

Financial Technology for Supporting Sustainable Agriculture

Muhamad Robbi Qawi, Mahawan Karuniasa

Abstract: *Financial market plays an important role in overcoming agriculture crisis. The fact shows that there are many agricultural practice stops because of capital problem. Therefore, it is important to investigate the innovation of agriculture capital service such as Financial Technology for supporting sustainable agriculture. This research was a case study on Financial Technology service in the agricultural sector conducted by startup iGrow, then the data were analyzed descriptively and explorative. The support of information and technology places iGrow as the sponsor bridge who has the fund, the land, and the operator in charge for the production activity and ensure the market certainty. Until the farmer who does not have land and does not have capital, they can conduct the farming practice. The system of indent commerce being developed makes the farmer easy to access the capital, the existence of the sale certainty, and agri-business management that gives profits to involved parties, make the agriculture practice supported by Financial Technology keep developing. The role of information technology, the collaboration with other parties, and indent capital, standby buyer, will support the sustainable agriculture practice in Indonesia.*

Keywords: *Agriculture, agriculture finance, financial technology, sustainability*

I. INTRODUCTION

The role played by the economy and financial markets (credit) is important for achieving sustainable development. This was confirmed by Manelli [1] to reject the opinion that "agricultural crisis" is mainly based on agricultural and environmental problems. The fact, in the agricultural sector, there are many farmers who stop working due to capital problems [2]. This capital problem becomes one of the fundamental factors which contributes for the less optimal agricultural products and productivity [3]. Some efforts made by farmers to overcome the capital problems are through capital loans in cooperatives, banks, credit unions (CU), and others who are considered to be more capable [4]. The main reason farmers make loans to start their farming business is due to the lack of personal capital, high living costs, and agriculture is the main source for living [5].

Along with the development of technology and internet, it has changed the financial market landscape in recent years [6]. There has been a combination of financial services and

information technology to provide financial solutions, this is known as Financial Technology (Fintech) [7]. Furthermore, Financial Technology can be an alternative capital for agricultural sector.

Inclusive digital economy can be realized to increase community empowerment in facing capital problems. There is a financial technology application in the agricultural sector developed by Agropay, which helps farmers starting from capital to the supply of agricultural raw materials [8]. Therefore, the financial technology service which is developed by Alibaba Group, links fintech services to the marketplace so farmers can directly sell their agricultural products to consumers [9]. Indonesia can utilize financial technology as an agricultural capital service, but the implementation of technology use in the agricultural sector has problems on infrastructure availability and low human resources [10]

The researcher pays attention to one of the providers of Financial Technology service, iGrow which is engaged in the agricultural sector. iGrow existence has become a champion at the Southeast Asia Start Up World Cup competition 2017. Inspired by the achievements of iGrow, this study aims to investigate how the technology-based financial services developed by iGrow can support sustainable agriculture. To answer the research objectives, the researcher makes several research questions, (1) How does iGrow as a Fintech provider provide agricultural capital solutions?; and (2) How is iGrow performance in supporting sustainable agriculture?

II. METHOD

This research was a deep case study towards Financial Technology service on agricultural sector which had been conducted by iGrow startup. Choosing iGrow as research object was due to some reasons of iGrow, which were: iGrow were listed on the financial service authority as the provider of technology-based financial loans services, iGrow had been operating more than 5 years (since 2014), iGrow was an Indonesia startup which managed to win some startup competitions.

The data collection technique used in depth interview to the key informant, by using in depth interview guide. The data could be obtained from the publication issued by iGrow in books and journals also article which used English concerning fintech and its role in the agricultural sector. Then, from the primary and secondary data, it would be classified based on research objective. The analysis used in this research was explorative descriptive.

Revised Manuscript Received on January 5, 2020.

* Correspondence Author

M. Robbi Qawi, School of Environmental Science, University of Indonesia, Jakarta, Indonesia. E-mail: qawirimawan@gmail.com

Mahawan Karuniasa*, School of Environmental Science, University of Indonesia, Jakarta, Indonesia. E-mail: mahawancac@yahoo.com

III. RESULT AND DISCUSSION

A. Capital Agriculture Model

iGrow is founded in 2014, since the beginning, specialize as startup in agricultural sector. Platform iGrow is an application-based platform (stage) which meet some parties to the agricultural sector, which are: land owners, sponsors, and farmers. Farmers, sponsors, and land owners, are identified by Anshari *et al.* [8], as the *first line processors* of agricultural business chains.

iGrow operationalization in its early foundation is flowing from upstream to downstream. The business involves to 3 stages of agricultural cycles as stated by Deloitte [11], which are: stage of Pre-cultivation, Crop Cultivation and Post-harvest. In the first stage, iGrow looks for funding for agricultural production activities, then, on the stage of production iGrow involves to assure good agriculture management in order to get maximize result for quality and quantity, and on the last stage, iGrow assures the marketing of agricultural production result.

