



Social Innovation for Creating Local Food Source and Empowering Young Farmers Community-Supported Agriculture

Ibnu Budiman¹(✉) and Silviana Chandra²

¹ Wageningen University and Research, Wageningen, The Netherlands
Ibnu.budiman@wur.nl

² Faculty of Psychology, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

Abstract. The COVID-19 pandemic has revealed vulnerabilities in Indonesia's complex food systems that threaten food security (including vegetables) in Indonesia. These vulnerabilities are mainly seen in the value chain's logistics and long distribution process that got highly impacted by lockdown policy. As a result, there is an uneven surplus and shortage of products in areas over Indonesia. The consumers experienced limited food access. A longer value chain also results in higher carbon emissions that are exacerbating climate change. This study aims to find a more sustainable and resilient food system. Based on the literature review we found that urban areas in Indonesia can adopt a concept of a local food system that was designed to shorten the growing gap between producer and consumer called Community Supported Agriculture (CSA). CSA has a basic system where members pay a sum of money (subscription) upfront that supports the farm operation. We tested the CSA using participatory action research in three urban areas in Greater Jakarta. The communities adopted aquaponics and hydroponic cultivated in their areas, and the membership is open for the residents within the farm's region. The members become 'part' of farmer-producer cooperation based on a 'fair-income for the farmer' principle. We found the creation of a community farm creates a local food source and new job opportunities for young farmers.

Keywords: Food · Vegetables · Community-supported agriculture · Urban areas · Indonesia

1 Introduction

The COVID-19 pandemic has revealed vulnerabilities in Indonesia's complex food systems that threaten food security in Indonesia. These vulnerabilities are mainly seen in the value chain's logistics and long distribution process that got highly impacted by lockdown policy. As a result, there is an uneven surplus and shortage of products in areas over Indonesia. Farmers experienced decreased household income due to decreasing demand and a decrease in the selling price of farm produce. On the other end, the consumers in the urban area experienced limited food access [1]. A longer value chain also results in higher carbon emissions that would disrupt the natural agricultural ecosystem [2].

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A. G. Abdullah et al. (Eds.): SEAVEG 2021, ABSR 23, pp. 433–442, 2023.

https://doi.org/10.2991/978-94-6463-028-2_45



Fig. 1. Vulnerable food system.

To address this problem (Fig. 1), rather than shortening value chain and create local food system, the country instead create food estate program that utilize peatlands. This does not solve supply chain issues, and even will bring more environmental and climate problems due to GHGs emission from peatlands [3, 4].

Meanwhile, Indonesia is expected to lose all its farmers by 2063. Only 23% of the country’s 14.2 million people aged between 15 and 24 worked in the agriculture, forestry and fishery sectors in 2019. To address this problem, the government creates a program to develop young millennial farmers, but these people tend to contribute more in marketing level, instead of farm level [5].

To address the gap, the objective of this study was to find and test a sustainable and resilient food system that can be implemented in Indonesia’s urban areas; and, stimulates employment opportunities for young farmers.

2 Materials and Methods

2.1 Finding a Local Food System

This study was conducted using a literature review on farming models that has a shorter value chain and are suitable to be adapted to Indonesia’s ecological and social traits. Traditional literature review was done by using keyword of local/community food system in Google Scholar.

The result of the review or the selected model is then tested in community targets in Greater Jakarta, Indonesia.



Fig. 2. CSA.

2.2 Testing the Local Food System

Testing the selected model is a participatory action approach to action research emphasizing participation and action by members of communities affected by the study. It seeks to understand the situation by changing it collaboratively and following reflection [6]. Steps for the testing and its results are presented in the following section.

3 Results and Discussion

The initial review showed that these characteristics were mostly found in small-scale farming, which led to the concept of community farms. The Netherlands has a concept of a local food system or community garden that was designed to shorten the growing gap between producer and consumer called Community Supported Agriculture (CSA) farm *De Nieuwe Ronde* [7] (Fig. 2). *De Nieuwe Ronde* has a basic system where members pay a sum of money (subscription) upfront that supports the farm operation. The farm itself is cultivated in an area close to the community, and the membership is open for the residents within the farm's region. The members become 'part' of farmer-producer cooperation based on a 'fair-income for the farmer' principle.

Community-supported agriculture (CSA) seeks to create a direct relationship between farmers and those who eat their food—farm members or shareholders. The

perceptions and behavior of farm members vary in three different ways: their motivations for membership, the role of women in initiating and maintaining farm membership, and how the extent of membership participation relates to member perceptions about and commitment to their farms [8].

