

Pokdakan Mino Ngremboko's Business Recovery Strategy: Resilience Analysis and Supply Chain Integration

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ABSTRACT Mino Ngremboko Fish Cultivator Group (or Pokdakan Mino Ngremboko) is the pioneer of fish cultivation, which has been developing rapidly since its establishment in April 1987 until now (the beginning of 2021). *Corona Virus Disease* (Covid-19) pandemic has been attacking Indonesia violently (since March 2, 2020), disrupting the supply chain of the fish cultivation business. The negative impact is a decline in revenue significantly. Mino Ngremboko Cultivator, for instance, has been affected by the pandemic with an average revenue (demand) loss of 50-70 percent. In addition, business resilience becomes very crucial which comprises business continuity that represents the ability of businesses to rapidly adapt and respond to the pandemic crisis (EIB, IBRD, 2022). The objective of the study is to assess the resilience and supply chain integration of the Mino Ngremboko Cultivator in facing the Covid-19 pandemic and beyond. Method this study uses the inductive-qualitative approach through a case study of Mino Ngremboko Cultivator. Data was collected through unstructured interviews and observation from November 2020 to March 2021. The study results provide three constructive insights, especially for managing Mino Ngremboko Cultivator and Fish Cultivator Group in general for sustaining their businesses. (1) Supply chain resilience is relatively good, which was shown by the average of productivity 1,10 from March 2019 to March 2021; (2) supply chain integration of fish cultivation business was not optimally implemented yet, and (3) Pokdakan Mino Ngremboko's business recovery strategy to optimise the practices of supply chain integration based on the digital marketing as well as downstream and commercialisation the output of fish cultivation. These recovery strategies require the support of improving organisation capability and stakeholder alignment to contribute to sustainable development (benefits for the social and ecological environment) in 2022 and beyond.

Keywords: Covid-19 pandemic; cultivation group; fish; resilience supply chain; supply chain integration; the strategy of business recovery

INTRODUCTION

Pokdakan (Cultivator) Mino Ngremboko is one of 48 cultivator units located in Bokesan, Sindumartani Village, Ngemplak District, Sleman Regency, Yogyakarta Special Region. Starting from the Fish Farmer Group in Bokesan, Sindumartani Village, Mino Ngremboko began a fish farming business on April 23, 1987. In its development, the cultivation of African catfish and red tilapia has been proliferating to date. The land area development for fish cultivation expanded from 12 hectares to 25 hectares with the support of 58 fish farmers. At first, the people of Bokesan developed food crop cultivation as their main business (primary activities), while fish farming was a secondary business (supporting activities). However, rice yields have failed due to the intense attack of rice plant pests; hence, the Bokesan community took the initiative to make a turnaround by making fisheries their main livelihood (Pokdakan Mino Ngremboko, 2014). In developing the fish farming business (spawning, hatchery/nursery, rearing, and processing), Mino Ngremboko Cultivator is supported by the vision of "Ready to Step Forward to be Professional and Independent" with the credo (ethical work spirit) 'Working Together, Playing Equal Roles.' Based on this vision and credo, Mino Ngremboko Cultivator management seeks to create a harmony of

interests among fish cultivators to avoid unfair sales competition. The dynamics of the development of the Mino Ngremboko Cultivator have succeeded in improving the economy of the Bokesan community through sustainable production and supported by a sound management system. Various forms of appreciation and recognition from the Yogyakarta Provincial Government and the Government of Indonesia have made Mino Ngremboko the main class of cultivators and a pilot in the Special Region of Yogyakarta Province.

