



The Evaluation of Implementation of Integrated Farming System Program and the Reality of Increasing Farmers Income in Bali



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Abstract

The integrated farming system was an agricultural system that integrates the various agriculture components in a whole unified. It had a positive impact and meets the criteria for the development of sustainable agricultural by optimizing the use of local resources. The one indicator of the success of the integrated farming development shown by the farmer's income was increasing. In developing, the program of an integrated farming system in Bali was targeted in 3-4 years for getting a double income. On the one hand, there were much research shows that the implementation of an integrated farming system in Bali has increased the farmer's income. On the other hand, the job vacancy was created for family farmers. Although, the implementation of the integrated agriculture system had not been optimal. Wherein, the farmers get a benefit in selling their organic fertilizers that were used to reduce the use of chemical fertilizers.

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1. Introduction

Integrated Farming Systems (IFS) is defined as an agricultural system that integrates all the farming activities unlike animal husbandry conventional, aquaculture, horticulture, agro-industries, and sewage treatment are in one integration. Integrated farming is a very identity of agriculture with safe green for environmental. Wherein, the agricultural waste is processed into a resource that helps in improving a fertile soil, weeds controlling, pests, and the effort in improving the efficiency water. [Walia and Navdeep \(2013\)](#), [Nurhidayati et al., \(2008\)](#) argued that *Simantri* (IFS program) could be a solution for all issues in agriculture, not only in terms of economic and ecological section but also provide the necessary production facilities unlike fuel, fertilizer, and food, in addition to increasing productivity. [Nurcholish and Supangkat \(2011\)](#) argued that IFS can improve the ability of farmers in producing

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organic fertilizer and can cultivate organic farming. In the end, the resources utilization in agriculture, including fullest waste will provide high value for farmers.

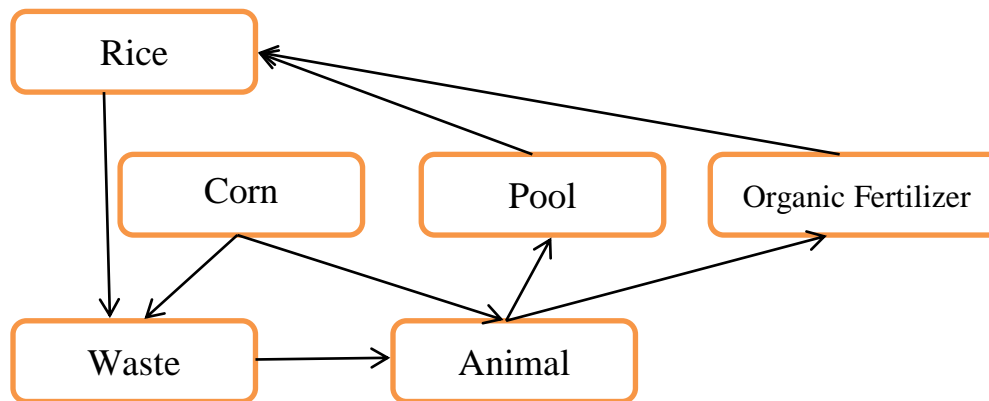


Figure 1. The model of IFS in wetland
(Nurcholis & Supangkat, 2011).

2. Materials and Methods

The IFS model is seen in the farm biological cycle without any waste, due to all the materials become a resource that can be utilized. The implementation of the integrated farming concept will produce 4F (*Food, Feed, Fuel, and Fertilizer*), which essentially is a step in maintaining the resilience and food and energy availability regionally and nationally. The *food* is for human needs and others product e.g. (rice, soy, corn, etc.) livestock e.g. (meat, eggs, etc.), the aquaculture product e.g. (catfish, tilapia, etc.) and plantations product e.g. (bananas, soursop, etc.). The *feed* that is consumed by the animals. The agricultural waste in the hay form can be used as feed for cattle, goats, buffalo etc. The rice straw can be processed into *hay* (dry feed materials) for ruminants. The *fuel* is in the biogas energy that produced by manure waste processing. The biogas availability would be an energy source for farmers the energy needs for cooking or even support the small industries development in village areas. The *fertilizer* is in the fertilizer material that can be produced by waste manure processing and hay waste (Department of Bali Prov. Agriculture, 2015).

