

## **Sustainable Development Program: Synergism Integrated Farming System Implementation in Tambrau, West Papua with A Holistic Approach**

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### **KEYWORDS**

Integrated Farming System;  
Holistic Approach;  
Sustainability

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### **ABSTRACT**

Indonesia, as an agricultural country with abundant natural resources, still faces the problem of poverty in various regions, especially in West Papua. The high poverty rate in this area is related to the low access to education, food security, and proper economic resources. In an effort to address these issues, the Integrated Farming System (IFS) is considered a potential solution to improve community welfare and support the Sustainable Development Goals (SDGs) targets. This study aims to identify the benefits, challenges and opportunities of IFS implementation in Tambrau Regency, West Papua, with a focus on its contribution to the achievement of the five SDGs targets, including poverty and hunger alleviation, and improvement of quality of life and environment. The method used in this research is a descriptive qualitative study through literature review and secondary data analysis. Data were taken from various sources such as scientific journals, books, and official documents relevant to the research topic. The results show that the implementation of IFS in Tambrau has the potential to increase agricultural and livestock productivity, create new jobs, and promote sustainable food production. In addition, the use of organic fertilizers and a holistic approach can have a positive impact on the environment and local communities. IFS is an effective program in supporting the achievement of SDGs through empowerment of local communities and sustainable use of existing resources. However, further support in the form of technological innovation and sustainable government policies are needed to ensure the long-term success of this program.

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### **Introduction**

Indonesia as one of the countries that has a diversity of resources makes this country superior in several ways. However, these advantages are still not fully utilized by most people (Ramli & Djumena, 2023). In addition, Indonesia is also known as an agrarian country where almost most of the area is vast and very fertile. However, this does not make farmers or communities in a certain scope prosperous. In fact, almost most farmers live in poverty. Problems related to poverty are a

crucial social problem for most developing countries, including Indonesia. The low level of the economy and income of the people of Indonesia is one of the factors that cause poverty. Where almost most of Indonesia is still classified as poor.

Data from the Central Statistics Agency shows that there are 10 provinces in Indonesia with the highest poverty rate, one of which is West Papua with a poverty rate in 2023 of 20.49 percent (Putri & Hardiyanto, 2023). A series of problems continue to follow along with the increasing poverty in the Papua region. Income inequality, low Human Development Index (HDI), stunting, and low education levels are one of the bad effects of poverty. Nevertheless, until now Papua is still one of the provinces with abundant resources. As in one of the regions in West Papua, namely Tambrauw Regency, which has an advantage in one of the corn food commodities. Tambrauw Regency has a corn commodity productivity level of 9.86 tons/ha with details of total corn production of 3,106 tons with a harvest area of 306 hectares (Kementerian Pekerjaan Umum dan Perumahan Rakyat, 2023). On the contrary, these advantages do not make the surrounding community prosperous where the data presented (BPS Papua Barat, 2024) shows that in this region the percentage of poor people is 31.23 percent in 2023.

Poverty is seen as the economic inability of the community to meet the basic needs of clothing, food, and board. In addition, the lack of access and health services, the lack of clean water facilities and infrastructure suitable for consumption, and the fact that many toddlers do not get additional food are still found to be high stunting in West Papua (Kemenko PMK, 2023). It was further explained that the high level of poverty resulted in many children not getting a proper education. This will in turn cause the unemployment rate to increase. In addition, poverty will hinder economic development programs because the costs that must be incurred to carry out economic development will be greater (Imanto et al., 2020).

To answer and overcome the problem of poverty in West Papua, especially in Tambrauw Regency, the integrated farming system is one of the efforts that can be applied. Integrated farming system is an agricultural program or system that is implemented in an integrated and sustainable manner. Integrated farming system can be implemented through a combination of agriculture, livestock, fisheries, plantations, and other sciences in one area (PIAT UGM, 2010). Type Integrated farming system later it is hoped that it can be implemented in the Tambrauw Regency area with the aim of overcoming social problems, including poverty problems.

