Islamic Social Finance and Sustainable Finance to Minimize Post Harvesting Food Losses in Indonesia

Taslima Julia[1], Anwar Muhammad Noor[2], Salina Kassim[3]

Abstract

The entire globe is experiencing unprecedented time and is trying to live in this era of digitization and declining globalization, which is being exacerbated by a small virus known as COVID 19. Indonesia is no different. To handle the pandemic, ensuring good health through enhancing food security is vital. The post harvesting food losses because of lack of storage capacity is an issue for the country. In essence, mini cold storage powered by renewable energy can resolve the issue. Sustainable financing, in combination with Islamic Social Financing, can benefit the fishermen and agriculture farmers by facilitating to them the cold storage system. Using a qualitative research technique, this paper attempts to present two finance models for facilitating the cold chain in the existing post-harvest food supply chain to reduce losses. The implementation of the models can assist the rural population in overcoming poverty, hunger, and malnutrition issues. Not only will this endeavor guarantee good health and well-being, but it will also strengthen collaborative business practices while ensuring inexpensive clean energy use. Moreover, rural people will get the strength to overcome the current crisis and reduce uncertainty while attaining several sustainable development goals.

Keywords*:* Islamic Social Finance, Sustainable Finance, Post Harvesting Food Losses, Food Security, Digitalization.

1. Introduction

Indonesia is the fourth most populated country in the world. Food safety is one of the national development urgencies. Over the past four decades, the country has upgraded its food security, and agronomic production has significantly enhanced. Nevertheless, increasing population, other demographic changing aspects, and environment change pose challenges to future food security (FAO, 2017). The current unprecedented event of pandemic increases burden on the country to maintain the food security. In the Global Food Security Index in 2018, out of 113 countries Indonesia ranked 65th. In terms of natural resources and resilience, the country ranked 111th, it

[1] PhD Research at IIUM Institute of Islamic Banking and Finance, IIUM, Kuala Lumpur, Malaysia, taslima.julia@yahoo.com

[2] PhD Research at IIUM Institute of Islamic Banking and Finance, IIUM, Kuala Lumpur, Malaysia, anwarmdnoor@gmail.com

[3] Associate Professor, Dean at IIUM Institute of Islamic Banking and Finance, IIUM, Kuala Lumpur, Malaysia, ksalina@iium.edu.my

is an indication that sustainability must be one of the prioritized programs in food and agriculture planning of the country. The Ministry of National Development Planning (BAPPENAS) is formulating a detailed roadmap to meet SDG targets to achieve the country's vision to be one of the Top economies by 2045. Among other aspects, the country need to focus more to reduce postharvest losses to ensure food security and to achieve its vision 2045 (ADB, 2019).

The Indonesian use traditional methods to handle fresh vegetables without hardly any sorting or grading prior to marketing. Therefore, at the farm level the post-harvest loss begins, and measures need to be taken to cut down the losses of vegetables at the farm level. Because of postharvest losses, a significant portion of the cultivated produce never reaches the consumers. An estimated range of 20-40% of the fruits and vegetables in the entire world are lost. (Wills, McGlasson, Graham, & Joyce, 2004). The amount of food losses and waste in Indonesia is relatively high. , On the contrary, the availability of data and information about food losses and waste are very limited (Adiandri, 2017). Moreover, in the entire marketing channel, there is very low facility for short and long-term storage of perishables. Ideally, storage facilities should be located at each of the loading and unloading points, and in the wholesale markets. This is a critical problem in the present marketing system, especially for the perishables like fishes, meat and fruits.

Although quality of fresh produce cannot be improved by post-harvest handling, however it is necessary for extending shelf-life. Fresh fruits and vegetables continue to function metabolically after harvest and therefore they are subjected to physiological and pathological deterioration. Post-harvest handling has a decisive effect on the extent of post-harvest losses, the final quality, and the market value of the crops (Kim 2006). Post-harvest handling covers the time span from product harvesting in the farm field until it reaches the urban consumer through the market (Tjahjadi, 2006).