Urban areas in Indonesia have the capacity and opportunity to enhance their local food system with the growing demand for fresh healthy food, vacant lands that are yet to be optimized, and the lack of promising job opportunities in agriculture that leads to the shifting of agricultural graduates to work in another sector.

The following sections explain the steps to implement *De Nieuwe Ronde* in urban areas in Indonesia.

3.1 Community Partner and Area

First, we created a pool of communities in Jabodetabek or Greater Jakarta that are interested to have a community garden. We are using two approaches in gathering these potential communities: open registration and direct approach. The open registration is conducted virtually using social media and promotion in which any community member from the public can register their area for the prospect. The direct approach is done by the team to a closed network. From these approaches, we derived several applicants with most of them interested with aquaponics mixed with eco-tourism, education and social activities in their area.

The applicants proposed two types of management scheme; 1. Profit sharing with land owner (housing developer) and 2. Using community member land and membership plans that the community members can choose from. The membership plan has no risk for members as risk such as harvest failure will be covered by the land owner (Table 1).

Secondly, we screen the most suitable ones for the community pipeline based on desk study regarding institutional, financing, regulatory, community participation, and operational technical aspects. In this process, we also conduct several surveys, Focus Group Discussion sessions, and prospecting events in the attempt to gain social acceptance from the community members while also assessing their level of commitment and participation to sustain this project in the future.

The targeted community is chosen based on final considerations as follows:

- Located in Jabodetabek area;
- Has minimum 5–10 households per community that's committed to participating (be the first members);
- Willingness to co-fund the pilot project (we introduce the project in the subsidy-based model to the community)
- Has feasible (regulations, land technical feasibility) vacant space in which the owner/community agrees to be used as a public garden;
- Fits the time restriction between 1 October 2021 and 30 September 2022;
- Willing to continue running the garden after the project ends.

The co-funding is subsidy-based, where the community only has to pay for less than or equal to 50% of the total budget needed for garden cultivation. The final percentage is negotiated accordingly to match the community's capability.



Fig. 3. CSA in Indonesia.

No	Community Name	Location
1	Cluster Skandinavia	Telaga Golf Sawangan, Depok
2	Pemukiman Serpong BSD	Serpong, BSD (Belakang Al Azhar)
3	Lahan kosong Margo City	Belakang gramedia margonda / samping margo city, Depok
4	Empang ikan 2000m2	Desa Sukmajaya Kec. Tajurhalang, Bojong Gede, Bogor
	Saung yatim	Tajurhalang, Bojong Gede, Bogor
5	Vida Bekasi	Pedurenan, Bekasi

Fig. 4. Community applicants.

We finally chose to work with three communities in Depok, BSD, and Bekasi (Fig. 4). Communities in Depok and BSD propose aquaponics, while the community in Bekasi proposed using hydroponics (Fig. 3). This community collaborates with a vocational

Table 1. Membership plan

Types	Shared Payments/Fee	Crops Share
Traditional	800.000 (6 months) IDR	Allowed to self-harvest and self-determined fresh produce weekly using a designated container with predetermined volume according to the season's harvesting quality (productive season/failed harvest)
Subscription	1.200.000 IDR (6 months)	Members will receive their weekly fresh produce, determined and packed by the producers, with the agreed volume of share (e.g. 3 kg of vegetables/month, 5 kg of fish/3 months)
Flexible	6.000.000 IDR (full 25 weeks/one season) Rp 2.880.000 (12 weeks/half-season)	Members will receive their fresh produce, determined and packed by the producers, with the agreed volume of share on their chosen week within the season

high school in the area, where students will also use the aquaponics as a laboratory for their study. They propose a concept of action research.

3.2 Young Farmers

First, we create a pool of talents interested in working in the urban garden (hydroponic and aquaponics, adjusted with community preference in their applications). We are using two approaches in gathering these potential communities: open registration and direct approach. The open registration is conducted virtually using social media and promotion in which any agricultural graduates or young farmers with agricultural experience can apply. The team directly approaches several agricultural educational institutions' alumni network/students bureau (such as Institut Pertanian Bogor, Universitas Indonesia, and Universitas Mercu Buana) and agriculture vocational schools. From this approach, we derived five applicants, with most of them having expertise in hydroponic. We found three candidates for young farmers, all specializing in hydroponics. However, one of them was willing to join a venture with his farmer colleague working on aquaculture. Together they make an aquaponics to fit community requests.

Secondly, we pipeline the candidates from their documents. Then, candidates are interviewed together with the community manager as their user. The candidates' specific criteria are adjusted according to the community preferences with general criteria as follows:

- Based in Jabodetabek area or willing to relocate/commute to the community area;
- Has a degree/education in agriculture or previous working experience in the agricultural sector (farms);

- Commits to working at the assigned garden throughout the pilot phase.
- We decided to work with two young farmers, one in aquaponics and another in hydroponic.