Since 2009, the Bali Provincial Government adopted the IFS program that hopes to improve the farmer's income in Bali. In 2015, there were 547 *Gapoktan* (farmer group) implemented IFS in Bali. *Gapoktanis* spread to eight regencies and one city in Bali. There are various studies related to the IFS program implementation conducted by academics. Including the research related to its impact based on the farmer's income. This article explores more whether IFS was correct in its implementation for farmer income and what is an advantage profit for individual or group. These will be discussed in the next section 3.

3. Results and Discussions

3.1 Integrated Farming System development in Bali

The IFS program that developed in Bali comes from program development of *prima tani* (agricultural prima) for a long time ago in Bali. According to Kariada (2014), the *prima tani* program has been implemented in Desa Kerta (village), Kecamatan Payangan Gianyar (district) from 2007 to 2009 by BPTP Bali. Kecamatan Payangan was chosen due to *agropolitan* area that was developed by Gianyar government and become an agricultural center with mixed crops integrated to cattle in Bali. On the one hand, the *prima tani* activities succeed if the farmers are more independent and more efficient in conducting farming activities. The farmers are also aware of the importance of the product quality that produced. On the other hand, the farmers are aware of the importance of the sustainable business

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of the environment. It can also be seen from economic institutions in their village. In addition, the farmers are able to formulate the marketing strategies independently.

The Bali provincial government officially adopted *prima tani* model after MOU with the Agricultural Research Agency. The MOU was signed on October 28, 2009, i.e. No: 075/12/KB/B. PEM/2009 and No: 680/HM.240/I.10/09. Unlike the MOU forwarded then developed a sustainable model of farming integrated next the government of Bali did MOU with the City Government to increase and support agricultural development, therefore, the Simantri IIFS) can work synergistically. The IFS is stated a succeed can be seen by their productivity, their job vacancy through the diversification development and development of the economic is to increase that lead farmers' income in the village. In the early, the IFS program was developed at 10 locations that financed by the budget changes in 2009. The sample project itself was developed with funding approximately IDR. 200 million namely *bansos* (social donatioan) to each location (1 *gapoktan*). The funding is allocated for buying female cattle (20 cattle), colony place, composting production place, bio urine installation, and the feed house (feed preservation warehouses). The available funds are also used for the procurement of seeds/seed crops, plantations and in some locations that have the potential of fisheries; the funds are also used for the pool building and purchase the fish seed (BPTP Bali, 2011).

Based on the previous study show that Simantri has provided a good prospect for future toward food self-sufficiency, feed, organic fertilizer, the availability of energy and farmer's well-being. The Simantri also gives hope to the agricultural development process in village areas, although it is still needed an improvement. Moreover, Simantri has become a strategic commitment to agricultural development policy in Bali province. On the one hand, the Simantri program is implemented as an effort to improve the farmer's welfare and societies in the village. There are some animal waste recycling into organic fertilizer, organic pesticides, as well as biogas and bio urine provide a positive value for farmers need organic fertilizer. On the other hand, it also provides a better income financially. The best point that Simantri program is able to encourage the farmer's independence a need for food, fertilizers, and organic pesticides as farming production inputs as well as the availability of energy (biogas) which can be used in a household though still on a limited scale (Anugrah *et al.*, 2014).

It was noted at the end of 2015, the Simantri groups in Bali reached 547 units Simantri. In Simantri development unit, the Bali Provincial Government provides IDR. 225,000,000/group. The funds are provided after the farmer group suggested a proposal. If their criteria meet requirements, therefore, they are validly established as Simantri group. The criteria have agricultural potential and have an official farming group. In addition, it has a land about 7 acres for the physical construction (Department of Bali Prov. Agriculture, 2015).