The loss of post harvesting fruits, vegetables, meat and fishes is an important issue to ensure food security, specially, in this pandemic scenario when ensuring food security is an essential: this article would try to find out an appropriate solution of the problem. Consequently, the first objective of the article is to identify whether there is a way to solve the problem. After extensive literature review it is detected that proper cooling technology, specifically, the cold storage within the supply chain can reduce the losses remarkably. Cabbage, broccoli, fishes all the items need different temperature and relative humidity to keep them fresh (Pracaya, 2003; REEEP, 2012; Rukmana, 1994). The cooling process during the postharvest handling helps to reduce deterioration of food items from high tropical temperature (Zainalabidin, Sagrin, Nabilah, Azmi, & Ghazali, 2019). Moreover, cold storage facilities prolongs fruits and vegetables usefulness and in some cases improves their quality, it also checks market overabundance, provides wide varieties of fruits and vegetables throughout the year, helps in orderly marketing, increases financial gain to the producers and

preserves the quality of the living product (Bafdal et al., 2019; Moody et al., 2007). The introduction of solar-powered mini-cold storage can greatly alleviate the problem.

Cold chain need to set up across the supply chain (Verma, Plaisier, van Wagenberg, & Achterbosch, 2019). This strategy is also in line with government desire to upgrade many fishing ports in off-grid and under-serviced areas to 'eco-fishing-port' status, with both financial and energy self-sufficiency (REEEP, 2012). Ministry of Agriculture, The Republic Indonesia, is currently implementing a national program, called UPSUS standing for Upaya Khusus (special effort), and aimed at increasing productivity and production while at the same time reducing yield losses. The cold chain at the farmers' aid can significantly minimize losses, saving millions of rupiahs each year. Cold storage requires a consistent supply of electricity, and the unreliability of electricity supply at the rural level is a major impediment to its implementation. Considering these factors, introducing mini solar-based cold storage in Indonesia would be a breakthrough in the agricultural sector.

The solar mini cold storage will not only save a significant quantity of food and money, but it will also provide a variety of jobs related to the management of these cold storage systems. Furthermore, the service of this equipment will offer new job possibilities in the surrounding area. In general, it will assist the country in achieving several of the SDGs. The solar mini cold storage system is costly and out of reach for most small farmers. Therefore, the second objective of the article is to find out whether there is financing mechanism to solve the cost problem. In consideration of the country's socioeconomic situation, this essay will propose two different financing models: sustainable finance combined with social Islamic finance and bringing together banks and non-bank financial organizations under one roof. The paper is structured into multiple sections to facilitate the research with the following elements: literature review, methodologies, results analysis, and discussion followed by conclusion and recommendations.

2. Literature review

This section is going to investigate literatures related to Islamic social finance, green finance, post harvesting food losses in Indonesia, existing solutions that is practiced solving the problem and sustainable development goals (SDGs).

a) Islamic Social Finance

Social finance is a multibillion-dollar strategy for managing assets that create financial returns while also having measurable social and environmental benefits. Though the area is swiftly evolving, it is yet under-institutionalized. Social finance or social investment is not the same as a grant or a contribution; it is indeed a refundable investment that often yields a profit. Social finance or social investment that adheres to Shariah principles is known as Islamic social finance (Razinah & Engku Ali, 2017). Islamic social finance occupies a central position in the Islamic social safety nets and poverty eradication programs. ISF is also used as a form of empowerment of the less

privileged members of the society (SFC, 2017). According to contemporary practices, Islamic social finance may be classified into three primary divisions: (a) Islamic traditional instruments based on philanthropy. Examples: *zakat, sadaqat* and *waqf* (Abduh, 2019; Jouti, 2019; Razinah & Engku Ali, 2017; Syed Marwan & Engku Ali, 2019). (b) cooperative-based foundations. Examples: *qard al hasana* and *kafala* (Islamic Social Finance Report, 2015). (c) Other modern forms of Islamic financial services. Islamic microfinance, *sukuk* and *takaful* are the examples. (Jouti, 2019), socially-impactful Islamic crowdfunding (Syed Marwan & Engku Ali, 2019).

