The development of integrated agricultural system in improving the local community in Papua

B A M Rahawarin¹, D Salman² and E B Demmallino²

¹ Agricultural Systems Program, Graduate School, Hasanuddin University, Makassar, Indonesia
² Faculty of Agriculture, Hasanuddin University, Makassar, Indonesia

E-mail: beatrixrahawarin69@gmail.com

Abstract. The Wapeko village area was targeted by investors because of its geographical location and natural resource wealth, but the lives of residents of the Wapeko village were almost 100% indigenous / local Papuans, their lives still mixed with a low level of education and economy. This research aimed (1) to analyze the implementation of the development program of the integrated agriculture system in Wapeko Village to achieve the aims of the program; (2) to analyze the achieved results in agriculture products and the incomes of the community through the development of the integrated agriculture system; (3) to develop alternative strategies in order to develop integrated farming systems in realizing a sustainable livelihood pattern of the local communities. The research was conducted in Wapeko Village Kurik Sub-District, he method used was a qualitative method which used quantitative instruments. The data collection was done using direct observation in the field and interviews with the respondents through questionnaires. The respondents involved 25 households of the local Papuans as well as the stakeholders who were directly involved in the program. The analysis of the revenue used the Farming analysis, and the Strategy analysis through SWOT method. The research results indicated that the collaboration program between Medco Foundation and Yasanto had an impact especially on the development of the Integrated Agriculture System (Sitandu) which was shown by the change in the pattern of the basic livelihood as well as the increase of the income of the local community.

1. Introduction

The history of the agriculture shows that agricultural system has developed from environmentally friendly-indigenous system to non-environmentally friendly conventional, modern, industrial system. In tropical countries, including Indonesia, the agricultural system’s disruption is even greater due to the shifting of agricultural land to hilly areas, due to population pressure and conversion of agricultural land to residential and industrial/ factory land [1]. As a result, tropical agriculture has tended to develop towards agricultural systems that use local resources intensively with little or no external use, resulting in the destruction of natural resources [2].

Integrated Agricultural System (Sitandu) is a system that combines conventional animal husbandry, aquaculture, horticulture, agro-industry, and all agricultural activities. Manure produced by livestock is used to fertilize plants, and crop residues are used as animal feed [3]. Sitandu is able to provide the necessary production facilities such as fuel, fertilizer and food, besides the increasing productivity. It can change a risky farming system towards an economical agricultural system and balanced ecological
conditions. The purpose of implementing the system is to minimize the minimum input from outside, therefore, the negative impacts that are mentioned above can be avoided much as possible and be sustainable [4].

Wapeko Village is a strategic area in the Kurik district, Merauke Regency, Papua. At the local level, the village area is the link among the town of Merauke, the Senegi village area, and other surrounding villages. At the national level, this village is the government's concern, related to the government's program to create the first modern technology-based food agriculture center in Indonesia. This national granary program targets the development of paddy farming land to 1.2 million hectares in 3 years, with the potential for overall land expansion to 4.6 million hectares in the future to include private parties other than BUMN.

The results of the Modern Agricultural Social Risk Study in Merauke District conducted by the CSWS FISIP UNAIR team 2016, it is found that in addition to infrastructure development that has not been sufficient, the level of education is low, and the economic conditions of the community are still lagging behind, it is also mentioned that there are still many indigenous communities in Wapeko village who do not have the ability or knowledge of farming [5] and low capital formation of farming [6]. Most villagers still rely on their livelihoods from hunting and fishing. Social welfare is a condition or circumstances where various social problems in a community are well managed, when the basic needs of the community are met, and social opportunities can be maximized [7] Indigenous Papuans are gatherers, relying on their daily lives by taking extraordinary natural resources so that they don't feel deprived.

However, along with the advancement of information, technology and advancing times, the local community must not be complacent; they must also go forward, especially in developing human resources so that they are not left behind. Sitandu is a strategy that is most likely to be collaborated. With the Sitandu collaboration, it is hoped that there will be an increase in local people's income and income patterns as well as alternative strategies for future program development. This study aims to analyze the implementation of integrated farming system development programs in Kampung Wapeko in achieving the program.