Integrated farming system implemented by involving all aspects of society and making the most of all potential local resources. According to (Rose et al., 2019), integrated farming system able to balance productivity, profits, and social responsibility through an integrated agricultural model. This model is expected to create sustainability for the welfare of the people of Tambrauw Regency, West Papua through the potential of existing resource commodities. Integrated farming system is also expected to be able to answer the targets of sustainable development goals. Sustainable development goals It is a national and global commitment in an effort to prosper the community which contains seventeen targets by 2030 (SDGs Indonesia, 2020). Through integrated farming system, This model will answer five of the seventeen SDGs targets, including no poverty, no hunger, healthy and prosperous life, decent work and economic growth, and responsible consumption and production.

Based on the previous explanation, the formulation of the problems that can be built in this study is as follows: (1) How can an integrated farming system answer the SDGs targets?; (2) What

are the obstacles and challenges in the implementation of the integrated farming system in Tambrauw Regency?; (3) How big is the opportunity for the implementation of an integrated farming system in Tambrauw Regency, West Papua. The purpose of this research is to find out how the benefits and impacts that can be provided by the integrated farming system, especially in answering the target of the SDGs program. Not only stopping at the identification of obstacles and challenges in the implementation of the integrated farming system, this study also aims to find out the opportunities for the implementation of the integrated farming system in Tambrauw Regency, West Papua.

The results of this study are expected to be useful in providing an overview to the government related to the effectiveness of the implementation of the integrated farming system in answering the targets of the SDGs program. In addition, this research is also expected to provide benefits for the development of science, especially in the fields of agriculture, livestock, and food.

## **Materials and Methods**

### **Types and Data Sources**

The research methods used in this study are included in qualitative research. Qualitative research is a research method that implements scientific methods in revealing phenomena by describing data and facts (Sugiyono, 2015). According to (Rusandi and Muhammad Rusli, 2021), qualitative research is a form of research method to describe existing phenomena, both natural and man-made phenomena, which can be in the form of activities, characteristics, changes, and relationships between one phenomenon and another. It is further explained that qualitative research seeks to describe and interpret something, for example it can be in the form of conditions and situations with existing relationships, developing opinions, and the effects that occur and so on. The data used in this study are secondary data obtained from research results, official documents, scientific books, journal articles, and opinions of experts and other publication media. To increase the validity of the research results, the secondary data selection process was conducted through several stages. First, data was collected from online databases such as Google Scholar, ScienceDirect, and national journals, with the criteria of relevant publications within the last 10 years related to IFS and sustainability in Indonesia's agrarian context. Next, data was filtered by identifying relevant articles and reports through abstracts and keywords such as integrated farming system, agricultural technology innovation, sustainable agriculture, and West Papua. Only studies that had direct relevance to IFS implementation in the tropics were selected for further analysis. Once the data were selected, the articles were analyzed qualitatively using thematic analysis techniques to identify patterns, themes, and insights related to the contribution of IFS to the SDGs, challenges of agricultural technology implementation, and synergies between local resources and agricultural systems. To enhance the validity of the findings, triangulation was conducted by comparing results from different literature sources and data from organizations such as FAO to ensure consistency and reliability.

### **Data Analysis Techniques**

In conducting data analysis, this study uses a literature study method. Literature study is a technique by critically and in-depth examining related to library materials relevant to research topics such as books and journals that are worthy of reference and reference (Assyakurrohim et al., 2022). It is further explained that literature studies refer to a set of data and information derived