In case of Islamic social crowdfunding initiatives, to help the under privileged people, Indonesia is in an advantageous position the country has already used the Ethis Islamic Crowdfunding platform for social housing (Ethis Crowd, 2018). Moreover, to boost the operation of Micro, Small and Medium Enterprises (MSMEs) investment - based crowdfunding is proposed by Abdullah and Susamto, (2019) and to increase the contribution of East Java's agricultural sector to GDP of the country an Integrated Agricultural Land Crowdfunding Model (IALCM) using Islamic financing instruments through a crowdfunding platform also proposed by Thaker et al. (2020). Subsequently, there is a potential to use the same platform to lessen the post harvesting food losses in Indonesia.

A number of scholars have studied the Sustainable Development Goals (SDGs) from the perspective of Islamic Finance. (Gundogdu, 2018). According to certain Islamic finance academics, the SDGs are linked with Islamic finance's concept, making Islamic finance a unique replacement for achieving the SDGs by 2030 (Zarrouk, 2015). To recover the global SDG investment deficit, *infaq*, *waqf*, and *zakat*, the three Islamic social finance mechanisms are powerful alternative philanthropies fund. The second SDG that is "end hunger, achieve food security and improve nutrition and promote sustainable agriculture" may be accomplished with Islamic Social Finance (Abduh, 2019). With a FinTech-enabled platform, Islamic financing may improve agriculture sustainability and efficiency (Ningrat & Nurzaman, 2019). Recently the authors have offered three different types of financing mechanism to solve post harvesting fruits and vegetable losses in Bangladesh context and they have given emphasize on the Islamic social financing crowdfunding investment platform and recommended to implement the mechanism (Julia, Noor, & Kassim, 2020).

b) Sustainable Finance

In Indonesia the Financial Services Authority (Otoritas Jasa Keuangan, OJK) is dedicated to creating an effective regulatory framework that promotes the development of long-term funding for the attainment of the SDGs. In 2014, the OJK with the support of some prominent contributors issued the first phase sustainable finance roadmap for the years 2015-2019 (Maghribi, 2019), later in 2017 incorporated green bond guidelines to raise capital for green projects and SDGs initiatives under sustainable finance umbrella regulation. At the same year the OJK imposed binding

regulation on banks, capital market and nonbank financial institutions to prepare standardized sustainability reporting (Imansyah, 2020). As per the studies, Indonesia can achieve a cost-effective green transformation without endangering its economic growth and poverty reduction, however, there remains a large deficit in funding. The public fund alone is inadequate, and thus greater investment by both the private and the public sectors is necessary (Liebman et al., 2019).

"Green finance comprised financing of (including preparatory cost and capital cost) green investments, financing of public green policies and green financial system" (Nannette Linderberg, 2014). According to the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), "Green Finance is a strategic approach to incorporate the financial sector in the transformation process towards low-carbon and resource-efficient economies, and in the context of adaptation to climate change" (GIZ, 2011). Principles, policies and practices that are adopted by green businesses enhance the living quality of their customers, employees, communities and their planet. Green firms are socially and environmentally conscious, and they strive to achieve social and economic justice, environmental sustainability, and community health and development goals. Communities benefit from green enterprises.

