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DESIGN OF SUPPLY CHAIN FINANCING MODEL OF RED CHILI COMMODITY WITH STRUCTURED MARKET ORIENTATION

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Abstract: *Finance is one of the issues in the agribusiness development of red chili clusters in Indonesia. The flow of money will decide whether the product flow will work properly and reaches its sustainability. Financial development in supply chain and agribusiness clusters should be done holistically. Therefore, development of the agriculture supply-chain financing for red chili commodity is importantly needed, especially for the commodity that is sold to structured markets, such as exporters, modern retails, or food industry. This research was conducted in five districts, which are the centers of red chili production in West Java province. The supply chain financing is expected to increase the return on investment, growth, and supply chain competitiveness. This study is an action research that uses case study method with qualitative modeling approach through value stream mapping identification. The design of the red chili supply-chain financing model consists of two financing models. First is pre-harvest financing for red chili growers, which are parts of farmer groups or cooperative members. The second is trade financing for cooperatives, which is already attached to some contractual agreement with buyers. These buyers are also an avalist in this model. The success of this financing model also needs to be supported by other parties and stakeholders, such as assistances from academic institution, mentoring from government instructors, or even institution of guarantor financing county to give guarantee for the financial providers.*

Key words: *finance, supply chain, red chili, structured market*

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INTRODUCTION

Red chili is one of the vegetables that exhibit high fluctuations in price. The price fluctuations affect the rate of inflation in food commodity prices, which are monitored by the Indonesian government annually (Central Bureau of Statistics, 2012). Under certain conditions, red chili prices in Indonesia could reach Rp. 100.000, - per kg, where as in other conditions they reach Rp. 4.000, - per kg.

The price fluctuations are caused by the unsustainable supply of red chili from production centers to markets. Data from the Central Bureau of Statistics and the Directorate General of Horticulture (2012) showed that during the period of 2007 to 2011, there was a surplus production of red chili in Indonesia, meaning that the national consumption of red chili was still below the national production. Nevertheless, the availability of red chili in the consumption market, as well as the prices, were fluctuating because the red chili production in the production centers was not sustainable.

The production discontinuity was caused by farmers who did not apply the planting schedules in the red chili cultivation. It happened because the production decisions of the farmers are determined by tenures, climate conditions, as well as selection of traditional markets as the target market. Traditional markets do not require farmers to sell their product son an ongoing basis based on certain quality specifications. This condition is different from the characteristics of structured markets (processing industry, exporters, modern retail markets, and food services) that require manufacturers or other actors in the production centers to be able to supply their products sustain ably based on the product specifications and prices that are determined (Perdana Tomy etal., 2011).

The fluctuation of red chili prices caused consumers dissatisfaction, so that they shifted their consumption to substitute products that were imported. For the producers, the fluctuation resulted in a high trade risk. In a long term, this condition can reduce the interests from farmers and investors to cultivate red chili, so that the availability of local red chili will be replaced by the imported products.

Indonesian government gave a task to the Indonesian central bank to control inflation that was partly caused by food fluctuations, such as red chili. The inflation control was carried out by stabilizing the prices of red chili. The central bank then took an initiative to develop agribusiness clusters of red chili in West Java. Since the end of 2011 until today, this initiative has been done in collaboration with Value Chain Center (VCC) of Puslitbang Inovasi and the LPPM institute at the Padjadajan University, as well as the government of West Java Province.

One component of the development of red chili agribusiness clusters in Indonesia was the financial component (Perdana, Nurhayati and Kusndar, 2013). Component or the flow of money is one of the four flows in the agricultural

supply chain management. The flow of money will determine the smoothness and continuity in product flows (Perdana and Avianto, 2008). Financial development in supply chains and agribusiness clusters has to be done holistically. It means that the development cannot be done separately as in financial schemes or agriculture financing that is available today. Therefore, it is necessary to develop a model for the agricultural supply-chain financing of red chili commodity, especially the one with structured market orientation.

The agricultural supply chain financing model will strengthen the development of agribusiness clusters of red chili in Wes Java, and even to be replicated at national level. Supply chain financing is a financial and service product that flows to or through every point in the supply chain in order to increase the return on investment, growth, as well as the competitiveness of the supply chain. With the supply chain financing, the risk and return of the financial providers are under the responsibility of all the actors in the supply chain (USAID, 2010).