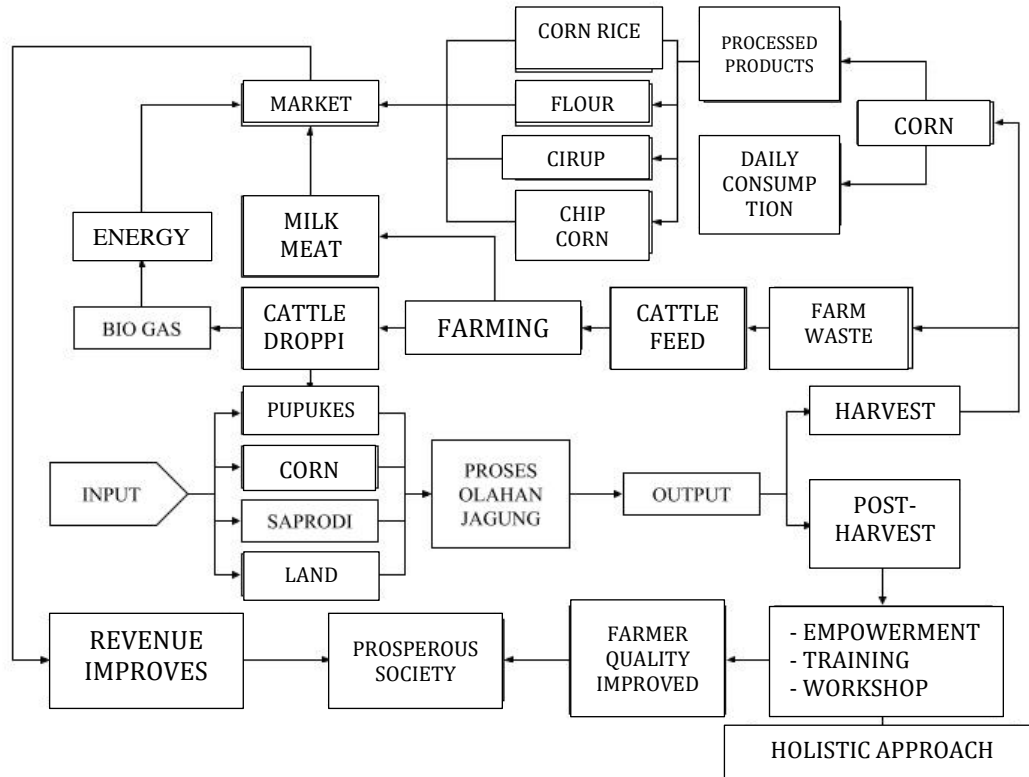
from relevant news, books, interviews, and documents. According to (Danandjaja, 2015), this study is a research method that is carried out with scientifically designed references, consisting of collecting data from references related to research objectives and integrating and presenting data.

## **Results and Discussions**

### **Integrated Farming System in Responding to SDGs Targets**

Indonesia is known as an agrarian country with abundant resources, which means that people should not live in poverty (Kementerian Keuangan RI, 2023). As previously stated, the poverty rate in Indonesia is quite high, especially in the Tambrauw Regency, West Papua. This shows that currently several areas that are included in the poverty line need support programs to alleviate the problem. In the international arena, several programs have also been carried out to help overcome this, such as the sustainable development goals (SDGs) which has 17 achievements in 2030, one of which is related to welfare (SDGs, 2015). Of course, not a few parties are encouraged to take part by providing their ideas or programs to help achieve the goals of the SDGs, one of the programs that can be proposed to help overcome poverty and achieve the SDGs target is integrated farming system (IFS).

The idea of the program has been proven through previous research, as conducted by (Mucharam et al., 2022) which shows that IFS is one of the important components to answer the SDGs targets. (FAO, 2015) proves that IFS is a program that can support the achievement of the SDGs by 2030. In addition, the findings (Ansar and Fathurrahman, 2018) said that IFS can help in improving food security in certain regions. Literature review conducted (Bhati et al., 2024) shows that IFS provides an increase of at least 26.5% in the profitability of farming businesses, and by 14.3% provides an increase in the opening of new jobs. Based on the literature review carried out, it was found that innovation is a form of IFS development that can be implemented in Tambrauw Regency. A visualization of the modified IFS process can be seen as follows:



**Figure 1. Integrated Farming System**

Source: Data Processed, 2024

The figure above explains that the IFS system offered is integrated and sustainable. Every process and use of materials also utilizes environmentally friendly products. Selection of corn commodities based on data (Kementerian Pekerjaan Umum dan Perumahan Rakyat, 2023), which shows that corn production in Tambrau Regency reached a production figure of 3,106 tons. By utilizing this local potential, the IFS program can help alleviate poverty and achieve the SDGs targets.