During the Covid-19 pandemic (March 2020 - December 2021) the era of Community Activities Restrictions Enforcement or CARE (*Pemberlakuan Pembatasan Kegiatan Masyarakat* or PPKM)-the Micro, Small and Medium Enterprises (MSMEs) in Yogyakarta Special Region were at particular risk as they suffered deeper losses to adapt to the Covid-19 pandemic crisis (Dinas Koperasi & UKM DIY, 2021). Every small business like Mino Ngremboko Cultivator should recover its revenue losses through finding its own way of doing business recovery. In 2022, after the CARE or PPKM, Mino Ngremboko Cultivator needed to redesign its business strategy related to efforts to deal with non-natural disasters (health crisis) in the Covid-19 pandemic following the credo of "Recover Faster, Rise Stronger". Contextually,

the purpose of this research is the need for efforts to optimise marine and fisheries MSMEs, in this case, Mino Ngremboko Cultivator related to recovery strategies due to the Covid-19 pandemic and beyond. Conceptually, the Mino Ngremboko Cultivator recovery strategy needs to consider the application of the following three relevant concepts: supply-chain resilience (SCRES) supply-chain integration, and business recovery strategy (Ali *et al.*, 2017).

Ali *et al.* (2017) explained that supply chain resilience (SCRES) is associated with three-time dimensions, namely before a disturbance (pre-disruption), during a disturbance (during-disruption), and after a disturbance (post-disruption). Regarding current conditions, what is meant by disruption is the disruption from the Covid-19 pandemic (Akintokunbo & Adim, 2020). SCRES requires support for the implementation of proactive strategies (anticipation, adaptation), reactive strategies (response, recovery), and collaboration of proactive and reactive (learning) strategies to be able to overcome Covid-19 disruptions.

Perdana *et al.* (2019) and Awad & Nassar (2010) define supply chain integration as a collaboration between the upstream and downstream sectors through integrated product management, information, and financial from suppliers to customers. Walters (2006^a; 2006^b) refers to the upstream sector as a supply chain that seeks to improve business cost-efficiency. Meanwhile, the downstream sector is referred to as the demand chain, which is related to increasing the effectiveness of business revenue performance. Fernando (2010) and Khare (2006) formulate business productivity optimisation to compare the effectiveness of operating revenues divided by the efficiency of operating costs. The optimal business productivity indicator should be above one or >100%. Martinez & Stewart (2003) specifically connect the agribusiness strategy to shifting from a supply push orientation (starting from suppliers) to a demand-pull orientation (starting from consumer demand). Madhani (2016), based on Porter (1992), suggests the development of business competitiveness through the movement from the supply chain (business costs efficiency) to the demand chain (business revenues effectiveness). Christopher & Ryals (2014) describe the relationship between marketing (demand chain) and supply chain to realise agility in capturing demand opportunities and lean in managing business processes. Awad & Nassar (2010) suggested three supply chain integration challenges that must be anticipated: macro business, micro-business, and technical factors. The meaning of integration is an effort to build a business network from upstream to downstream-which involves internal and external stakeholders based on the values of togetherness, kinship, benefit, and business sustainability (Department of Agriculture, Food and Fisheries, Sleman, 2018). Figure 1 is a supply chain integration

model that integrates the upstream sector (supply chain) and downstream sector (demand chain).

In the 2017 Sleman Fisheries Profile book, the Department of Agriculture, Food and Fisheries of Sleman Regency 2018 has consistently implemented community economic development based on groups (togetherness and kinship efforts). This intention is to follow the policy of the Ministry of Marine Affairs and Fisheries (through the Directorate General of Aquaculture) in collaboration with Indonesia's Sustainable Development Goals (SDGs). The SDGs are a global movement, including Indonesia, to end poverty, reduce inequality, and protect the socio-ecological environment. The SDGs contain 17 and 169 targets expected to be achieved by 2030 (SDG Indonesia, 2015). Marine and fisheries policies based on the blue economy (14th SDG related to marine ecosystems) and green economy (15th SDG related to terrestrial ecosystems) as strategic steps toward sustainable marine and fisheries development (UNEP, 2010; Sunoto, 2014; World Bank, 2015). The blue economy and green economy as leading sectors as well as 'big policy' to create positive collaboration between the Ministry of Maritime Affairs and Fisheries, Ministry of Energy and Mineral Resources, Ministry of Public Works and Public Housing, Ministry of Environment and Forestry, the Ministry of Tourism and Creative Economy, and the Investment Coordinating Board under the coordination of the Ministry of Maritime Affairs and Investment (Kemenko Marves, 2020).

