

RISK IDENTIFICATION OF CACAO AGROINDUSTRY SUPPLY CHAIN

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ABSTRACT

Indonesia is the second largest cocoa producer in the world and Indonesia produce 18 percent of the market globalization. Although Indonesia as a second cocoa producing country in the world, but sustainability of cacao agroindustry may be threatened if there are many risks that threaten the sustainability of cacao agroindustry. The aim for this research are identification of risk in cacao agroindustry. The result for identification of risk, we found that there are several risk: price risk, supply risk, quality risk, market risk, transportation risk, environment risk, inventory risk and transportation risk. all risks must be identified for further measured and analyzed

Keywords: risk identification, cacao agroindustry, supply chain

1. INTRODUCTION

Indonesia is the second largest cocoa producer in the world and Indonesia produce 18 percent of the market globalization. Some of the processed cocoa beans are cocoa butter and cocoa powder. That product are needed by the people of the world, especially in America and Europe, where the demand for cocoa reached 2.5 million tons every year (Bappenas, 2011).

Although Indonesia as a second cocoa producing country in the world, but sustainability of cacao agroindustry may be threatened if there are many risks that threaten the sustainability of cacao agroindustry, such as : supply shortages, productivity decreases, the amount of land conversion, low quality cocoa, etc. These risks should be eliminated or minimized.

According to Borge (2011), risk is the possibility of the emergence of a thing is not good. The appearance of something that is not good, can affect the sustainability of the cocoa agro-industry supply chain. Such risks may occur along the supply chain from upstream to downstream cocoa agro-industry.

Minimize or even eliminate the risk in the supply chain is not easy because of the cocoa agro-industry supply chain is complex, relying on many discrete actors

before the finished product is complete. This makes communication up and down the length of the chain challenging; producers may be unaware of cocoa characteristics that buyers are willing to pay a premium for, while marketers often find it onerous to locate a source for the high value differentiated product demanded by consumers (Haynes, J., Cabbage, F., Mercer, E., Sills, E., 2012).

The complexity of the cocoa agro-industry supply chain resulted in a lot of the risk occurring and involve many actors, so that the risk identification process is an important thing to do because according to Hanafi (2009), if the risk can not be identified, the risk can not be measured, and if the risk can not be measured, the risk can not be managed.

To overcome these problems, conducted research to identify the risk for subsequent analysis and risk mitigation. The research goal is to the risks that would affect to sustainability of cacao supply chain cocoa.

2. LITERATURE REVIEW

The cocoa bean is the dried and fully fermented fatty seed of *Theobroma cacao*, from which cocoa solids and cocoa butter are extracted. They are the basis of chocolate and according to Aikpokpodian

(2003), The cacao tree, *Theobroma cacao* L. is the source of cocoa powder and butter used for the manufacture of chocolate and its allied products.

According to Kouvelis (2012), at the planning stage, carefully thought-out plans and proactive actions should be put in place to ensure business continuity and to sustain profitability in the event of an undesirable scenario. The main actions include identifying the prospective supply chain risks, assessing the likelihood of risk occurrence and the severity of consequences, and devising risk mitigation plans and putting counter measures in place to avoid or reduce (if possible) the probability of risk events and to reduce the damages/disruptions to the supply chain.

In the execution stage, firms should establish a risk scanning mechanism to detect signs of risk events, put in place a real-time risk response process that is ready to deploy recovery plans immediately, and have a measuring system to assess all relevant data and analyze the effectiveness of the scanning and response processes.

According to Kouvelis (2012), risk identification is a step identifies each possible adverse event, large or small, and produces a supply chain vulnerability map where the likelihood of those events and the severity of their consequences are estimated roughly. Risk identification is an important step of supply chain risk management and should involve multiple business functions and/or supply chain members, because this exercise not only raises the awareness of the various risks that the supply chain is exposed to, it also leads management to prioritize efforts in the following tasks of risk assessment and mitigation planning.

3. RESEACH METHOD

To identification the risk in cacao agroindustry, we discussed with some expert by purposive sampling and study literature.

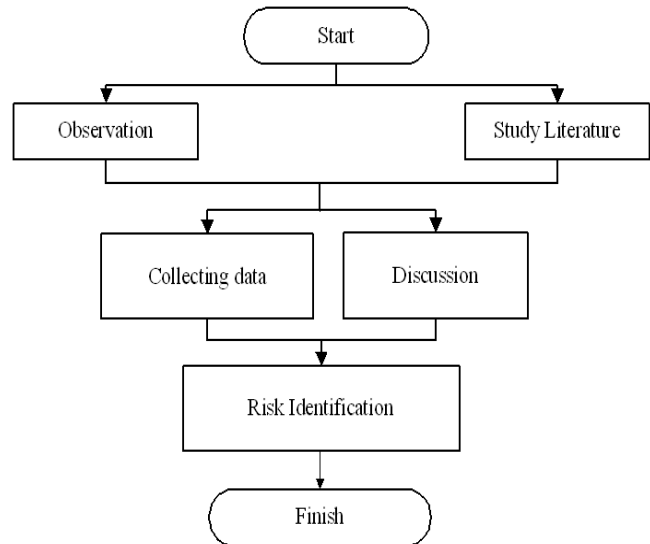


Figure 1. Reseach metodology

4. RESULT AND DISCUSSION

According to Kasidi (2010), Risk identification is identifying all the activities of the business risks faced, both speculative risk and the risk of pure nature. Any information relating to a business is collected and analyzed, if only parts of which part will appear as the cause of the possibility of a loss.