Although in Bangladesh the sustainable financing or green financing started its journey since 2011 after the inauguration of green banking policy and guidelines by Bangladesh central bank (Circular 2 2011), however Indonesia is a pioneering country with the sustainable finance strategy for the entire financial system (IFC, 2018). Like Bangladesh Islamic banks in Indonesia are in ahead position in green financing compare to conventional counterpart (Julia & Kassim, 2019, 2020). In Indonesia Islamic banks are doing 2.5% green financing of total financing, while the portion of green financing in conventional banks is 1.1% (Siregar, 2014). Therefore, Islamic social finance platform along with sustainable finance have huge potential to help unbanked rural people to get financing to afford solar mini cold storage to lessen post harvesting losses.

c) Sustainable Development Goals (SDGs)

The United Nations Sustainable Development Summit took place in New York from September 25 to 27, 2015, with the goal of adopting an aspirational, bold, and universal sustainable development agenda that will eradicate poverty and promote prosperity by 2030 while also tackling environmental issues. The summit's final report, entitled "Transforming our World: The 2030 Agenda for Sustainable Development," was agreed upon by the United Nations' 193 member states agreed on the summit final document, which comprises 17 Sustainable Development Goals and 169 goals. The seventeen goals are as follows:

1. Poverty
2. Zero hunger
3. Good health and well-being
4. Quality education

5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry innovation and infrastructure
10. Reduced inequality
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice and strong institutions
17. Partnership for the goals

Understanding the five P's is essential to appreciating the SDGS: People, Planet, Prosperity, Peace and Partnership. These five Ps are considered SDG elements, with three of them serving as SD pillars: People, Planet and Prosperity. The 2030 Agenda is unbreakable. Countries must give importance to carefully weighing the trade-offs among them and avoid cherry picking goals. (Mohin, 2016). SDGs are quite broad and aimed to reach universal goals that are agreed upon by the global society in general, and they do not contradict with Islamic beliefs. However, the sustainable development discourse has recognized that the three pillars of sustainable development require an ethical dimension at the level of popular values to be realized. The World Summit on Sustainable Development in Johannesburg (2002) added a short paragraph 6 to its Programme of Action: "We acknowledge the importance of ethics for sustainable development and, therefore, emphasize the need to consider ethics in the implementation of Agenda 21" (WSSD, 2002).

d) Post Harvesting Losses & Food Security

Indonesia is experiencing an agri-food transformation with rapidly growing demand for high value agricultural products including horticultural products such as fruits and vegetables. Therefore, policy makers and government should support farmers to expand the adaptation of horticultural crops besides adequate production of vital staple food crops such as rice, maize and soybean, to achieve national food self-sufficiency (Suprehatin, 2016). The quality of the product cannot be improved by post-harvest handling but is necessary for extending shelf-life is affected by natural properties of fresh produce as well as various external factors (Bafdal et al., 2019). Appropriate post-harvest technology can minimize moisture loss. The societal consequences of the losses are essentially twofold. To begin with, the country is losing a significant amount of money each year. Second, consumers are denied the opportunity to consume highly nutritious fruits and vegetables. (P. D. M. K. Hassan, 2010). Post-harvest handling of food which greatly influence the level of postharvest losses and the quality of produce include harvesting, sorting, cleaning, pre-cooling, grading, packing, storage, transportation, and postharvest treatments.

The most effective strategy to decrease post-harvest losses and retain the quality of fruits and vegetables is to use proper temperature management. Post harvesting losses of food is related to the early stages of the food supply chain and refers to a system which needs investment in infrastructure. Food waste is applied to later stages of the food supply chain and generally, relates to the attitude of food suppliers and consumers. Like it or not, food losses and wastes will influence global food security.

To ensure global food security besides increasing agricultural productivity, initiatives to reduce post harvesting losses of food is critical. However, the later aspect is overlooked by all (Mahmud Tengku, 2017).

Broccoli is a highly profitable crop in Indonesia, and it is rich with vitamins and minerals, as well as a great source of vitamin A, potassium, folic acid, iron, and fiber. The challenge with broccoli is its improper post-harvest management due to the lack of technology, moreover its handling is still done the old way, with little sorting or grading done beforehand.