Pauli (2010), in his book *Blue Economy*, describes the blue economy as the sustainable use of marine (maritime) resources for economic growth, improvement of people's lives and employment, and the health of marine ecosystems. The blue economy includes six key activities: renewable energy resources, fisheries, maritime transportation, tourism, climate change, and waste management (Ciptono *et al.*, 2017). Eikeset *et al.* (2018), Wibowo (2020), and UNCTAD (2020) stated that the *Blue Economy* is a blue investment program that utilises the natural potential of the marine environment based on sustainable development to realise blue growth, especially in facing the Covid-19 pandemic. Blue investment is in line with the *strategy for sustainability* proposed by Werbach (2009), who defines sustainability as follows. "Sustainability (sustainable development through the blue and green economy) as "meeting the needs of the present without compromising the ability of future generations to meet their own needs based on the three Ps performance or triple bottom line: Profit (Economic Value), People (Social-Cultural Value) and Planet Earth (Environmental Value)".

Sustainability (sustainable development through a blue and green economy) is fulfilling the needs of the present without compromising the ability of future generations to

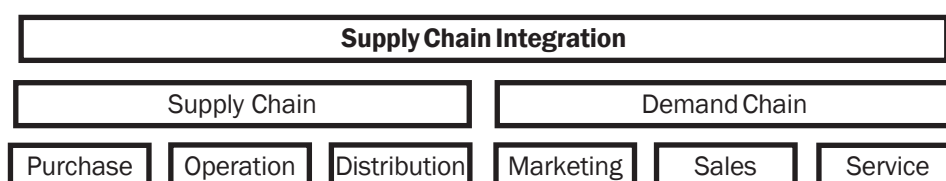


Figure 1. Supply chain integration (Award & Nassar, 2010; Perdana *et al.*, 2019).

meet their needs based on three performances and values: profit (economic value), welfare (socio-cultural value), and ecological environment (environmental sustainability value). Blue Economy and Green Economy are the two main pillars related to the sustainability of marine and fisheries businesses based on optimal utilisation of marine and land resources to support sustainable development programs. Fish cultivation is part of the fisheries business system from upstream to downstream, which needs to be managed in an integrated and sustainable manner. Facing the Covid-19 pandemic, fish cultivator requires a study of resilience and supply chain integration for the future sustainability of the fish cultivation business. Lee (2004) suggests that the Triple-A concept supports supply chain integration best practices associated with sustainable development (the three Ps). Triple-A supply chain includes *agility*, the ability to adapt to global change (*adaptability*), and stakeholders *alignment*.

This research is related to the revival and recovery of the Mino Ngremboko Cultivator in the face of the Covid-19 pandemic. (1) How good is the supply chain's resilience before, during, and possibly after the Covid-19 pandemic? (2) What illustrates supply chain integration from upstream to downstream? (3) What is the relevant business recovery strategy for Mino Ngremboko?

METHODS

This inductive research uses qualitative methods through a Mino Ngremboko Cultivator case study. Data were collected through observations from November 2020 to February 2021 and interviews process with five informants from Mino Ngremboko Cultivator and a webinar with two experts from the Ministry of Maritime Affairs and Fisheries, two experts from the Yogyakarta Provincial Chamber of Commerce and Industry, the Agriculture, Food, and Fisheries Office of Sleman Regency, as well as one expert from the Community Service of the Department of Fisheries, Faculty of Agriculture, Universitas Gadjah Mada. These ten interview participants were selected to know about Mino Ngremboko Cultivator and understand marine and fisheries MSME policies in dealing with the Covid-19 pandemic, and be willing to be interviewed (purposive and convenience sampling to obtain primary data). At the same time, the observation process was carried out by visiting the Mino Ngremboko Cultivator location (field observation) to obtain secondary data related to the cultivation and processing of African catfish and red tilapia.

The obstacle faced by researchers, especially when conducting interviews, was the unwillingness of some prospective informants to be interviewed. Initially, it was expected to be able to conduct interviews with seven administrators and active members as well as five consumers (a total of 12 prospective informants). The researcher finally came up with four administrators, active members, and one consumer (a total of 5 informants) who were successfully interviewed. The main reason for not being willing to be interviewed was that seven prospective informants said they were not ready to be interviewed because they were still confused about facing business difficulties and following the Large-Scale Social Restrictions (lockdown) regulations regarding the Covid-19 pandemic.