To identify risk, in this research begins with identifying actors in the cacao agro-industry supply chain. The primary members of supply chain cacao are: farmer, trader, exportir and industry. Identification of cacao risk, performed by activity in cacao agroindustry as we seen in Table 1. Table 1 explain the activity in cacao agroindustry start from the farmer until cacao butter and cacao powder industry. There are several activity for diferent actors.

According to Abbate (2007), A growing problem for Indonesian cacao farmers is the significant damage to their crops by a small moth called the cacao pod borer, short CPB. More than 400.000 smallholders in Indonesia depend on cacao to provide cash income to support their families. CPB infestation is spreading at an alarming rate.

To avoid the risk of crop failure due to pests, farmers often use pesticides derived from chemicals that can cause environmental pollution, so that environmental pollution is one of the risks that may arise in the event.

Farmers can not determine the selling price of cocoa because the selling price of cocoa is determined by the world market (London and New York). If the price of cocoa is not in favor of the farmers, the farmers will stopped to perform his Agroindustry activities, so it will be a risk of shortage of supply cacao and quality of cacao are not as expected. Quality in this case is that in fermented cocoa.

Table 1. Activity in Cacao Agroindustry

	Activity	Parameter
Farmer	Land preparation	Quality Quantity Price Information
	Utilization of natural shade	
	Making the planting hole	
	Make rorak	
	fertilization	
	Pruning and shade management	
	Control of pests and plant diseases cocoa	
	Picking	
	Sortation	
	fruit ripening	
	split fruit	
	Fermentasi	
	Drying	
	Tempering	
Packing		
Traders	Drying	Inventory Quantity Quality Cost Price
	Sortation	
	Quality Control	
	Packing	
	Inventory	
	Delivery	
Exportir	Packing	Inventory Quantity Quality Cost Price
	Quality Control	
	Delivery	
	Loading unloading	
	Inventory	
Industry	Sortation	Quantity Quality Continuity Cost Price
	QC	
	Processing	
	Packing	
	Inventory	

Problems at the farm level, not only the price, but the information regarding the cocoa price fluctuations are not routinely known by farmers and growers distance to the cocoa industry far enough, so that farmers often sell their cocoa beans to traders or exportir and the price sell they receive, have been cut by the cost of transportation.

Collector will sell cocoa beans when they get cocoa beans in an amount equal to that desired by the company (industrial processing of cocoa beans), so that collectors need a warehouse or storage of a large and well. This should be done not to damage the cocoa beans that have been obtained. Traders often combine cocoa fermentation with non-fermented cocoa

Cocoa industry will be able to continue production in case of a balance between supply and demand, so that the continuity of supply of cocoa beans has an important role in the sustainability of the cocoa industry.

Based on these descriptions, it is known that some of the risks that occur in the cocoa supply chain Agroindustry among which supply risk, risk quality, quantity risk, inventory risk, financial risk, price risk, market risk, environment risk and transportation risk as can be seen at Picture 2.

Based on Picture 2. it can be seen that the price is the biggest risk factor that occurs in the cocoa agro-industry. One of the causes of the price risk is the sale value of cocoa beans is determined by the value of the stock exchange in the United States (for non-fermented cocoa) and the UK (for cocoa fermentation). It is delivered by Damanik (2010) that the domestic market and cocoa prices follow international prices, especially the price on the New York because the majority of Indonesian cocoa exports destined for the United States. Rheza B (2013) said that farmers do not have a strong capacity to face the market and just accept the price (*price taker*).

Fluctuations in the price of cocoa is not as stable as can be seen in Picture 3. Based on ICCO (2015), fluctuations in the price of cocoa from August 2012 - 2014 can be seen in Figure 3.

All risks must be identified for further measured and analyzed. The supply chain members should be coordinate by sharing information regarding demand, orders, inventory etc. Information sharing between downstream and upstream partners in a supply chain is considered to be a major indicator of the use of Supply Chain Management.