To maintain the product quality and to extend shelf-life temperature plays a vital role. Different temperature is needed to keep the freshness of fruits and vegetables such as cabbage and broccoli. Cabbage should be stored at 0^0C, RH 90%. In such condition cabbage can be stored for 8 months (Pracaya, 2003). On the other hand, broccoli's storage conditions should be dark, 4.4 ^{0}C, RH 85 – 90%. In such conditions broccoli can be stored for 14 – 28 days (Rukmana, 1994). .

In Indonesia, there are 800 small fishing ports, many of which lack sufficient cold storage and ice-making equipment. This results in a substantial wastage. The Indonesian government aims to independently improve numerous of their fishing ports in the off-grid and under-serviced locations into 'eco-fishing-port'. They are also committed to increasing the use of renewable energy to expand the cold chain in the regions (REEEP, 2012).

e) Existing Solutions to Reduce PHL

The Grand Strategy of Agricultural Development 2013–2045, Indonesia's first long-term agricultural development strategy, was released in 2013. Its key purpose is to promote a sustainable agroindustry. The Ministry of Agriculture had established a medium-term strategic plan to attain food sovereignty and refine farmer welfare by 2015-2019. The Indonesian government issued its third National Plan of Action on Food and Nutrition in 2011, which ran from 2011 to 2015, for the first-time identifying stunting as a serious nutrition problem. The country joined the Scaling Up Nutrition (SUN) Movement and developed the SUN Framework in 2012, together with a new food law to strengthen food sovereignty and self-reliance. The fourth National Plan of Action on Food and Nutrition, for the years 2015-2019, includes the Sustainable Development Goals and the outcomes of the second International Conference on Nutrition. In addition, the Strategic Policy and Action Plan on Food

and Nutrition has been finalized as of December 2016 and a Presidential Decree for it has been proposed. Food security improved between 2007 and 2016 in Indonesia, as a result of improvements in a number of food and nutrition security related factors and policy decisions (FAO, 2017).

Controlling PHL can help to alleviate the world's food crisis. Three strategies are being used by both developed and developing countries to address the PHL issue. The first strategy is to apply current knowledge for the improvement of the handling systems. The second is to overcome the socioeconomic barriers such as infrastructure deficiencies, bad marketing systems, and low R&D capacity. And the third is to encourage the vertical integration and consolidation among horticulture crop growers and marketers (Kumar, Shankar, & Kumar, 2015).

Three alumni of IIT Kharagpur have provided an impactful solution to the agri-community in India to solve the PHL problem as well as save the environment from the harm of diesel-powered cold storage. The solution was termed as Ecozen Solutions. Solar energy was the most efficient technique to produce a clean, non-exhaustible, and effective technology. Ecofrost, Ecozen's solar-powered cold room, is designed to assist farmers in storing fresh produce until it reaches end consumers. Farmers can earn more money and avoid post-harvest losses by preserving the quality of their crops. Agri-traders, wholesalers, retailers and farmers are targeted by the start up. (SW, 2018).

f) Literature Gaps

Among the several proposals made by Hassan, Chowdhury and Akhter (2010) to prevent the PHL of fruits and vegetables, one stands out: the public-private partnership. The researchers emphasized the diffusion of low-cost storage technology to farmers' doorsteps, as well as the introduction of new and sophisticated postharvest technologies such as low temperature storage, refrigerated transport vehicles, ethylene induced ripening technology, and plastic packaging. Losses were generally greater at the hands of middlemen, particularly wholesalers, because of a faulty supply chain. Growers usually sell their produce to a group in their own field or to a wholesaler in one of the surrounding rural markets. As a result, they never acquired the price they expected. If the cool chain was brought to the farmers, the situation might change.

It is well acknowledged that intermediaries are important components of today's industry. Excluding them from the supply chain can’t be possible. However, if cold storage can be brought within the reach of farmers, their bargaining power will increase, and monitoring will strengthen, mitigating the negative impact of intermediaries in the supply chain of meat, fish, fruits, and vegetables. This can ensure two major benefits: first, growers would receive a fair price for their product, and second, consumers would be able to purchase the produce at a lower cost. However, no significant efforts have been made in Indonesia to establish a comprehensive cold chain. There remains a gap that must be filled.