The figure explains that at the input stage, fertilizers, seeds, saprodi or agricultural equipment are available as well as land that is given once at the beginning of the IFS. The next stage is the corn processing process where currently farmers are doing their duties until the end of the harvest period arrives, when the harvest period arrives, the output produced can be two parts where there is harvest waste and corn yields. The harvest waste obtained can be used as animal feed, where this animal feed is used for cattle as one of the most animals in Tambrau Regency. This means that until this stage IFS is still utilizing the local potential of the region.

The livestock used in the IFS program produces livestock manure which can then be processed into two important components to maintain environmental balance. Where the manure can be processed into biogas and finally produce renewable energy and can be used as an alternative fuel for the community. The manure can also be reprocessed as organic fertilizer (solid and liquid) which can be used for agricultural processes so that the products produced are of higher quality. Although organic fertilizers have a longer permeability, their benefits are felt in the long

term in maintaining soil fertility (Pratiwi & Setiawan, 2020). Processed livestock products can also be used by the community for resale or as personal consumption in the form of meat and milk.

In line with its goals, IFS also pays attention to the post-harvest conditions of farmers so that they can have a good impact in the future. This stage will utilize a holistic approach by paying attention to the overall aspects of people and the environment through empowerment programs, trainings or workshops. This aims to provide a good stimulus in improving the quality of farmers' human resources so that it ultimately has an impact on the welfare of the community. Various aspects and components of the IFS offered have considered the welfare of the community where every processed agricultural and livestock product can be processed in such a way as to produce a diversification of products to be retraded.

The modified IFS program is supported by a statement (Smith, 2010) that IFS depends on the interaction of each component in order to be productive, adaptive, develop and need to utilize resources as efficiently as possible. (Nedea, 2021) it also reinforces that the concept of IFS can be developed in such a way because of its complex nature and attention to space and time. The IFS overview shows that each process takes advantage of local potential, the environment and other aspects. The results of the literature review and the development of IFS model solutions indicate that the program is able to create long-term sustainability through the use of environmentally friendly products and renewable energy. The model also helps in improving community welfare through increasing farming income from the diversification of processed agricultural products.

The output results obtained from the implementation can answer five of the seventeen SDGs program achievements, namely: (1) without poverty: by utilizing processed agricultural and livestock products, the income of the local community can increase little by little; (2) without hunger: processed agricultural and livestock products can not only be traded but can be used for daily consumption (meat, milk and processed corn products); (3) healthy and prosperous life: through the use of IFS, the products produced are much higher quality because they utilize organic materials; (4) decent work and economic growth: the success of IFS requires support from human resources, so the existence of the program provides new opportunities for the surrounding community to contribute their energy to the program. With decent work, other impacts can follow, such as economic growth due to increased people's incomes; (5) Responsible consumption and production: An environmentally friendly (organic) oriented IFS is able to generate added value through the efficiency of its materials and processes. Of course, this opinion has been supported by the findings of previous research, so that it can strengthen this argument by stating that almost most of the IFS process is able to contribute to the achievement of the SDGs program by 2030 (Sahoo et al., 2022; Shahmohamadloo et al., 2022).

### **Obstacles and Challenges in the Implementation of the Integrated Farming System in Tambrauw Regency**

The components of strengths, weaknesses, opportunities, and threats are the basic assessment when a program will be implemented. In the effort and effort to implement the integrated farming system (IFS) in the Tambrauw Regency area, West Papua, there are aspects that are considered to assess whether the IFS model is effective and efficient to be implemented. Therefore, an analysis related to the strengths, weaknesses, opportunities, and threats related to the implementation of IFS in Tambrauw Regency is needed. The following is a table of SWOT



analysis conducted based on several review literature in the implementation of IFS, especially on corn commodities in Tambrauw Regency.