4. CONCLUSION

Based on the literature study, it can be concluded that there are several risk : *price risk, supply risk, quality risk, market risk, transportation risk, environment risk, inventory risk and transportation risk.*

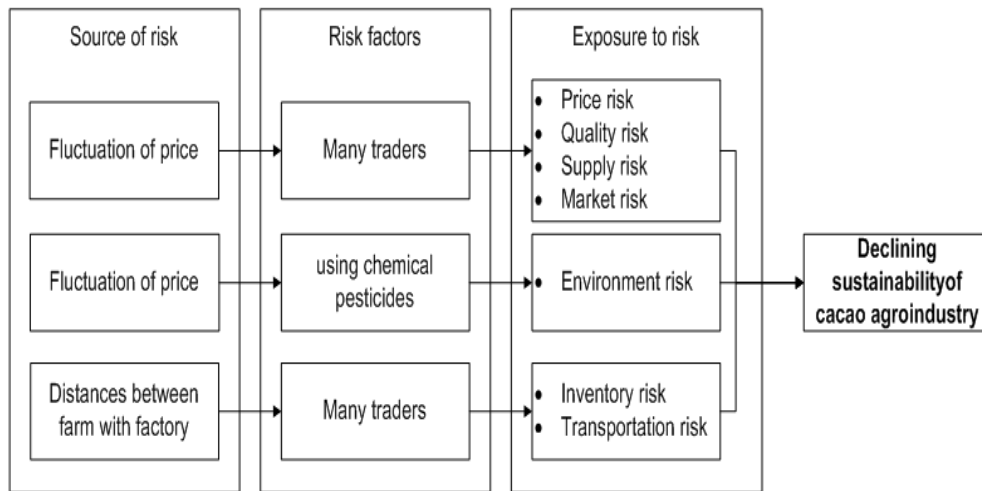


Figure 2. sequences risk

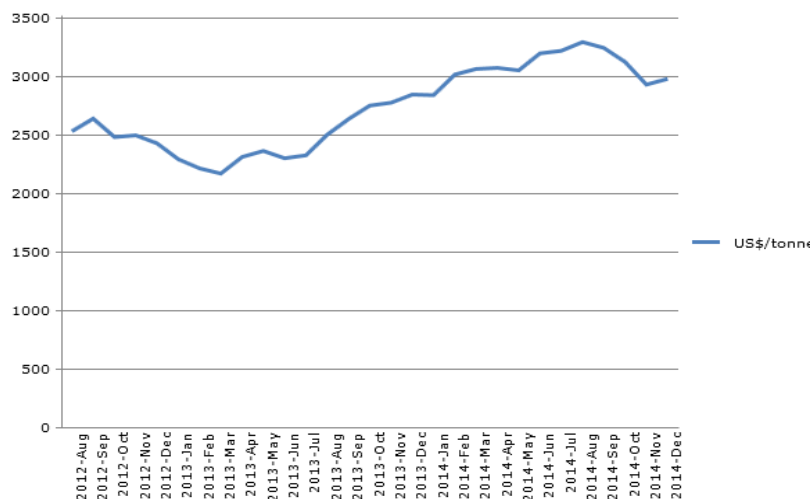


Figure 3. Fluctuations in the price of cocoa from August 2012 – 2014 (Source : ICCO)

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REFERENCES

(a) Abbate, M. 2007. The “Sweet Desire” Cacao Cultivation and its Knowledge Transfer in Central Sulawesi, Indonesia. *STORMA Discussion Paper Series Sub-program A on Social and Economic Dynamics in Rain Forest Margins. Gottingen.*

(b) Aipokpodian, PO., Badaru, K; Eskes. AB. Improving brown budding efficiency in cacao, *Theobroma cacao L.* effects of twig manipulation and some control

treatments of fungal infection on new sprouts. *Crop Protection* 22 (2003) 1–6.

(c) [Bappenas] Badan Perencanaan Pembangunan Nasional. 2011. *Masterplan Percepatan dan Perluasan Pembangunan Ekonomi Indonesia (MP3EI).*

(d) Damanik S., Herman. 2010. Prospek dan Strategi Pengembangan Perkebunan Kakao Berkelanjutan di Sumatera Barat. *Perspektif* Vol. 9 (2.): 94-105.

(e) Haynes, J., Cabbage, F., Mercer, E., Sills, E., 2012. The Search for Value and Meaning in the Cocoa Supply Chain in Costa Rica. *Sustainability* 2012, 4, 1466-1487; doi:10.3390/su4071466.

(f) Hanafi, MM. 2009. *Manajemen Risiko.* UPP STIM YKPN

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- (g) ICCO.
http://www.icco.org/statistics/cocoa-prices/monthly-averages.html?currency=usd&startmonth=08&startyear=2012&endmonth=12&endyear=2014&show=graph&option=com_statistics&view=statistics&Itemid=114&mode=custom&type=1. Download at Februari 2015.
- (h) Kasidi. 2010. Manajemen risiko. Ghalia Indonesia.
- (i) Kouvelis, Dong, Boyalati, and Li . 2012. *Handbook of Integrated Risk Management in Global Supply Chains. A John Wiley and Sons, Inc, Publication*
- (j) Rheza, B., Karlinda E. 2013. Analisis rantai nilai usaha kakao di Kabupaten Majene & evaluasi program Gerakan Nasional peningkatan produksi dan mutu kakao di kabupaten majene. *Laporan Penelitian*