3. Methodology

In line with the title of the article the researchers tried to investigate literatures. Literature was searched based on the title 'post harvesting losses', 'Islamic Finance', 'green finance', 'sustainable development', 'existing solution of the post harvesting losses of fruits and vegetables in Indonesia'. Poor people can own solar small cold storage in groups or collectively with the help of Islamic social finance instruments and sustainable finance supported by banks or financial institutes so that so that the whole year-round, fish, meat, fruits, and vegetables may be preserved and maintained fresh to obtain an appropriate price.

Based on literature review, this article at first tries to find answer of the first objective of the article that is "whether there is a way to solve the problem" and attempts to identify a way to reduce post-harvest losses of fruits and vegetables in Indonesia. Solar-powered small cold storage facilities have been recognized as a viable solution to the problem. A model is also stated. EcoFrost's technique appears to be suited for dealing with atypical veggies and fruits that demand different temperatures to remain fresh and have their nutritional values preserved. (Hassan, Chowdhury, and Akhter 2010; Smart World 2018).

The solar small cold storage, on the other hand, is expensive, ranging from 345.6 million to 259.2 million Rupiah per cold storage, and financing is a problem. Therefore, extensive literature has been reviewed to get the answer of second objective of the article which is "to find out whether there is financing mechanism to solve the cost problem". Given the high cost of a solar-based mini cold storage facility, this paper will propose a unique funding method based on the authors' analytical abilities and literature reviews, which will include green financing and Islamic social finance as mechanisms. The feasibility of the proposed approach is justified considering the country's legal situation and socioeconomic background. The articles and research papers used as a source of data are published in internationally recognize journals, therefore, data used are reliable and useful.

4. Results and discussion

The Ecozen-invented solar small cold storage device, or a comparable product, appears to be a viable option for resolving PHL in Indonesia. The finance system, on the other hand, will be different. Even though the projects are subsidized, the product cost varies depending on customer needs, markets, and areas. Solar energy allows users to save a lot of money on electricity and petrol. In many cases, the company used a lease-based business strategy, which got excellent feedback from consumers. The method has benefited horticultural growers, who have specific season-based production throughout the year, by allowing them to lease the system as needed.

A five-year maintenance contract is included in the contract The duration of the return on investment (ROI) is exclusively determined by the manner of use and

the commodity held within the system. Crops that are perishable and highly valued provide good returns. The payback period is two to three years after initial use; however, regular crop cultivation may take a little longer. Sellers (farmers and perishable crop growers or vendors) and purchasers (organized retailers, fresh e-commerce firms, wholesalers, or merchants) can be brought on one platform to trade on the web and mobile applications. As a result, both parties can pre-cool and transport the commodities in a refrigerated truck from the source to the destination, ensuring that the quality of the produce is maintained.

Figure 1: Solar Mini cold storage
Sources: (SW, 2018).

a) Financing Model One

Solar micro cold storage costs between 345.6 and 259.2 million Rupiah, which is beyond the reach of the average farmer. Farmers, on the other hand, can collectively afford and own it; therefore, a party is required to bring them together, train them, and assist them in managing the entire process, including obtaining financing. A green enterprise or cooperative society can be the party. Many people can utilize a single cold storage unit to preserve a variety of fruits and vegetables one at a time throughout all the seasons. Farmers, on the other hand, can rent cold storage space as needed, and green companies can provide the farmers and other stakeholders in the supply chain with the services. This article is going to offer two financing models to own the solar cold storage in Indonesia context.