According to the above backgrounds, the research questions can be formulated as follows:

1. What are the financial requirements along the red chili supply chain oriented on the structured markets?
2. How is the design of the supply chain financing model of red chili that is suitable with the needs of the actors involved along the supply chain of red chili (from top to down)?

State of the Art

Financial development in the supply chain and agribusiness clusters must be done in a holistic manner. This means that the development cannot be executed separately, which differs from the agricultural financing schemes today. Therefore, it is necessary to develop a model of agricultural supply chain financing on red chili commodities, especially the one with structured-market orientation. Scientifically, agricultural supply chain financing is a relatively new field and developed more by international development supporter agencies, such as USAID and the Rainforest Alliance.

Academically, this field is still underdeveloped. These conditions encouraged Agribusiness Laboratory at the Faculty of Agriculture, Padjadjaran University, to conduct an action research to develop theories and methodologies in the field of agricultural value chain financing which involves small farmers (inclusive). In addition, through the development of this agricultural supply chain financing model, it is expected to strengthen the development of agribusiness clusters of red chili in West Java, and even to be replicated at the national level.

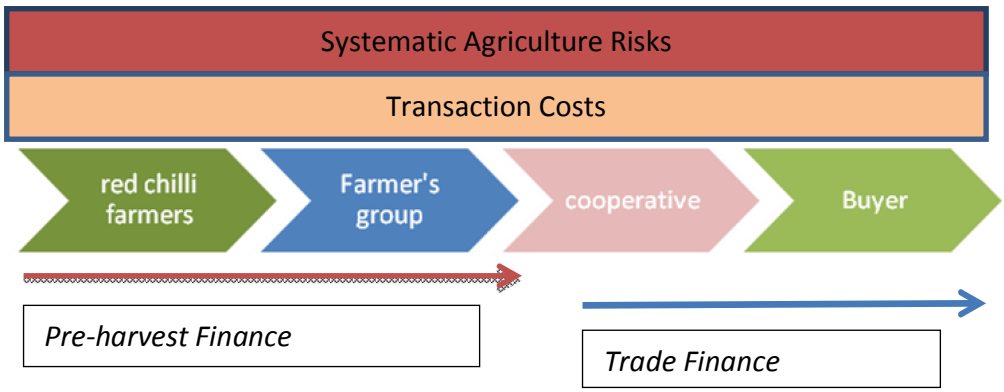
METHODOLOGY

This study is an action research that uses case study method. The study was conducted in five districts which are the main production centers of red chili in West Java, namely Garut Regency, Ciamis Regency, Bandung Regency, Tasikmalaya Regency, and Cianjur Regency. Identification of the supply chain financing requirements was done using Value Stream Mapping through observation and interviews on the red chili supply chain that are structured-market oriented, located in the five districts above. Modeling of the supply chain financing of red chili utilized a qualitative modeling approach based on system thinking that consists of "rich picture building". In addition, to demonstrate the effectiveness of the built model, financial analysis was done with conventional and sharia approaches.

Findings and Interpretation

In general, the purpose of financing along the supply chain can be divided into two kinds of needs, which are pre-harvest financing,that are needed by actors at the production level, and trade financing that are needed by actors at the trader level.

Figure 1: Business Processes of Red Chili Cultivation in West Java



The roles of each actor in the supply chain of red chili are as follows:

1. Red chili farmers

The red chili farmers are located at the agribusiness sub-system on farm, which act as the producers of red chili. In doing their activities, the farmers need information regarding to the input factors, as well as the markets, which are related to red chili commodities needed by the consumers sold to either traditional markets (on the

spot) or structured markets with contract basis. Accordingly, in order to obtain a high quality red chili product, the farmers have to have the knowledge regarding the appropriate cultivation techniques, as well as the input factors that support the good harvest in terms of quality and quantity.

Nevertheless, the red chili cultivations at the farmer level are still in a small scale, hence the needs for the input factors are also relatively small. In their farming activities, the farmers still need financing for the smoothness and sustainability of the production process because the seasonal agribusiness works will result in the farmer's income fluctuation.

2. Farmer groups

The farmer groups are channels for information and discussion regarding the quality, quantity, and continuity of the red chili crops adapted to the contract. In these groups, planting schedules and the production capacity of each member are defined. Besides, the farmer groups are also a plat form to distribute the input factors collectively and to help the distribution of red chili crops from the farmers to cooperatives.