**Table 1. SWOT Analysis related to the Implementation of Integrated Farming System**

<b>STRENGTHS:</b>	<b>WEAKNESS:</b>
<ul style="list-style-type: none"> <li>a. IFS is an important component of sustainability programs (Mucharam et al., 2022)</li> <li>b. By utilizing organic matter, IFS helps farmers in maintaining soil fertility.</li> <li>c. IFS helps in material efficiency by prioritizing environmental aspects.</li> <li>d. IFS has an impact on agriculture in the long term (Ariawan, 2023)</li> </ul>	<ul style="list-style-type: none"> <li>a. Plant growth using organic fertilizers is relatively longer than using inorganic fertilizers (Pratiwi &amp; Setiawan, 2020)</li> <li>b. There are possible models integrated farming system that are not developed in accordance with the ecosystem (Laode Muh Munadi, 2019)</li> </ul>
<b>OPPORTUNITIES:</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>a. The cattle sector is the first leading commodity in Tambrauw Regency (Sogen &amp; Harling, 2013)</li> <li>b. Many people use agricultural land to cultivate corn with the number of agricultural business managers as many as 2,758 or 14.68 percent (Sensus Pertanian, 2023)</li> <li>c. There is one agricultural company that is already a legal entity (Sensus Pertanian, 2023)</li> <li>d. The Tambrauw Regency Government has developed corn commodity agriculture with an area of 4,155 hectares (Banafanu, 2024)</li> <li>e. The Governor of West Papua and the Faculty of Agriculture of the University of Papua have collaborated on a plan to establish agricultural land with an integrated agricultural system in West Papua (Frans, 2023)</li> <li>f. The Representative Office of Bank Indonesia West Papua and the Cassowary Military Command/XVIII, and the West Papua Regional Police carried out training on organic farming field practices based on integrated farming system (Redaksi, 2020)</li> <li>g. There is a commitment from the West Papua government to continue to make efforts in advancing and developing the world of agriculture (Pemerintah Provinsi Papua Barat, 2023)</li> </ul>	<ul style="list-style-type: none"> <li>a. There is still a lack of post-harvest processing practices in Tambrauw Regency</li> <li>b. Lack of agricultural innovation carried out in Tambrauw Regency</li> <li>c. Inadequate transportation and electricity infrastructure</li> <li>d. There is no continuous assistance to manage and process agricultural products (Sinaga, 2022)</li> </ul>

SWOT analysis helps in interpreting or visualizing the obstacles and challenges of IFS implementation in Tambrauw Regency.

## Opportunities for the Implementation of Integrated Farming System in Tambrauw Regency

The findings of the literature review made it clear that the recommendations for solutions offered in overcoming problems in Tambrauw Regency are based on a considerable opportunity from the implementation of the integrated farming system (IFS). As the opinion (Suryana, 2016), IFS is one of the media that has a huge opportunity for the development of farming. The integrated system makes the IFS program a bright opportunity in the future because the positive impact will be felt much longer (Haryono, 2012). Apart from this, currently the demand for organic products is increasing due to increasing public awareness of environmentally friendly (organic) products (Indreswari et al., 2021). The high demand gives the potential for the surrounding community to create products that are valuable and have high marketability.

When viewed from the SWOT analysis that has been described in the previous section, the Tambrauw Regency area is considered to be a conservation area. (Kahar et al., 2019) said that Tambrauw Regency is known as a conservation area because of its strategic location. The conservation area consists of nature parks, nature reserves and wildlife sanctuaries. This designation provides an opportunity for Tambrauw Regency to become an IFS conservation area. Tambrauw Regency as a conservation area has full support from the government as a representation of the government's concern for the community (Robiansyah, 2018). This provides a considerable opportunity for the success of IFS. In addition, when looking at the main agricultural and livestock commodities, Tambrauw Regency has corn and cattle commodities as one of the main commodities with a fairly high production value (Kementerian Pekerjaan Umum dan Perumahan Rakyat, 2023; Sogen & Harling, 2013). In terms of human resources, Tambrauw Regency has quite good opportunities where almost most of the people make a living as farmers, where the number of farmers who cultivate corn is in the second highest position (Sensus Pertanian, 2023). The data shows that corn is still one of the leading commodities, through this local potential, it can be clearly seen the opportunity for IFS success in Tambrauw Regency. However, the implementation of IFS requires a fairly large conservation area of about 20 hectares (Kominfo Kota Pariaman, 2021). In the Tambrauw Regency area, it has a total area of approximately 11,529,182 km<sup>2</sup>. The visualization of the Tambrauw Regency area can be seen in the following figure.