3.3 Connecting Farmers with Community

We found several challenges in this stage. First, it was not easy to match skills between farmers and community preferences. Second, with a limited budget from the project, there was a dilemmatic situation to choose the provision of small size farm for several communities or larger size to one or two communities. This is related to the risk of implementation failure in (each) community target. The third is the trust issue between the community and the farmer.

3.4 Execution

We assist the community in establishing a formal organization responsible for the garden management system. The system itself elaborates on the financing, administration, human resource, garden operation, and membership plan. The community members choose a garden manager and organization committees based on their collective agreement. On a day-to-day basis, the community members are mainly involved in the garden's management, administration, and financial aspect. At the same time, the young farmers lead the operational aspect until the first harvest and knowledge transfer between farmers to the local community. An agreed membership plan decides the form of community involvement in operational matters. In Tangerang, the community manager made a schedule for the members for daily monitoring of the aquaponics (Fig. 5).

The exact amount of subscription fee or share of the garden is adjusted accordingly to ensure the garden's financial sustainability.

The community (garden) manager and farmers play a significant part in the consultation to determine the garden design or farm system they need. We facilitated the establishment of the 100 m² aquaponics and hydroponic in each community. The design includes starting/planting season and proper placement to avoid conflict with non-community members.

Based on the agreed farm system/design, we did a site survey that includes land capacity analysis, and the community's crops need estimation together with farmers. After the design is agreed upon, we continue to the construction phase. The construction includes hardscape (non-living, structural elements such as drainage, garden beds, pathway) and soft cape (soil preparation and overall plant transplant and care). The management does the construction entirely while we monitor and evaluate the process.

After the construction is finished, farmers are responsible for proper cultivation (soil preparation, seeds, planting, care management, post-harvest). Meanwhile, the (community) management runs the administration and financial process. We return to the site every month to monitor and evaluate the garden, giving consultation as necessary.

We found two issues in this stage: First, it is difficult for the community to absorb information on cultivation techniques as aquaponics and hydroponic are quite knowledge-intensive. Intensive assistance is required until the first harvest. Second is the distance between the location of young farmers and the community, which may be an obstacle for regular field monitoring.



Fig. 5. Community aquaponics in Tangerang.

3.5 Exit Strategy

The garden management is later slowly transferred to the community in the last six months of the project. They are expected to continue running the garden that has been established. Full management is handed to the community organization after the project. It will be funded using the community's membership payment. The community can also consider some alternatives of extra income to replace the pilot (our) funding, such as selling some of the crops to external parties or inviting other communities to join – thus increasing capital to the garden from the membership fee.

4 Conclusion

Finding an ideal targeted community to implement *De Nieuwe Ronde* in Greater Jakarta is difficult because of several reasons. First, the communities have little motivation regarding efforts to reduce greenhouse gasses emissions and empower young farmers. Most community members care more about the price of the food products. Second, the community also preferred a flexible management scheme, not a strict membership plan, because it takes too much energy and time for them.

Third, there are also land issues with the permit to use the land for cultivation. To gain a format permit, the community needs to put energy into dealing with the landowner or housing developer. Although the permit is granted, it is still uncertain that the community can use it for a long time as the permit clause that the developer can take over the land use anytime when they need it. Even when the permit was granted, there was still an issue with acceptance from some community members. Land stewardship is an important aspect in the CSA implementation [9].

Fourth, it was difficult to choose the most suitable community group to be subsidized as the criteria such as predicting the farm's sustainability and assessing the capacity of the 'institution' in the community were difficult to assess.

However, the community found another reason to implement *De Nieuwe Ronde*: to build stronger bonds and strengthen relationships and interactions between community

members. This is important for some middle and high-class housing areas in Greater Jakarta. Having a positively strong community is important for everyone. Building a strong rapport with community peers can positively impact what is going on in the community regarding everyone's happiness. People coming together and voicing one opinion is much stronger than one solo voice standing on its own [10].

In conclusion, we found that adaptation of De *Nieuwe Ronde* can work as a sustainable and resilient food system that can be implemented in Indonesia's urban areas; and stimulates employment opportunities for young farmers. Local policy support is needed to incentivize and increase the motivation of the community to adopt De *Nieuwe Ronde*.

Acknowledgments. The authors thank the NL Alumni Network and Nuffic Neso for financially supporting this study through the Changemaker Challenge 2021 as part of the campaign Empower Youth4Food.

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