2. Method

2.1. Approach and Types of Research
The research approach used to explore facts, data and information, used a qualitative approach that is supported by quantitative data. Qualitative data collection is conducted by in-depth interviews with informants, while quantitative data is done through surveys that take samples from a population and use a questionnaire as a data collection tool [8]. Researchers play a full role in conducting research, both in quantitative and qualitative data collection.

2.2. Time and Research Location
This research will be conducted for 6 months from February to July 2018 in the village of Wapeko, Kurik district, Merauke Regency. Wapeko village before it was divided into a village, was a hamlet and in government administration, was one of the RTs (neighborhood units) from Ivimahad village where the distance from the center of the village was about 10 km. At present Wapeko has officially become a new village from the division of the village of Ivimahad with Papua Province Regulation No. 7 of 2013.

2.3. Data and Resources
Primary data were obtained directly from each head of community in Wapeko village who was directly involved in the program. This primary data was collected through in-depth interviews and questionnaire filling, while secondary data was obtained from various related sources such as data from the Yasanto baseline survey, population data and village situation from the Kurik district and the
village secretaries of Wapeko and Merauke in Figures years [9,10]. Secondary data that were obtained will be used as a complement and reinforcement of primary data.

2.4. Data Collecting Procedure
Data collection / retrieval is performed by direct observation and in-depth interviews at the research target of the community in Wapeko village using a questionnaire. Interviews were conducted per family on 25 families of indigenous Papuans.

2.5. Data Analysis Techniques
To answer objective 1, the conducted analysis is descriptive analysis, in the form of a systematic description of the process of implementing programs and activities carried out by Yasanto related to the development of integrated farming systems. The results of this analysis are an overview of the stages of the process and the parties involved in implementing integrated farming programs.

To answer objective 2, the analysis conducted is farm analysis [11] in the form of a calculation of fixed costs, variable costs, value of income and farm income obtained by households through integrated agricultural development, namely: \[ B = R - C \] where: \( B \) = Income; \( R \) = Revenue (Volume x Price) and \( C \) = Fixed Costs + Variable Costs.

To answer objective 3, a SWOT analysis (strengths, weaknesses, opportunities and threats) is carried out, by identifying the strengths, weaknesses, opportunities and threats contained in the management of integrated farming systems in the village of Wapeko. Rangkuti explains that the SWOT analysis is the systematic identification of various factors for formulating organizational strategies [12]. This analysis is based on logic that can maximize Strengths and Opportunities but simultaneously minimize Weakness and Threats. SWOT analysis is used to compare external factors and internal factors. External factors consist of opportunities and threats, while internal factors consist of strengths and weaknesses.

In the SWOT analysis, a comparison is made between internal and external strategic factors to obtain a strategy for each of these factors, then scoring. Based on the results obtained, the focus of the strategy recommendations is then determined.

3. Results
Prior to the implementation of the program, Yasanto conducted a baseline survey and the results were in the form of a baseline report that described the conditions at the starting point (zero point) of the target villages prior to the program implementation and could be used in evaluating program implementation for clear and accurate measurement of success.

After the baseline survey, it is continued with program planning designed based on the natural, social and cultural potential of the community and to increase active community participation, then making decisions regarding what activities will be carried out, through FGD (Focus Group Discussion) with stakeholders and the community in Wapeko village. The desire to develop organic farming and livestock rising and to consider human potential, natural, social and cultural potential, it was decided to carry out integrated farming system development activities, from cultivation to marketing.