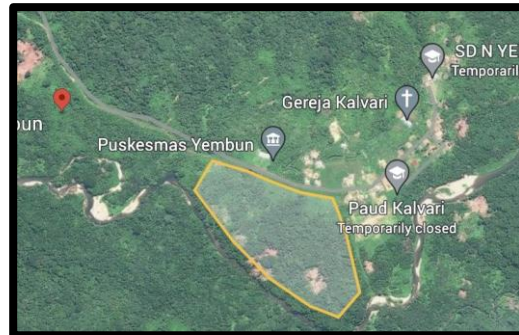
**Figure 2. Tambrauw Regency**

Source: Google Earth, 2024

To see the potential or opportunity for the success of IFS conservation, in the early stages of IFS implementation, it will be focused on Yembun District, Tambrauw Regency. The conservation



of this program is modified in such a way by considering several criteria such as land, proximity to settlements and water flows. This conservation will be in the middle between Yembun Agricultural Vocational School and residential areas. This is so that students can take advantage of IFS conservation as a learning process, as well as ease of access for residents to make the implementation of IFS considered successful. The Regional Secretary of Tambahau explained, there is a discourse to make Yembun District a barn for food security by facilitating the provision of farmer groups (Allo, 2023). To simplify the implementation picture, the following is a picture of the conservation location that is considered possible to be used based on the requirements of IFS implementation.



**Figure 3. Examples of IFS Conservation Areas**

Source: Google Earth, 2024

The land description indicates that Yembun District can be one of the areas used for the implementation of IFS with a total land area of 10.53 hectares. If IFS in one region is successfully implemented, it is hoped that it can be an example for other regions to implement similar programs. The support and role of various parties can certainly have a significant impact on the success of IFS. By using a holistic approach, each stakeholder will be considered and analyzed what are the duties and responsibilities as well as the benefits of IFS implementation. The goal is for stakeholders to better understand what can be gained from its implementation. So that various parties will feel the benefits. This stakeholder analysis will be framed through hexa-helix by explaining 6 important roles as shown in the following table.

**Table 2. Analysis Stakeholders**

	<b>Role</b>	<b>Benefit</b>
Government	Accommodating farmer groups and communities to develop processed products	Equitable distribution of people's well-being
Medium Mass	Assist in the publication of information	Obtain good exposure and feedback
Rules and Policies	Providing permits to the community in running business operations	Creating a good image for the community
Education	Assist in providing training and community empowerment	Producing newness in science and technology, especially related to IFS
Industrial	Providing IFS supporting facilities and services	Provides a potential for higher profit margins
Community	Actively participate in IFS programs	The quality of farmers' human resources has increased, the added value of farming has encouraged product diversification

Analysis stakeholders Using Hexa-Helix provides innovation and a new picture to involve many parties in initiating a program or idea (Zakaria et al., 2022). So it is hoped that there will be synergy from each party to create the success of IFS.

### **The Relationship of the Integrated Farming System to the Problem**

The integrated farming system (IFS) model offered is based on a holistic approach, in which in its implementation all components will be considered. This approach has been seen in the early stages of the IFS process, in which the existing inputs are quality organic materials. This process has reflected that there is good utilization in minimizing the impact of environmental damage. Until the final stage (output) of the recommended IFS program not only pays attention to the environment but there is a human aspect in it and can be seen through the procurement of training or workshops and empowerment. This means that every process of activities carried out will generate income for the surrounding community. Through this, the problem of poverty and low community welfare and other problems behind it will gradually improve. As mentioned earlier, this IFS can answer 5 out of 17 targets in the 2030 SDGs.

### **Conclusion**

The conclusion of this literature review shows that the integrated farming system (IFS) is an environmentally friendly program that plays an important role in achieving the 2030 SDGs targets, including the elimination of poverty, hunger, and increasing responsible consumption and production. While IFS offers sustainable solutions and long-term benefits by protecting the environment and reducing waste, challenges such as lack of innovation and resistance to organic fertilizers must be addressed. Further research is expected to overcome current limitations, such as time period and distance, as well as provide deeper insights through more varied methods. The implementation of IFS can support government policies in poverty alleviation and effective utilization of local potential.

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