In assessing the success of IFS program, the Bali provincial government set a few indicators. The indicator itself is targeted to achieve 3-4 years shortly. The indicators are becoming the parameters of success to IFS program, i.e. (1) the development of institutional and human resources both agriculture officers and farmers, (2) the employment is created through the desertification development of farming and household industry, (3) the intensification and extension of farming developed, (4) the incentives for production increased and the farming efficiency (fertilizers, feed, biogas, bio urine, biopesticides self-production), (5) is created and the development of organic farming, (6) the development of economic institutions at village activities, and (7) the farmers income increasing (min. 2 fold) (Department of Bali Prov. Agriculture, 2015).

3.2 The Effectiveness of Integrated Farming System in Bali

A farmer is a person whose farming (growing plants) with intention the plants can multiply more and earns an income, the plant is aimed to supply a food for their life that can be consumed by humans and their pet. The income that is produced by farming is not enough their needs, and the cost of farming is expensive. It impacts the farmers overwhelmed by their rice fields and trapped in poverty. The government's policy has not been able to solve the poverty problem, especially, for farmers due to government concern is a less to them for increasing crop production (Salim & Kahono, 2013).

Regarding some studies, IFS is judged to have the effectiveness and impact on increasing farmer's income. Wibawa and Yasa (2013), respecting their research related to the implementation IFS program in Desa Kelating, Kecamatan Kerambitan, Kabupaten Tabanan concluded that IFS is a very effective seen by farmer's income and the employment for farm households. Based on the analysis results showed that the effectiveness of IFS was 98.94 percent. The IFS program has a positive impact and a sign on an employment in research location was observed from time working before the program conducted average was 5.222 hours and after the program was 9.827 hours per day.

Arnawa *et al.*, (2015), in his research concern on the effectivity of the program development to IFS in Bangli regency, Bali stated that its effectiveness Simantri was effective enough, the average achievement score was 48.00, or 80.00% of the maximum score achievement. In term of this means the Simantri program implementation has been not applied optimally by farmers. The factors of farmer characteristics that related real on the IFS development based on age, family number, and farmers education level.

Astuti (2013), in her research related to the effectiveness of implementing IFS program towards two Gapoktan in Tegalalang-Gianyar, Bali that stated if reviewing on the effectiveness of *sapta usaha ternak* (seven of livestock effort) and *sapta usaha tani* (seven of farming effort) stated that the IFS implementation was categorized a quite effective and the effective levels institutions as well. If reviewing on the farmer's income was increasing to IDR. 7.322.000/year for Gapoktan Ternak Satya Kencana and Tegal Sari increase about IDR. 2.140.000./year. It is to show that the Simantri program provides substantial benefits to increase the farmer's income and their families.

The IFS implementation in Bali, cattle breeding effort, and crops are very high. Whereas, the implementation of waste cattle processing effort based respondents on averaged is moderate. It is reviewed to the human resources quality was proved positively and significant affect, however, it has not been effective towards the effort of cattle breeding, the food crops, and cattle waste processing. On respondents averagely is classified as less effective applied for Simantri program. The implementation of cattle waste processing effort proved by the most dominant variable influence on the IFS implementation effectively. The effectivity of Simantri implementation is proved to be positively and significantly in increasing the breeders and farmers income (Sanjaya, 2013).

3.3 The Integrated Farming System and Farmers Income

On the IFS development (Simantri) by the Bali Local Government, the cattle waste recycling is introduced to become new innovations. The waste recently is forwarded cattle effort has not been managed well. If the waste cattle is managed well, it can be utilized as a source of organic fertilizer. The identification results at colonies place to Kelompok Ternak Munduk Lingker Nadi, Desa Sumberkima, Kecamatan Gerokgak, Bali showed that the potential of waste economic produced by a Bali cow is IDR. 4.335 with compost value is IDR 1.365 and bio urine IDR. 2.970 / day (Adijaya and Yasa, 2013). Ardana, *et al.*, (2013), stated that from waste livestock can develop into a biogas potential, it happens in Desa Tunjuk, Tabanan. The potential of biogas in there to be developed with the potential livestock sector available is 40.644 m³ /year. The potential of the IFS program with 2 *denplot* (sample organic only) units produced 10 m³ / day. Economically, it has been able to increase the organization income IDR. 97.600 / day.