The Sitandu development by Yasanto was implemented in the activities of building understanding through Integrated Agricultural Training with material and practice. In addition to material on Sitandu, cultivation of plants and livestock, Household Economics, and practices in the form of processing local food ingredients such as sago, bananas and cassava into cakes and chips, making jerky and salted fish, also making demonstration plots, making fertilizers and pesticides organic. Follow-up after the training activities, the community was given assistance with vegetable seeds and then encouraged and accompanied to build their own gardens in their yards. Chicken livestock assistance is also provided so that they can raise chickens.
The data from 25 respondents regarding livelihoods, it appears that before the program was carried out, there were still respondents who only relied on one type of livelihood, namely Farmers and Private Employees (9 people = 36%) to make ends meet for their families. Whereas more respondents (11 people = 44%) with 2 types of livelihood and the smallest percentage of respondents with 3 types of livelihood (5 people = 20%). The data above also shows that livelihoods as farmers are still the main and collaborated with other livelihoods such as livestock, fishermen and hunting.

After the implementation of the program, there was a change in the type of respondent's livelihood after being directly involved as a beneficiary for approximately 1 year in the Medco and Yasant collaboration program. From the initial situation of the respondents that have been described above there is an impact on people's livelihood patterns to survive and get out of the difficulties they face. Data changes in community livelihood patterns are very drastic, where there are no more respondents by only relying on one type of livelihood, most respondents rely on 4 types of Livelihood (14 org = 56%) and some even rely on 5 types of livelihood (3 org = 12%) to make ends meet and improve their welfare.

Respondent Income Level is carried out by farming analysis in the form of calculation of Fixed Costs, Variable Costs, Value of Revenue and value of farm income obtained by households through the development of Sitandu.

Analysis of Farming Business :  
\[ B = R - C \]

Where : 
\[ B \] = Revenue
\[ R \] = Receipt (Volume x Price)  
\[ C \] = Fixed Cost + Variable Cost

Farming analysis results above show that the average largest income of respondents before the implementation of the program is from the Farmer results of Rp. 1,166,000, or 68.2%, followed by livelihoods as Farmers Rp. 534,648 (21.9%) and as Fishermen only Rp. 241,462.

Compared to the previous table on livelihood patterns, there are two other livelihoods, namely as a gatherer of wood forest products/wood censors and as an employee whose income is quite high, but because researchers require to measure the success of the Sitandu development program, therefore, it is focused on the 3 types of livelihoods, which is directly related to the program, consequently, the results are not biased.

While the results of farm analysis after the implementation of the program showed that the highest average income of respondents was still from livestock with a total income of Rp. 1,512,167, or as much as 44% because of the results of farming analysis, it appears that the total investment cost is quite high, but only 6 respondents are doing farming activities so that the average income is high. While the lowest yield is still from income as a fisherman with a total average income of Rp. 471,100 (13.7%), because the investment value is quite large and more respondents (20 people) are doing this activity. The yield from agricultural business of 19.7% (Rp. 677,768, -) is the third highest average income. When viewed from the income per family, agricultural output is not too large, but it increased significantly from income before the program was carried out because almost all respondents (23 people) carried out this activity.

With the situation described above, it can be seen that the change in community livelihood patterns also determines changes in the income level of respondents. When it is viewed from the program side, there was an increase in community income from the Sitandu Program. The integration of crop, livestock and fisheries management in one agricultural business that is the basis for developing the Sitandu, does not only encourage changes in the livelihood patterns of the community, but also increases their income.

In terms of season, it shows that Farmer activities can only be done in the rainy season and there is a significant increase in income between before and after program implementation. While hunting gathering activities can only be conducted in the dry season. While livestock and fishing activities can be carried out in both seasons or throughout the year and there is a significant increase in income.
4. Discussion
The results show that there is an impact on people's livelihood patterns to survive and get out of the difficulties they face. This data also shows that livelihoods as farmers are still the main and collaborated with other livelihoods such as livestock, fishermen, and hunting. Even so, farming and livestock carried out by the community are still on a small scale with limited land in the yard, only to meet the family's food needs. While the results of fishing and hunting are sold more than on their own consumption.