3. Cooperatives

Cooperatives act as a distributor of harvested chili and payments from the buyers, as well as a provider of input factors. Cooperatives receive the harvested red chili from the farmers that will be distributed to the buyers. In order to make the marketed red chili satisfy the specifications required by the buyers as written in the contract, the cooperatives post-treat the chili and perform sorting and grading prior to distribution. The red chilies that do not meet the specifications as in the contract will be sent to traditional markets. Cooperatives also make planting schedules for each farmer groups so that the timing and the amount of harvest could be predicted to maintain a continuous production.

4. Buyers

Buyers are actors who need the red chili commodities based on contracts. They are exporters, modern markets, and processing industry. Buyers purchase the harvested red chili through cooperatives according to a contract that has been agreed in regards to the quantity, quality, continuity, prices, and payment method. Buyers determine the adequate cultivation method in order to get red chilies with the desired quality. Payment is executed after the red chilies are received and declared to satisfy the desired qualification. It is usually done through banking processes by transferring the money to the bank that act as the financing provider.

Figure 2:. Value Stream Mapping of the Red Chili Supply Chain in the Lowland

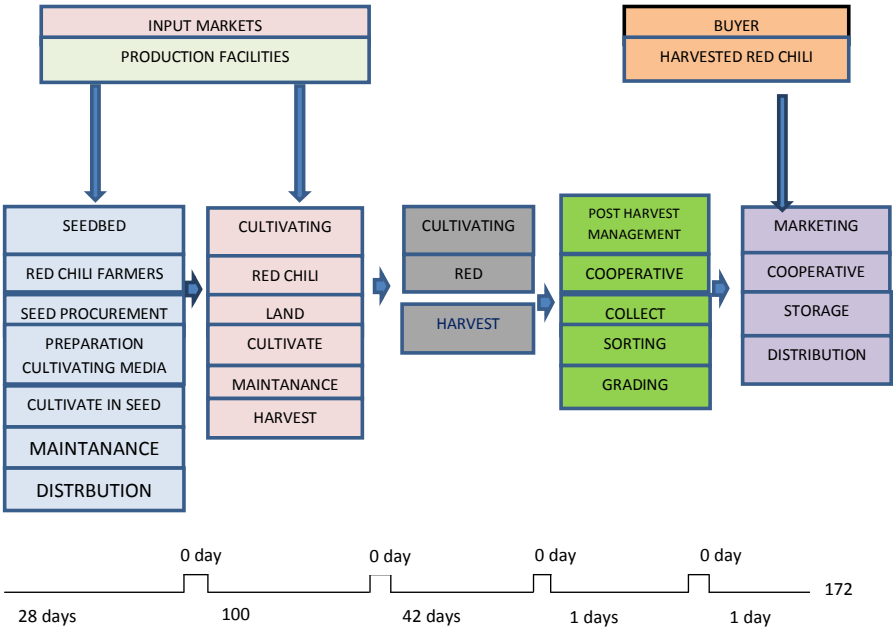
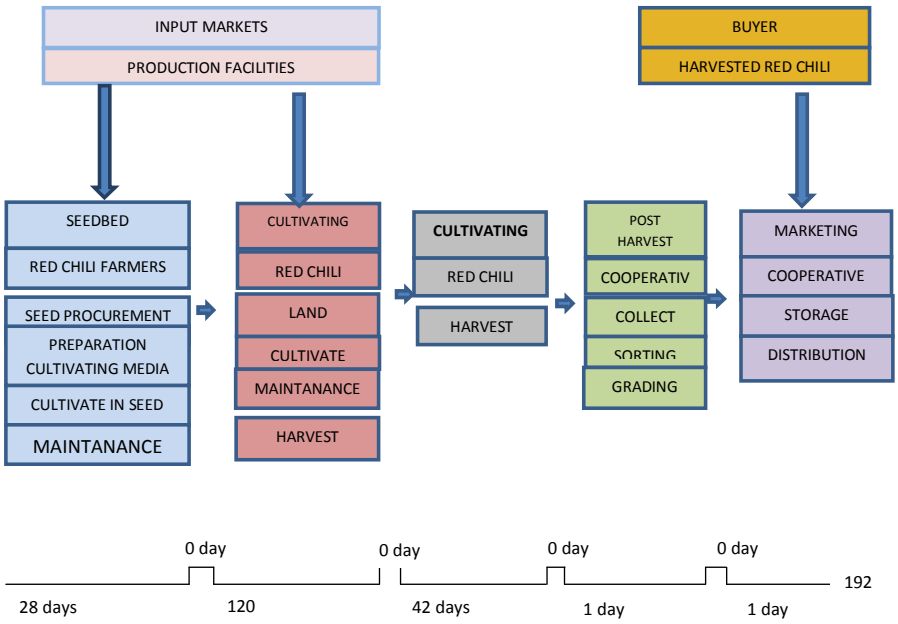