Meanwhile, five informants were willing to be interviewed because they are used to providing data related to previous undergraduate and postgraduate research at Mino Ngremboko Cultivator. Although five informants are sufficient, triangulation of data sources is needed (Creswell, 2013). In this study, the implementation of triangulation of data sources was carried out through secondary data by observing regulations related to fish farming businesses in Indonesia and Sleman and the profile/document of Mino Ngremboko Cultivator; as well as interviews and webinars with fishery experts/policymakers (two from Ministry of Marine Affairs and Fisheries, two from the Yogyakarta Provincial Chamber of Commerce and Industry, Department of Agriculture, Food and Fisheries, Sleman, one from Department of Fisheries, Faculty of Agriculture, Universitas Gadjah Mada) a total of 5 experts as the jury of expert opinion. Thus, interview constraints due to the Covid-19 pandemic can be overcome by triangulating data sources.

According to Bate et al. (2012) and Wahyuni (2019), a qualitative method with scientific justification can be utilised to study (inductively) the Covid-19 pandemic phenomenon that disrupts the supply chain of African catfish and red tilapia cultivation. Based on the qualitative method, a single case study or a *mono case study* was chosen (Yin, 2003; Hennink et al., 2020) in Mino Ngremboko Cultivator, a primary-class fish farming business and a pilot in the Special Region of Yogyakarta Province.

The qualitative research stage consists of the data collection and analysis stages, producing two research outputs, namely the supply chain resilience design and supply chain integration diagram, synthesised into a research outcome, namely the Mino Ngremboko Cultivator business recovery strategy.

RESULTS AND DISCUSSION

The impacts of the Covid-19 pandemic on Mino Ngremboko Cultivator as one of the marine and fisheries MSME actors are (1) a decrease in business income due to a decrease in demand for African catfish and red tilapia by the culinary industry; (2) limited supply of fish seeds; (3) a decrease in motivation in fish cultivation which affects the search for other business activities; (4) the price of fish feed and medicine increases which has an impact on the extra cost of the fish farming business. Concerning these four impacts, Mino Ngremboko Cultivator must consider the supply chain resilience analysis results and the following supply chain integration.

Business resilience (the supply chain resilience) describes an business' ability to respond and adapt quickly to disruptions or unplanned changes (i.e. the Covid-19 pandemic) that could threaten its business or supply chain operations (EIB/BRD, 2022). In fact, the supply chain resilience of the Mino Ngremboko Cultivator was disrupted at the beginning of the Covid-19 pandemic (2 March-31 July 2020). This statement is supported by the fact that there was a business loss in August 2020 of negative IDR 2,468,870. The average business productivity performance from March 2019 to March 2021 is 1.10 (above the value 1). This value shows that the resilience of the