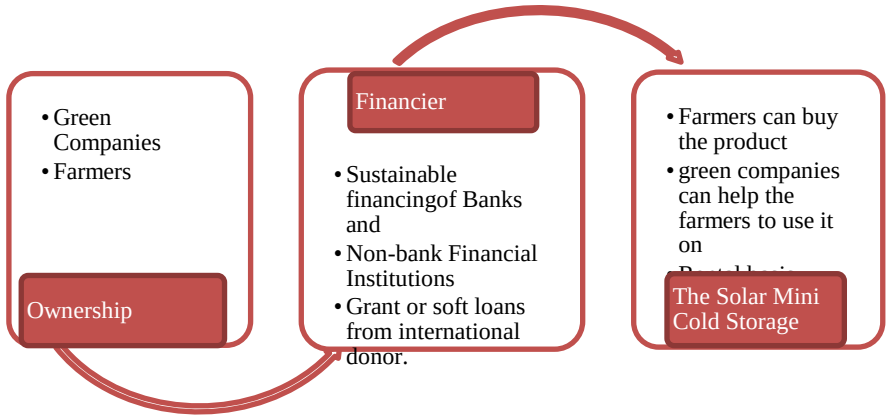

Figure 2: Solar Clod Storage Financing Model One

Source: Authors Illustration

Steps to Accumulate Financing

In this scenario farmers or green companies, anyone party can own the cold storage and financing provider will be banks, non-banks financial institutions or international donors. The financing type will be green or sustainable financing.

Step 1- Green businesses can approach any bank or non-bank financial institution for finance through their sustainable financing program to purchase the product.

Step 2- The Green Company will then rent out storage facilities to rural residents and farmers based on their needs. If farmers are the owner, then they can use and manage the whole system by themselves and take help from the seller companies for the servicing job.

Step 3- Farmers will be free of worries if green companies are the owners in this instance since they will not have to worry about service or maintenance.

Step 4- Green enterprises will be responsible for paying bank payments.

b) Financing Model Two

In this scenario farmers or green companies, anyone party can own the cold storage and financing provider will be Islamic social financing Crowdfunding investment platform. The financing type will be green crowdfunding or sustainable crowdfunding.

Steps to Accumulate Financing

Step 1- Crowdfunding platform is not new in Indonesia, already there are few platforms that are operational such Ethics Islamic Crowdfunding for social housing (Ethis Crowd, 2018). Moreover, two different platforms have been proposed to promote Micro, Small and Medium Enterprises (MSMEs) business (Abdullah &

Susamto, 2019) and to increase the contribution of East Java's agricultural sector (Thaker et al., 2020). Therefore, another Islamic social crowdfunding platform is possible to initiate to finance the solar mini cold storage.

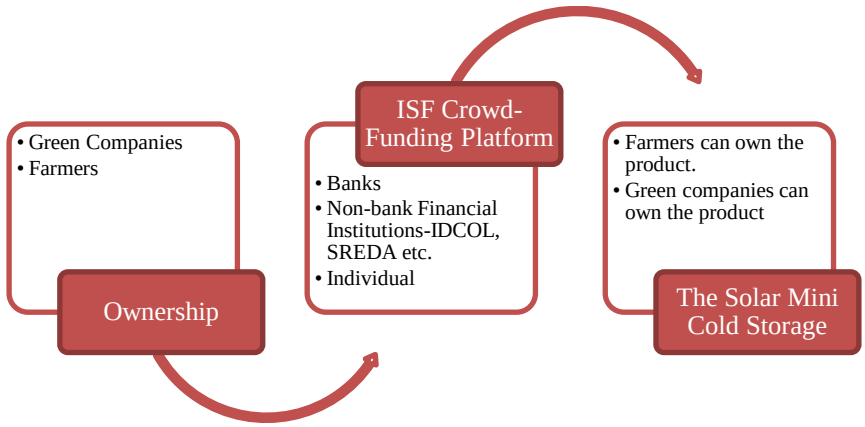

Figure 3: Solar Clod Storage Financing Model Two
Sources: Authors Illustration

Step 2- Along with individuals, banks from green financing schemes, non-bank financial organizations, and other stakeholders could join this platform as investors.