Sunada *et al.*, (2014), in his research entitled "Pola Interaksi Ternak dan Tanaman Pada Simantri 116 Desa Katung, Kecamatan Kintamani, Kabupaten Bangli" concluded that the integration pattern in Simantri 116 i.e. between horticultural crops (oranges, banana, cabbage) and Bali cattle have provided benefits to *usaha tani*, therefore, [1] the job vacancy is created through the *usaha ternak* development and horticultural. [2] The *usaha tani* incentives increased through a good production and *usaha tani* efficiency (fertilizers, feed, biogas, bio urine, biopesticides produced). [3] It is created and organic farming development (green economic). [4] The development of the economic institutions in the village. [5] Increasing of farmers income. The most farmers income in Simantri 116 i.e. citrus crops reaches to IDR. 64.955.152. The IFS between horticultural crops with cattle that was applied at Simantri 116 in Desa Katung, Kintamani, Bangli regency obtained revenue was IDR. 75.347.192 / year.

Sukanteri *et al.*, (2013), stated that the IFS pattern in agriculture is able to increase the farmer's income. It was concluded obtained from the IFS pattern research in Gapoktan Ananta Winangun, Desa Penarukan, Kecamatan Kerambitan, Kabupaten Tabanan. The real farmer's income is obtained by *usaha tani* included rice, corn, and cattle IDR. 332.026.141.55. Under optimal conditions, the farmers obtained a maximum income was IDR. 335.562.600 /year. The real difference incomes with optimal revenue were IDR. 3,536,458.45 or 1.07% which farmers spend as salary for workers.

According to Dananjaya *et al.*, (2014), the entrepreneurial spirit is a very significant positive effect on the success of Gapoktan in implementing the IFS. The entrepreneurial spirit is also a very significant positive effect on agribusiness management program of Gapoktan in implementing the IFS. Wherein, the agribusiness management is a very significant positive effect on the success of Gapoktan in implementing the IFS concepts.

3.4 The Development Challenge of Integrated Farming System

The IFS development can be said to be slow and not meet the IFS standards yet. The farmers, in fact, applied the IFS that are still partially or linear, i.e. the management of each system component is still separated or independent, e.g. cattle only or crops only or fish only. Some issues still become distortions IFS, therefore, can not develop optimally and widespread in farming societies. Those are included; (1) The IFS is not completely understood by various parties (farmers and facilitators). (2) The productivity level and SPT has been not convincing the farmers generally. (3) The IFS model that was developed not in accordance with the ecosystem environment. (4) The vertical and horizontal integration are not based on local potential; (5) The integrator existence in IFS have not been concerned. (6) There are no comprehensive and integrative studies those IFS. (7) The agricultural development policy does not support the IFS development clearly (Nurcholis and Supangkat, 2011).

4. Conclusion

The IFS implementation becomes a commitment and strategic policy in efforting to build organic farming in Bali. The IFS development also became a breakthrough in efforting to forward sustainable agriculture in Bali. Moreover, the IFS is implemented as an effort in the processing of poverty alleviation, unemployment reduction level, and improving the farmer's welfare and societies in the village.

The IFS research results can be used as a reference in developing Simantri program. These achievements can also be used as guidelines in formulating agricultural policy in Bali. The achievement in increasing farmer's income can also be used as a strategic plan to solve the family poverty farmers issue. The achievements in generating employment for family farmers through IFS also needed to be developed to cope with unemployment being.

The evaluation needs to be conducted, therefore, the IFS concept is running optimally. Moreover, the targets achievement shortly is to realize increased incomes up to 2-fold in 3-4 years after the farmers adhered Simantri program. If the IFS concept is optimally implemented by the farmer, the final result of organic farming and sustainable agriculture in Bali will be realized.

Conflict of interest statement and funding sources

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Statement of authorship

The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

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