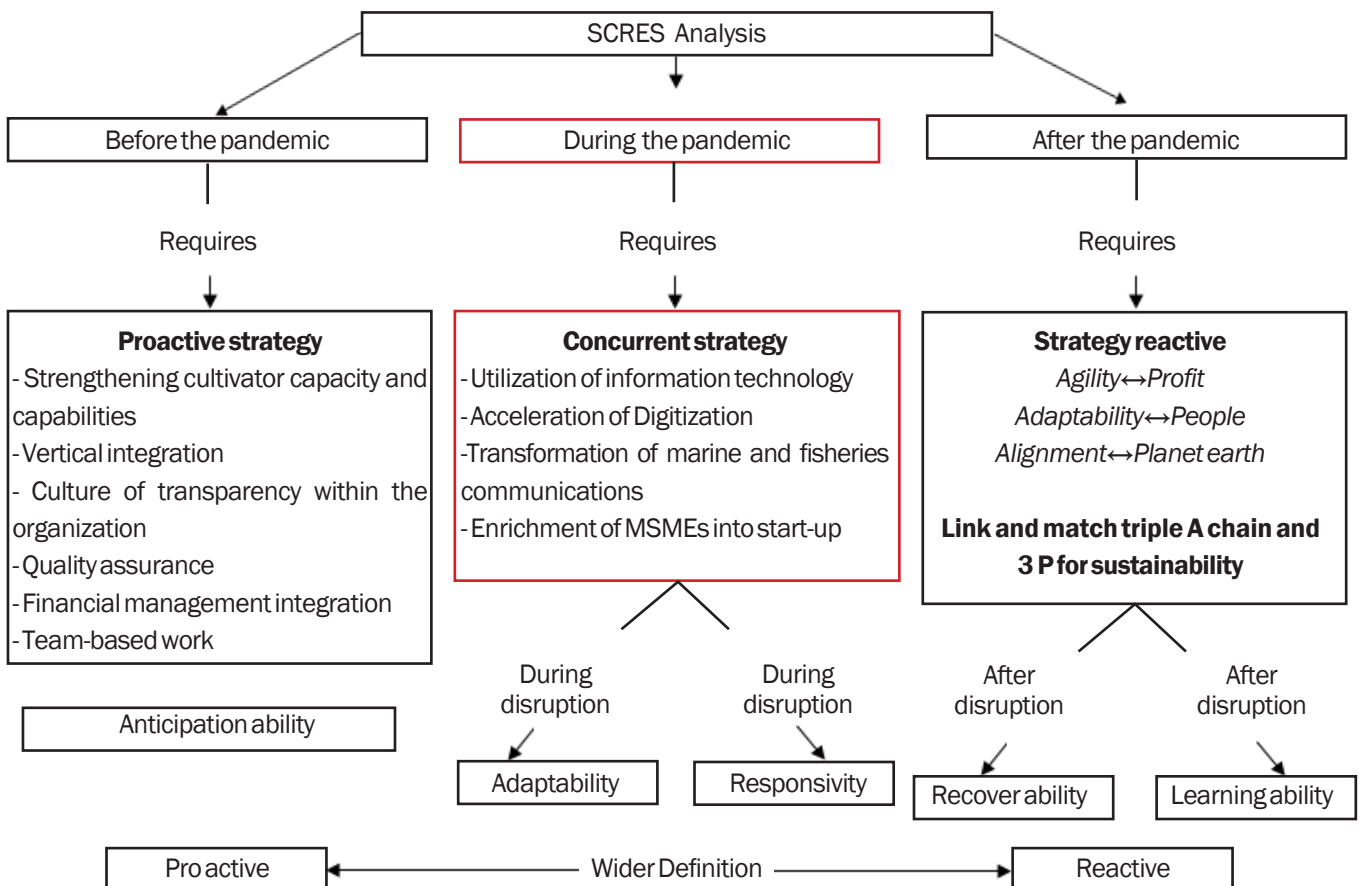
Mino Ngremboko Cultivator supply chain is relatively good. It is hoped that after March 2021, supply chain resilience will improve in line with the success of the national and regional economic recovery strategies supported by improving public health to realize “Recover Faster, Rise Stronger in 2022 and beyond”.

Mino Ngremboko Cultivator supply chain integration reflects the integrated fisheries business system from upstream (supply side) to downstream (demand side). In the context of the fish farming business carried out by Mino Ngremboko Cultivator, the implementation of supply chain integration has not been optimal. The Covid-19 pandemic has provoked awareness to optimise (best efforts) supply chain integration by marketing fish farming products through offline (conventional/fish selling points) and online marketing. In addition, business diversification downstream of fresh fish products (on-farm products) into processed products (off-farm products), such as shredded fish, meatballs, and nuggets with high added economic value, is indispensable. In this case, fish farming innovation strategies from the upstream and downstream sides are necessary to survive in the Covid-19 pandemic. Mino Ngremboko Cultivator’s business recovery strategy is effective based on a link and match between a triple bottom line (3P: Profit, People, Planet Earth) and triple-A (Agility, Adaptability, Alignment) sustainability development strategy.

The Mino Ngremboko Cultivator supply chain resilience analysis is represented in [Figure 2](#) below.

