate in participatory extension. Information and technological innovations produced by researchers (BPPT, Higher Education, and regional R&D) have been adapted to the needs of information and technological innovation through participatory means. The participatory way starts from defining farming problems, how to overcome them, adapting technology, and evaluating the technology used by farmers.

(4) Formal financial institutions, namely government banks involved in a collaboration to increase access to capital for farmers to obtain credit at low-interest rates. Provision of venture capital is accompanied by intense mentoring measures, therefore the capital is used effectively to develop a business and not to meet daily needs. Extension workers play a role in bridging the interests of bank institutions and farmers. Facilitator or extension workers provide information on capital requirements with an installment system according to cropping patterns.

**Figure 1** The Collaborative Model to Increase Dry Land Farmer Empowerment
(5) Agricultural Cooperatives (Koperasi Unit Desa/KUD) plays role in providing production facilities and credit assistance for farmers to overcome difficulties for farmers to obtain business capital. KUD can partner with farmers so that members of farmer groups become members of KUD.

(6) Traders, in partnership with traders (fertilizers, pesticides, seeds or seeds, and agricultural machinery). For example, an entrepreneur provides fertilizer to farmers in an appropriate manner in terms of quality, dosage, price, and time-based on an agreement with the farmer. Provision of fertilizers according to need with a payment system after harvest or according to the capabilities of the business group.

(7) Entrepreneurs, exporters, and traders assist farmers in overcoming market access difficulties. Farmers' products to be marketed include copra, and dry cocoa beans and vegetables as well as dried fish and peanuts according to consumer needs. An agreement between farmers and traders important to protect farmers, in terms of the types of commodities with the economic value needed by the market, price certainty. Marketing through e-commerce is important to be more profitable for farmers.

5. Conclusion

The characteristics of dryland farmers are as follows, the average farmer has a productive age, an average of 40 years, having low education, an average length of education of 7 years, the length of experience in farming is more than 14 years, has a large area of land, average income more than the average national income of farmers and the number of family members is more than four. Farmers' access to environmental resources is a low category, namely access to production inputs and agricultural equipment, capital supporting and financial facilities, marketing, infrastructure, and transportation, as well as the low availability of agricultural information and innovation sources. A collaborative empowering model was proposed to increase farmer empowerment. The collaboration model involved multi-stakeholders.

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