Since Financial Service Authority founded regulation concerning Technology-Based Money Loans Service founded in 2016, the scope of iGrow startup role is limited only to financial services for capital agriculture. As a form of compliance with regulations, the iGrow business model has changed into an institution that collects funds from investors to fund the agricultural commodity production. Furthermore iGrow cooperates with other parties, which referred as operators. Operators are those who are responsible for planting, maintaining and harvesting activities and also know *how to sell* to assure market certainty. There are several models of iGrow cooperation in funding the agricultural commodity production, which are those who responsible for planting activities, crop maintenance, harvesting, and ensuring market certainty.

1. Capital with Company Operator

There are several companies which has cooperated with iGrow in order to develop its business scale, which are: CV. Mitra Garuda, PT Kreasi Agro Terpadu, PT Ramsol, PT Eterische Olie International, PT Cinquer Agro Nusantara, PT Kreasi Agro Terpadu, PT Nudira Sumberdaya Indonesia. These companies act as iGrow operator. There are 2 models of capital with companies operator.

1.1. Model 1: Company operator as well as land owner

This model is arranged based on capital agriculture practice which has been conducted by iGrow towards Ramsol company in crystal salt company sector. The capital is given to the operator as well as the land owner (figure 1). iGrow involves in the agreement with 2 parties, which are operators and buyers. Basically, the cooperation scheme with PT.Ramsol is purchasing productive salt plots. However, iGrow only cooperates to funds the production process, not transfer the land status of ownership rights.

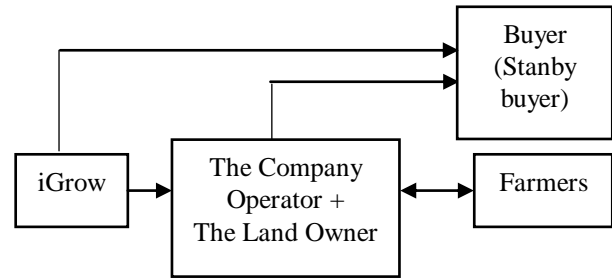


Figure 1. Capital for companies that also land owner

1.2. Model 2: Company operator with rent land

This model was developed based on the iGrow funding practice on Peanut cultivation conducted by CV.Garuda partners in Buleleng, Bali. There are land rent variables as fixed costs in peanut production (figure 2). Operator of CV. Mitra Garuda does not own land, but are responsible in organizing farmers from planting to harvesting. In this model, iGrow is involved in the agreement with 3 parties, they are the operators, the land owners, and the buyer.

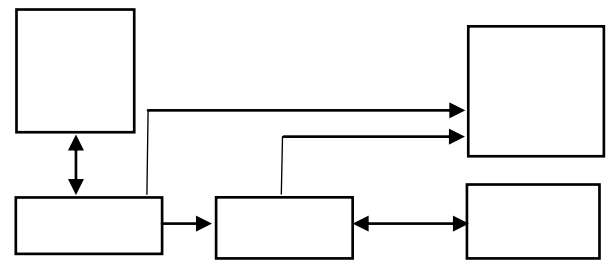


Figure 2. Capital for companies with rent land system

2. Capital with Individual Operator

2.1. Model 3: Individual Operator

Funding of capital agriculture from iGrow is provided for individuals, as provided to Rifo Romelio to develop forage planting of animal feed, which are sorghum and/or corn (figure 3). Rifo Romelio is responsible for organizing farmers from planting to selling the harvest. This model is similar with model 2; The difference is in the category of operators, which are individual operators. The managed land belongs to PT. Perhutani.

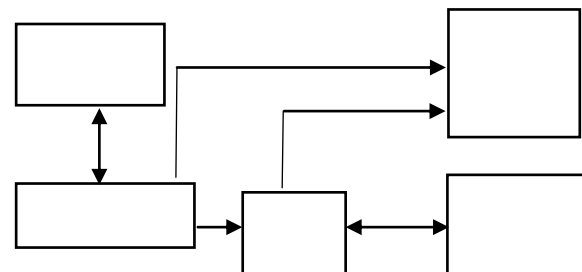


Figure 3. Capital agriculture for individual

3. Capital with Farmer Group Operator

3.1. Model 4: Operator is the farmer group

This model is arranged based on iGrow capital practice on agriculture/fishery to the Inti Nusa livestock group in NTB who developed laying hens and tilapia fish farming groups called Sumber Berkah



(figure 4).

Capital support is intended to increase production. The status of fish ponds for cultivation is the property of each farmer, so iGrow only cooperates with 2 parties, they are the farmer group and the buyer.