Step 3- Banks will rely on green companies to collect the installment amount from the clients. Green companies will ensure proper servicing services to the clients.

Step 4- The sole authority of product handling such as harvesting, selling, and using when needed belongs to farmers, however, green companies will only ensure selling product at a good price.

c) Implications of the Financing Models

Indonesian agriculture sector will enjoy a drastic positive change after implementing the suggested financial mechanism. The model will not only help to reduce post harvesting losses of fruits and vegetables but also will ensure achieving few SDGs. Sustainable development goals that will be possible to achieve directly are SDG no 1., 2, 3, 7, 8 and 17. The detail pf the SDGs are no poverty, zero hunger, good health and wellbeing, affordable and clean energy, decent work and economic growth and partnership for the goals. Few SDGs that will be achieved indirectly are SGD no 9, 11 and 12. The detail of the SDGs are industry, innovation and infrastructure, sustainable cities and communities and responsible consumption and production.

5. Conclusion and recommendation

Post harvesting losses of food items such as meat, fishes, fruits, and vegetables are an important hindrance to grow any country's economy, Indonesia is no exception. Instead of Indonesian government's various initiatives to ensure food security, post harvesting crop losses remain an issue. The current pandemic and lock down have worsened the scenario. On the contrary, food with nutrient values and proper quantity is essential for all to boost the immune system and handle the pandemic boldly. Therefore, government and regulators should focus immediately on reducing fruits and vegetable losses and ensuring the quality of those. Essentially, many issues such as hunger, malnutrition, overweight, health hazard, over pricing of commodities, farmer's economic losses are possible to resolve just by focusing on the one issue that is lessening the PHL. The initiative also can help to achieve many of the SDGs such as good health and wellbeing, increase employments etc.

Indonesia, a dynamic archipelago, dreaming to be the seventh biggest economy of the world by 2030, the country has already secured the sixteenth position for the same reason. Therefore, it is a promising economy (Oberman, Dobbs, Budiman, Thompson, & Rosse, 2012). The Ministry of Agriculture has taken measures to respond to COVID 19 such as conducting careful and detailed analyses to the food security situation and interventions to guarantee the supply of staple food for the community (WFP, 2020), besides, those initiatives arrangement of solar mini cold storage can solve the post harvesting losses, food security issue and lessen uncertainties.

Recently, the farmers are feeling the extreme need of storing ability facing with the recent unprecedented event of pandemic and country wide lock down that basically deteriorate the scenario of post harvesting losses (Parvez, 2020). Therefore, in this article the authors are trying to offer a solution of existing post harvesting losses problem through desk research. Secondary data sources have been used to discover the appropriate solution. Keeping in mind, the environmental factors and country agricultural scenario solar mini cold storage market has huge potential. 5-10 tons capacity mjni storage can be the appropriate solution based on dependability, sustainability, and cost-effective feature. However, cold storages are expensive and beyond the capacity of individual farmers, therefore looking for financing option seems another challenge which the authors have solved. A blended financing mechanism is proposed including Islamic social finance with green finance. Authors research experience, academic excellence and market trends played a very important role to design the financing models.

Additionally, the proposed financing models are supportive to the Ministry afford to enhance food security. The COVID 19 has shifted the business world towards digitalization. Therefore, authors are strongly recommending the second model that is the digital financing solution. This proposed fintech based solution of Islamic social finance crowdfunding investment platform includes green financing of

bank and nonbank financial institutions. Therefore, the mechanism could raise huge amount of capital or funding to afford mini cold storage. In this platform individuals, banks and nonbank financial institutions from green financing scheme can invest, hence, the accumulated funding will be huge that would help to buy a bulk amount of solar mini cold storage. The more mini cold storage is possible to install the more problems are possible to resolve. While solving the post losses of meats, fishes, fruits and vegetables, the country can reach many of the sustainable development agenda.

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