The situation of the respondent's type of livelihood change after being directly involved as a beneficiary in the Medco and Yasanto collaboration program, shows that there is a drastic change in the livelihood of the community, where there are no more respondents relying solely on one type of livelihood, most respondents rely on 4 types Livelihoods (14 org = 56%) and some even rely on 5 types of livelihood (3 org = 12%) to fulfill their daily needs and improve their welfare.

Changes in income patterns that occur are expected or should be followed by an increase in the level of community income. Increasing the level of income will be a benchmark of success in changing the pattern of living that has been tried to be encouraged in this collaboration program, especially in terms of developing Sitandu.

Farming carried out by local people including 25 respondents is still very simple on a small scale, so the value of low investment capital (fertile land and organic agriculture does not require chemical fertilizer to be purchased) also because most of the farming is done alone with local materials and production support equipment limited. Because the community still relies on hunting concoctions as part of their livelihood and is still closely related to food availability, in this analysis, livelihoods are analyzed. These agriculture-based businesses or activities before the implementation of the program are carried out individually by each respondent so that the income figure is very low.

After implementing the program for approximately 1 year, it can be seen that changes in Community Livelihood Patterns also determine changes in the income level of respondents. When viewed from the program side, there was an increase in community income from the Sitandu Program. The combination of crop and livestock management in an agricultural business that is the basis for developing a Sitandu, does not merely encourage changes in people's livelihood patterns, but also increases their income.

The culture of gathering is very dependent on the climate, which is quite extreme in Merauke district, where the dry and rainy seasons alternately for approximately 6 months. When it is the rainy season, gathering activities, especially wood forest product harvesting and hunting is difficult, so that it will affect people's income. While fishing becomes easier to do in the rivers around the village. Whereas in the dry season, the activities of gathering wood forest products and hunting can be done more easily, also fishing activities are still carried out by the community, but in the dry swamps.

Hence, when it is viewed in terms of the influence of this season, it can be concluded that the greatest results of all business activities to maintain life or a living pattern carried out by the community are from the results of the Sitandu (Farmer, Livestock) program by 57.9% compared to the results of gathering (Fishermen and Hunting) by 42.1%. This shows that although this program has only been implemented for about 1 year, the results are considered quite good because besides there is a significant increase in income, this program has also aroused community interest and curiosity as evidenced by wanting to be actively involved.

The results achieved from this cooperation program allow for continued collaboration to develop the program and expand its territory to other villages around Wapeko village, of course with better strategies to achieve cooperation goals, specifically in developing Sitandu, and for the continued development of the Medco collaboration program and Yasanto going forward. To determine the appropriate program development plan and strategy going forward, the SWOT method is used.

From the SWOT method that is performed by compiling the 4 elements in the SWOT matrix, alternatives arise for the development of future collaboration programs, namely: (1) Strengthening the development of the Sitandu program with variations in crop commodities and types of livestock for collaboration with the culture of gathering the community on existing natural resources to encourage
continuity of food availability, (2) Intensify gathering activities in the dry season by providing markets and collectors for gathering and vice versa, intensifying Sitandu activities in the rainy season so that people remain productive and can meet their needs, (3) Encourage and strengthen community competence in managing results, both from the results of the Sitandu Program and gathering so that the community can be more productive and improve their livelihood patterns as the main actors in marketing the results or entrepreneurship and (4) Involving Indigenous / Community leaders in government development plans. edepan so that the community does not only become spectators and lose natural resources as living and marginalized means of living.

5. Conclusions and Suggestions
The collaboration program of Medco and Yasanto in the community economic capacity building program, especially in the development of Sitandu has been carried out to the maximum and involves active community participation. The Sitandu program has led to positive changes in the improvement of livelihood patterns and income levels of local communities in maintaining family income and food sustainability. There are several alternative strategies for developing the Sitandu program going forward based on the SWOT Analysis. It is recommended that the collaboration that has been carried out can continue with the development of a broader Sitandu program, both in terms of increasing commodities and the diversity of productive livestock and collaborating with the culture of community gathering by considering alternative strategies that have been obtained from this research.

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