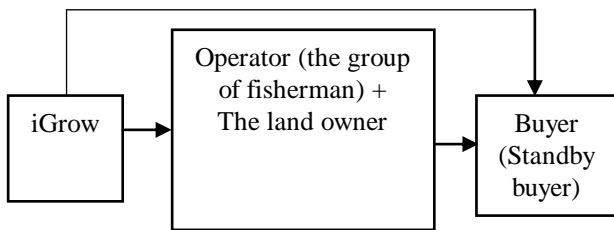


Figure 4. Capital for farmer group

B. Performance Supports Sustainable Agriculture

iGrow as a financial technology institution in agriculture has succeeded in developing agribusiness with a partnership system. This partnership is a platform that meeting the farmers, sponsors, and landowners. The partnership developed by iGrow is a new agricultural model, utilizing internet technology. The stage created is where the stakeholders meet is the virtual stage. The investor has never met the land owner and the farmer, nor has a landowner met

the investor and the farmer. In practice, iGrow is a bridge for sponsors as those who lend funds with operators responsible for agricultural production to marketing activities.

According to the financing model and partnership scheme developed by iGrow, it shows that iGrow is involved in the entire agricultural production process, starting from the pre-production stage to the marketing stage. Related to the performance of iGrow in supporting sustainable agriculture will be described based on the pillars of sustainable agriculture which are the sustainability of human social life, economic sustainability, and ecological sustainability.

1. Human Social Life Sustainability

There were already around 8000 farmers who has partnered with iGrow and the numbers are continuing to increase over time. For example, we present several agricultural commodity projects that have the support of iGrow. Corn seeding with the operator Agrindo Karya Persada, empowering 400 farmers in several cities in Indonesia (Table 1). Most of the national corn seed production still comes from global producers, that is a lot in the market. Therefore, corn seed production is in line with the corn self-sufficiency program/food sovereignty program launched by the government.

Table 1. The Number of Farmers with Agrindo Karya Persada Operators

No.	Commodity	Location	The number of managed farmers
1	Corn Seeding Batch 1	Malang	100
2	Corn Seeding Batch 2	Blitar	100
3	Corn Seeding Batch 3	Trenggalek	100
4	Corn Seeding Batch 4	Tulungagung	100

Table 2. The Number of Farmers with CV. Mitra Garuda Operators

No.	Commodity	Location	The Number of Managed Farmers
1	Peanuts	Buleleng, Bali	1000
2	Bali Cow	Buleleng, Bali	1000
3	Super Grain	Buleleng, Bali	1000

CV. Mitra Garuda who are operators located in Bali, developed several agricultural and livestock commodities, with a number of farmers managed by 1000 people per point (table 2). Funding from iGrow is intended to enlarge the business scale that has been run by CV. Mitra Garuda. The example is the peanut commodity, which is originally planted on an area of 45 hectares, developed to 120 hectares and subsequently developed to 200 hectares.

In addition to describe the farmer involvement, the 2 tables above also show that there is cultivation of plants and animals to support the realization of food sovereignty/independence. Not all of the above commodities are the starting initiation of iGrow, but iGrow also helps increasing production capacity with capital support. So that iGrow supports the creation of employment, and increases the production of agricultural products/food.

2. Economic Sustainability

The iGrow startup developed a sharing system (economic sharing) among stakeholders which are involved in agribusiness partnerships. The profit sharing amount has

been agreed upon in the beginning agreement of cooperation, which are with a percentage of 40-50% for service users/investors, 30-40% for partners in the gardening/farmer management, and 10-20% for iGrow. Whereas landowners will get land rental fees. Sharing economy is a socio-digital experiment, to counter the current unsustainable economic paradigm and be a transition towards sustainability [12]-[13].

There are several main factors, which make this business profitable, so it can realize economic sustainability, they are: First, there is a certainty of the buyer (standby buyer); Buyers are not retail but companies/ markets. Second, the system of buying and selling indents between operators and farmers. Farmers are given a number of capital to produce goods, with a certain amount, certain criteria, and a certain time; The agreement is made by both parties. Third, efficient and scalable business. The minimum area of land that is cooperated with iGrow is 10 Ha, so this will reduce production costs; At the sales

stage, a lot of production can become the bargaining position to get better prices.

3. Ecological Sustainability

As the development of Agroforestry, the collaboration between iGrow and PT. Perhutani, the empty land under Perhutani hardwood stands, planted with sorghum plants which are designated as fodder forage. The iGrow principle is to use abandoned land, because not every person/ party who has land has the ability to cultivate it and also has the availability of funds for developing it.

The effort to achieve ecological sustainability were also demonstrated by iGrow by developing national corn seeds. Funding for the corn hatchery project has entered stage 6, with planting locations spread across various regions of Indonesia (table 1). The national seeds developed are corn seeds from the research and development result of Serealia-Maros Research Institute. Most of the seeds developed by the community are from great global seed such as Bisi, Syngenta, Pioneer. The seeding problem which is the production input/ the agriculture upstream must be fixed in order to achieve sustainable agriculture.