Figure 3: Value Stream Mapping of the Red Chili Supply Chain in the Uplands



Activities undertaken by the farmers are red chili cultivations, which are adapted according to the land altitude. Cultivation method of red chili in a lowland is slightly different with the one conducted on a highland. Cultivation of the red chili is started from the seeding until the harvest. At the seeding step, the farmers procure the seeds with specifications aligned with the buyer demand. After that, the farmers prepare the planting media, followed by planting in seed trays. The seeds are grown to young red chili plants. This seedbed process lasts for about 28 days. The young plants will be planted into the field after conducting a pre-treatment to the field. The red chili plants will then be grown until they are ready to be harvested. The whole process starting from the planting until harvesting takes about 120 days for the highland cultivation, while for the lowland cultivation, it takes about 100 days. Harvesting will take place for about 8 weeks or 42 days through 4 times harvesting. The highest harvest production of the red chili is at the second and the third harvest.

The harvested products will be sent to a cooperative. After the harvested red chili products have been collected at the farmers, the cooperative will do sorting and grading that refer to the specifications on the agreement between the buyer and the cooperative. Storage is done for maximum of 1 day after the harvests are received from the farmers in order to maintain the quality of the red chili. The cooperative will send the red chili to the buyer once the required specifications are obtained.

The total time needed by the red chili supply chain from the seed procurement until the distribution to the buyer is about 192 days for the farmers that cultivate the red chili on uplands. Meanwhile, for the farmers that cultivate the red chili on lowlands, it takes faster, which is about 172 days.

Interest-Based Conventional Financing Model

a. Funding for Farmers (grower)

To perform red chili farming, it requires a quite large amount of operational costs of around Rp. 60,000,000.00. The allocated financing or loans are certainly not 100% coming from outside funding. Approximately, only 50% to 60% of the costs can be funded. For example, when the entitled bank loans are Rp. 30,000,000 per hectare, with an interest rate of 17% (for SMEs) and insurance of 2.5% per year, cumulatively, the calculation of the installment payments and expenses that have to be paid by the farmers are as follows (Table 1):

Table 1
Analysis of Loan Installment to be paid by Farmers per Hectarewith Conventional Pattern

Description	*Amount (Rp)*
Loan	30,000,000
The insurance premium of 2.5%	750,000
Total Loan	30,750,000
Total Cost of Loan (17%)	5,227,500
The cost of loan per month (flat)	435,625
Basis installment payment	2,562,500
Basis installment payment + expenses	2,998,125
Basis installment payment + costs / week	749,531

b. Financing for Cooperatives

The analysis showed a profit of Rp. 1,715,901 per hectare/week. Moreover, if the management fee was also charged to the business through a structured market, the analysis still also showed a profitable result that reached Rp.174,181 per hectare / week.

From the analysis above, it can be seen that the payment distribution between cooperatives and the farmers showed a good result. Cooperatives can use trade loans to make payments to the farmers and also to cover the necessary expenses, and everything that is done through the bank. Meanwhile, financing for the farmers can use the loan program that is modified based on the crop production cycle of red chili. The suitable payment technique is yarnen system, where the amount of the installment payment is adjustable.
Simulation of the Financing Pattern Model of Sharia Financial System

Sharia financial simulations that were performed for the red chili farmers were murabahah financing agreement (buying and selling). However, for the cooperatives, the financing agreement used in the simulation was in the form of musharaka financing agreement. This is because the cooperatives act as executors to distribute funds from donors to the farmers to finance the production needs of the farmers.