A proactive strategy before the Covid-19 pandemic related to the ability to anticipate fish farming business risks. The journey of the Mino Ngremboko Cultivator business from 1987 to 2020 has succeeded in managing the internal organisation (good organisational management) that supports production management from upstream to downstream. Award and the inauguration as the main class of the cultivator group in 1997 were part of their success story. Since changing to *Pokdakan* (cultivator) in 2000, Mino Ngremboko management has conducted various innovation programs more intensively related to aquaculture. This innovation program collaborates with relevant research institutions and government agencies. As a result, in 2001, Mino Ngremboko Cultivator became the first winner of the national-level cultivator competition. This success motivated all Mino Ngremboko Cultivators to develop their business with a market approach strategy of “*produce what can be sold*” from 2001 to 2010 ([Pokdakan Mino Ngremboko, 2014](#)) supported by Informants

Bokesan is located on the slopes of Mount Merapi and is flanked by two rivers, the Opak River and the Gendol River. In 2010, a catastrophic eruption of Mount Merapi resulted in all aquaculture and livestock dying. This natural disaster made Mino Ngremboko Cultivator aware of the importance of building business partnerships to revive his cultivation business. Mino Ngremboko Cultivator built a supply chain integration model upstream to downstream. From 2011 to 2014, Mino Ngremboko management pioneered



[Figure 2](#). Supply Chain Resilience (SCRES), Source: Primary Data Processed; [Cahyacipta \(2021\)](#).

interdependence relationships with external parties from upstream to downstream. This experience was intended to strengthen the capacity and capability of the cultivator group. In addition, vertical integration is needed, developing a culture of honesty and organisational transparency, quality assurance, integration of financial management, and a team-based work system. The management also succeeded in making the Mino Ngremboko Cultivator profile in 2014. This business partnership develops various businesses upstream to downstream (2014-to 2019). Various businesses being developed include nursery, rearing (on-farm), and processing (off-farm) such as shredded, crispy, catfish steak, fish crackers, tilapia *dawet*¹, fish balls, *Lemper*² stuffed with catfish shreds, and fish skin chips (Pokdakan Mino Ngremboko, 2014).

Concurrent strategies during the Covid-19 pandemic related to the ability to adapt and respond during the Covid-19 disruption. To increase the turnover of the fish farming business (which tends to decrease during the Covid-19 pandemic), efforts are needed to expand the marketing area. Fish production (rearing of African catfish and red tilapia) needs to be marketed more aggressively by creating distribution channels and online marketing. In addition, Mino Ngremboko Cultivation needs to diversify it is fish product processing business (downstream fish farming results), conduct business promotion through social media, conduct interactive communication with stakeholders (suppliers, customers, cultivator associations, banks, and the government), and organise special events with government agencies (such as exhibitions/bazaars, fishing competitions, and family gathering). Therefore, Bokesan, Sindumartani Village, as the location of the Mino Ngremboko Cultivator, can maintain its existence (uniqueness) as one of the Fisheries Tourism Villages in Sleman. Simultaneous strategy (adaptive and responsive) is implemented by utilising information technology, accelerating fisheries digitisation (with Sleman Department of Agriculture, Food and Fisheries facilitator), transforming marine and fishery communities with an economic value-added, and socio-cultural value-in-use and ecological sustainability. In addition, this strategy is also executed with the empowerment of fisheries MSMEs towards a digital business or start-up business to expand market reach.

The business environment is also related to better management of fish cultivator groups (especially in Mino Ngremboko Cultivator) to increase the business productivity of its members and groups. Business collectivity (group work) must be prioritised to increase group business productivity, quality of catfish seeds and red grades, quality of catfish and red tilapia produced by rearing, and processed fish products on a micro-small scale. For this purpose, development activities for fish farming and processing equipment, chest freezers, fish trading equipment (marketing facilities that comply with sanitary standards to prevent damage to fish during the marketing

process-according to SSOP: Standard Sanitation Operating Procedure), and frozen warehouses storage of fishery products before being marketed is imperative to be realised. Mino Ngremboko Cultivator must register its members to get a Marine and Fisheries Business Actor Card (or *Kartu Pelaku Usaha Kelautan dan Perikanan-KUSUKA*) as the sole identity of marine and fisheries business actors from the Ministry of Maritime Affairs and Fisheries.