IV. CONCLUSION

This research concludes that financial technology has big roles in encouraging the achievement of sustainable agriculture. The usage of technology has eased many parties to get involved in the improvement of agricultural production and creating the job opportunities for farmers. The system of indent commerce makes the farmers obtaining fixed income and not getting dizzy anymore by the activity of selling the production result because there are stand by buyers. The use of horizontal land or vertical land for the agricultural activity/vegetation plantation will impact positively towards the environment (ecology). The success of iGrow in managing profitable agriculture business involves the participation of farmers and keep the environment and gives hope that food self-sufficiency can be achieved.

ACKNOWLEDGMENT

This work is supported by *Hibah Publikasi Internasional Terindeks untuk Tugas Akhir Mahasiswa* (PITTA) 2019 funded by the Directorate of Research and Community Engagement, University of Indonesia No. NKB-1028/UN2.R3.1/HKP.05.00/2019

REFERENCES

1. Manelli, A. (2016). New paradigms for a sustainable well-being. *Agriculture and Agricultural Science Procedia*, 8, 617–627. <https://doi.org/10.1016/j.aaspro.2016.02.084>
2. Susilowati, S. H. (2016). The phenomenon of aging of farmers and the reduction of young workers and their implications for agricultural development policies. *Forum Penelitian Agro Ekonomi*, 34(1), 35–55. <https://doi.org/0216-4361>
3. Mulyaqin, T., & Haryani, D. (2013). Accessibility of lowland rice farmers to capital sources and the factors that influence them in Banten Province. *Bulletin Ikatan*, 3(2), 22–35. Retrieved from: <https://banten.litbang.pertanian.go.id/new/index.php/publikasi/buletin-ikatan/885-aksesibilitas-petani-padi-sawah-terhadap-sumber-permodalan-dan-faktor-faktor-yang-mempengaruhinya-di-provinsi-banten>
4. Mandry, S. V., Salmiah, I., & Sihombing, I. L. (2016). Analysis of capital capability of palawija farming (sweet potato, potato) and horticulture (cabbage, chili, orange) in rural areas (Case study: Parbuluan Village III, Parbuluan District, Dairi Regency). *Journal on Social Economics Agriculture and Agribusiness*, 5(11), 1–10.
5. Mulyaqin, T., Astuti, Y., & Haryani, D. (2016). Factors affecting rice farmers in the utilization of capital sources: Case study in Serang Regency, Banten Province. In *Respiratori Pertanian* (pp. 1234–1241).
6. Block, J. H., Colombo, M. G., Cumming, D. J., & Vismara, S. (2018). New players in entrepreneurial finance and why they are there. *Small Bus Econ*, 50, 239–250. <https://doi.org/10.1007/s11187-016-9826-6>.
7. Arner, D. W., Barberis, J., & Buckley, R. P. (2016). The evolution of FinTech: a new post-crisis paradigm? (Law Research Series No. 2016–62). *SSRN Electronic Journal*. Australia. <https://doi.org/10.2139/ssrn.2676553>.
8. Anshari, M., Almunawar, M. N., Masri, M., & Hamdan, M. (2019). Digital Marketplace and FinTech to support agriculture sustainability. *Energy Procedia*, 156(2018), 234–238. <https://doi.org/10.1016/j.egypro.2018.11.134>.
9. Zhou, Q., Chen, X., & Li, S. (2018). Innovative financial approach for agricultural sustainability: A case study of Alibaba. *Sustainability*, 10(891), 1–20. <https://doi.org/10.3390/su10030891>
10. Delima, R., Santoso, H. B., & Purwadi, J. (2016). Study of agricultural applications developed in several Asian and African countries. In *Seminar Nasional Aplikasi Teknologi Informasi (SNATi) 2016* (pp. 19–26). Yogyakarta.
11. Deloitte. (2012). *eTransform Africa: agriculture sector study sector assessment and opportunities for ICT*.
12. Martin, C. J. (2016). The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecological Economics*, 121, 149–159. <https://doi.org/10.1016/j.ecolecon.2015.11.027>
13. Ritter, M., & Schanz, H. (2019). The sharing economy: A comprehensive business model framework. *Journal of Cleaner Production*, 213, 320–331. <https://doi.org/10.1016/j.jclepro.2018.12.154>

AUTHORS PROFILE

M. Robbi Qawi, is postgraduate student in School of Environmental Science University of Indonesia. He is also working as an expert staff in Parliament of Indonesia. His main research area is agriculture especially in digital agriculture.



Mahawan Karuniasa, received his Doktor in School of Environmental Science University of Indonesia. He currently working as Lecturer in School of Environmental Science University of Indonesia. His main research area is environmental especially in climate change.