In the following, the simulation of sharia financing for actors at the farmer level (grower)was created, which was divided into two types, which were for the lowlands and for the uplands. The difference between the lowlands and the uplands is the 1 month time difference during the production process or the farming. The results of the financing simulation analysis showed that financing

granted for 1 ha of Islamic banks in the form of short-term financing as a working capital with mudharabah agreement is almost 50%. The installments that have to be paid by the farmers per month for the lowlands is Rp. 4.126.4554, whilst for the uplands is Rp.4.044.757.The results of the sharia financing simulation analysis for the cooperatives using Musharaka financing agreement scheme was carried out by dividing the ratio (*nisbah*) between the bank and the cooperative by 30%-70% or 20%-80%.Projection of the profit sharing ratio division between the cooperative and the sharia bank can be seen in Table 2.

Table 2
Projections Acquisition Nisbah Profit Sharing Financing

No	*Descriptions*	*Total (Rp)*
1	Total Invesment cost	-
	Cost of equiment	-
2	Total Operasional cost	4,922,616,670
	Financing of input factor	3,301,235,000
3	Total Operational Cost	4,922,616.670
	b. finacing	3,301,235,000
	b. Equiti	1,621,381,670
4	Projection of Income	18,816,000,000
5	Projection of Profit	13,893,383,330
6	c. Financing and Nisbah (Profit sharing 30%-70%)	3,301,235,000
	• Bank Nisbah (30%)	4,168,014,999
	• Customer Nisbah (70%)	9,725,368,331
	Total Financing and Nisbah	7,469,249,999
	d. Financing and Nisbah (20%-80%)	3,301,235,000
	• Bank Nisbah (20%)	2,778,676,666
	• Customer Nisbah(80%)	11,114,706,664
	Total Financing and Nisbah	6,079,911,666

Design of the Financing Model of Red Chili Agribusiness

Supply chain financing (SCF) can be applied if all actors in the supply chain of red chili already have a good management. In addition, the actors in the supply chain must be supported by the trust and commitment among the actors, either through written or unwritten contracts.

This supply chain financing can provide benefits for the bank, but on the other hand it also has a high risk. In this case, the SCF can be profitable for the bank because the financing to all businesses along the supply chain will provide greater benefits compared to the financing to only one or some of the actors in the supply chain. However, the risks along the supply chain that can lead to the possibility of faultiness must be suppressed, because if there is any congestion on the cash flow in one of the perpetrators, it will cause congestion in the cash flows of other actors.

Production Risk

Production risk in supply chain financing models can be suppressed with the assistance from agencies, both agricultural extension and university, that can assist farmers, farmer groups and cooperatives to produce quality red chili with a high value.

Market Risk and Price

Market risk can be mitigated by the presence of buyers who remain. Financing the supply chain can be applied to fund the red chili farmers through cooperatives that are already under contracts or agreements in selling the crops, either directly or indirectly, to the buyers, such as the exporters, modern markets or processing industry.

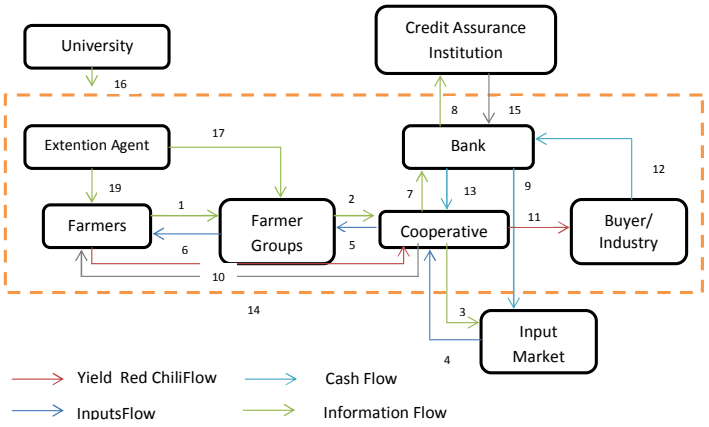
Financial Risk

Cooperatives serve as financial managers for the farmer members. Cooperative supply all the needs of farmers to inputs. Since the needs of the farmers for the input factors are relatively small, it would be more efficient if the procurement is done collectively.

a. Pre-Harvest Financing Model of Red Chili

Pre-harvest financing refers to the production processes of red chili cultivation. Prior to the seedbed, financing for the necessary input factors is needed, such as for the seeds, red chili, mulch, fertilizers and poly bag, cultivation, maintenance, fertilizers, and pesticides. For the red chili cultivation in lowlands, maintenance is performed for 100 days, while on uplands it takes 120 days. Therefore, the needs for the input factors that have to be funded for the red chili cultivation on uplands are higher than that of on lowlands.

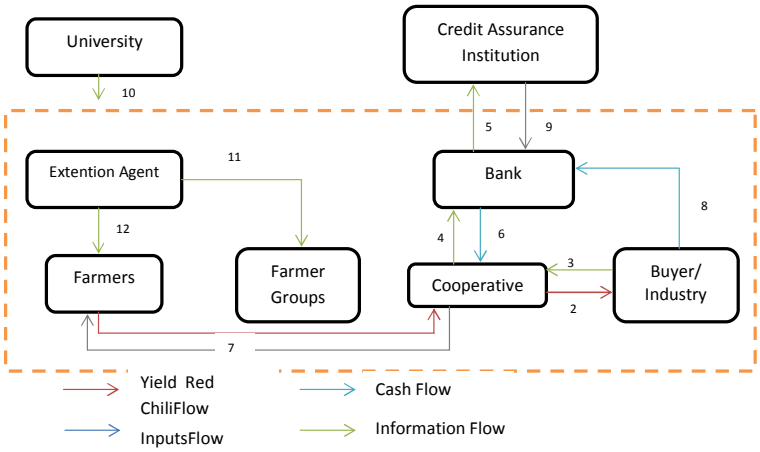
Figure 4: Pre-Harvest Financing Model of Red Chili Supply Chain



Trade Finance of Red Chili

The payment system from the buyers is not done directly. Instead, there is a certain time period agreed by the cooperative and the buyer. This has led to the possibility of late payments, including the payments to the farmers. This problem will cause a big impact because it can harm the agreed initial planting program which is not valid anymore due to the delayed funding. It will also affect the supply of the following month which cannot fulfill the quantity requested by the buyer. Therefore, a financing that can support the farmer cash flows through the cooperative is needed, which is through trade financing. Trade financing can be done during the red chili harvest which takes place for 42 days.

Figure 5: Trade Financing Model of Red Chili Supply Chain



CONCLUSIONS AND RECOMMENDATIONS

1. Financing is an important need for all the actors involved in the red chili supply chain with a structured-market orientation, especially the farmers. Financing availability in the supply chain is currently depending only on the internal actors in the chain itself. Nevertheless, in Ciamis and Garut at the moment, the banks are there already, even though only for the farmers. Financing that is given by BNI is in the form of KUR (Kredit Usaha Rakyat) or public business loans.
2. To be involved in the structured markets, the farmers or farmer groups need to use the consumer preferences as the production basis by applying planting patterns, planting schedule, and harvest schedule, so that the required input factors can be known precisely.

   Design of the financing model of red chili supply chain consists of:

   a. Pre-harvest financing is intended for financing to farmers who are members of farmer groups or cooperatives. The group membership is done to make the banking service efficient and to ease the monitoring.
   b. Trade finance is intended for cooperatives that have a contract or agreement with the buyer, as well as the production facility companies, such as seed companies, fertilizers and pesticides.
   c. In this financing model, cooperatives also perform post-treatment activities, such as sorting, grading, packing and transporting the harvested crops to the buyers. The cooperatives also act as the financial manager as well as the provider of input factors for the farmers. On the other hand, the buyers act as a market guarantor so that the farmers can get the assurance to sell their products to the markets.
   d. The results of the economic and financial analysis suggest that financing through the supply chain can benefit all parties, assuming that all the actors involved in the supply chain fulfill all the duties and obligations with discipline.

   3. Financing model could use the conventional model and the sharia model. Both models also suggest that financing through supply chain can provide benefits to all parties. The conventional financial instruments at first may be a short-term loan for working capital of the farming with interest rates that provide incentives to the farmers. The credit for the cooperatives can be a short-term credit in the form of deposits with maturities of 1 month. As for the sharia financing, Mudharabah financing is applied for the farmers, while Musharaka financing is for the cooperatives.

Recommendations

1. Assistance regarding the production basis and a common and strong understanding regarding the horticulture supply chain are needed.
2. At the initial stages, there should be a process of mentoring and a professional cooperative management.
3. Banks should get the assistance of the special financing model forred chili agribusiness.
4. Access to financing has to be adjusted according to the cash flows and the needs of each actor in the supply chain.
5. Buyers of the agricultural commodity that purchase the products directly from the farmers through the farmer groups and/or the cooperatives should understand and believe that obtaining agricultural products to supply the needs of their businesses will also provide certainty regarding the supply of commodities.

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