Reactive strategies after the Covid-19 pandemic related to learning abilities during the Covid-19 pandemic to support potential recovery efforts. Mino Ngremboko Cultivator, in collaboration with other cultivation in Sleman Regency, encourages member development to obtain a Certificate of Cultivation Eligibility to unlock access and information in developing fishery business legality/permits-downstreaming fishery products (fresh fish) into processed fish products. Mino Ngremboko Cultivator, as part of the marine and fisheries MSMEs, pioneered the implementation of an effective recovery strategy supported by the learning community processes during the Covid-19 pandemic. Table 1 provides information regarding the resilience of the Mino Ngremboko Cultivator supply chain with business productivity indicators from March 2019 to March 2021.

The productivity performance of Mino Ngremboko Cultivator's fish farming business from March 2019 to March 2021 illustrated that in March and August 2019, and June 2020, the figure was below 1, precisely 0.97; 0.79, and 0.82. Although data for other months show business productivity is above 1 (average 1.10), Mino Ngremboko Cultivator needs to increase its operating revenue target (performance of effectiveness) supported by improvements in operational processes that can save business costs (performance efficiency). Thus, business productivity can gradually increase to a minimum of 1.50 or ≥ 1.50 .

The supply chain integration analysis of the Mino Ngremboko Cultivator is illustrated in Figure 3.

Upstream-Downstream I (Supply Chain-Demand Chain I): The fish farming business (African catfish and red tilapia) starts from the upstream side, namely suppliers (providers) of infrastructure (fishponds and waterways) and facilities broodfish, fish feed/pellets, fish medicine, fertiliser, and cages/baskets or boxes made of bamboo slats for cultivating fish. Individual fish farmers prepare ponds for broodfish and ponds for spawning (the process of mating male and female broodstock). According to Informant I 2. (2020), the number of broodfish ponds and spawning ponds must be provided depending on the amount (area) of land to be stocked.

If the broodfish are available and ready (from the supplier), they are selected in the afternoon (around 4-5 pm). This selection is based on the requirements for the broodfish to be gonadally mature. The characteristics of male catfish that are mature gonads are the proportion of the head is smaller than that of the female, the colour of the chest skin of the male is muddier than the female, the male sex is prominent, extends towards the back, is located behind the anus, with a reddish colour, the movement of the male broodfish is more agile than the female catfish. While the

¹ Cold drink consisting of a mixture of coconut milk with Javanese sugar, rice flour, and cendol.

² Traditional snack made of steamed glutinous rice with meat or other stuffing and wrapped in a banana leaf

Table 1. Business productivity 2019-2021.

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Operating revenues(Rp)	-	-	12.823.798	12.589.863	11.175.973	9.062.662	10.989.759	9.193.559	6.514.465	5.153.004	4.802.096	10.478.817
Operating expenses(Rp)	-	-	13.167.095	10.226.276	10.285.086	7.244.302	8.780.734	11.662.429	5.501.539	5.429.591	4.425.917	9.282.224
Profit/loss(Rp)	-	-	(343.297)	2.363.587	890.887	1.818.360	2.118.025	(2.468.870)	1.012.926	(276.587)	376.179	1.196.593
Bussiness productivity	-	-	0.97	1.23	1.09	1.25	1.24	0.79	1.18	0.95	1.08	1.13

2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Operating revenues(Rp)	10.465.546	16.200.318	10.479.857	6.887.107	6.860.484	1.828.035		15.194.240				7.765.007
Operating expenses(Rp)	8.500.516	12.608.133	8.138.736	6.144.710	5.497.546	2.222.900		12.734.689				7.096.292
Profit/loss(Rp)	1.965.030	3.592.185	2.161.185	742.397	1.362.938	(394.865)		2.456.551				666.755
Bussiness productivity	1.23	1.28	1.25	1.12	1.25	0.82		1.19				1.09

2021	Jan-Feb	Mar
Operating revenues(Rp)	8.241.838	1.041.028
Operating expenses(Rp)	7.579.332	1.435.014
Profit/loss(Rp)	662.506	(393.986)
Bussiness productivity	01.08	0.72

Source: Primary Data Processed, 2021.; Note: Business Productivity = [(Operating Revenues) : (Operating Expenses)].

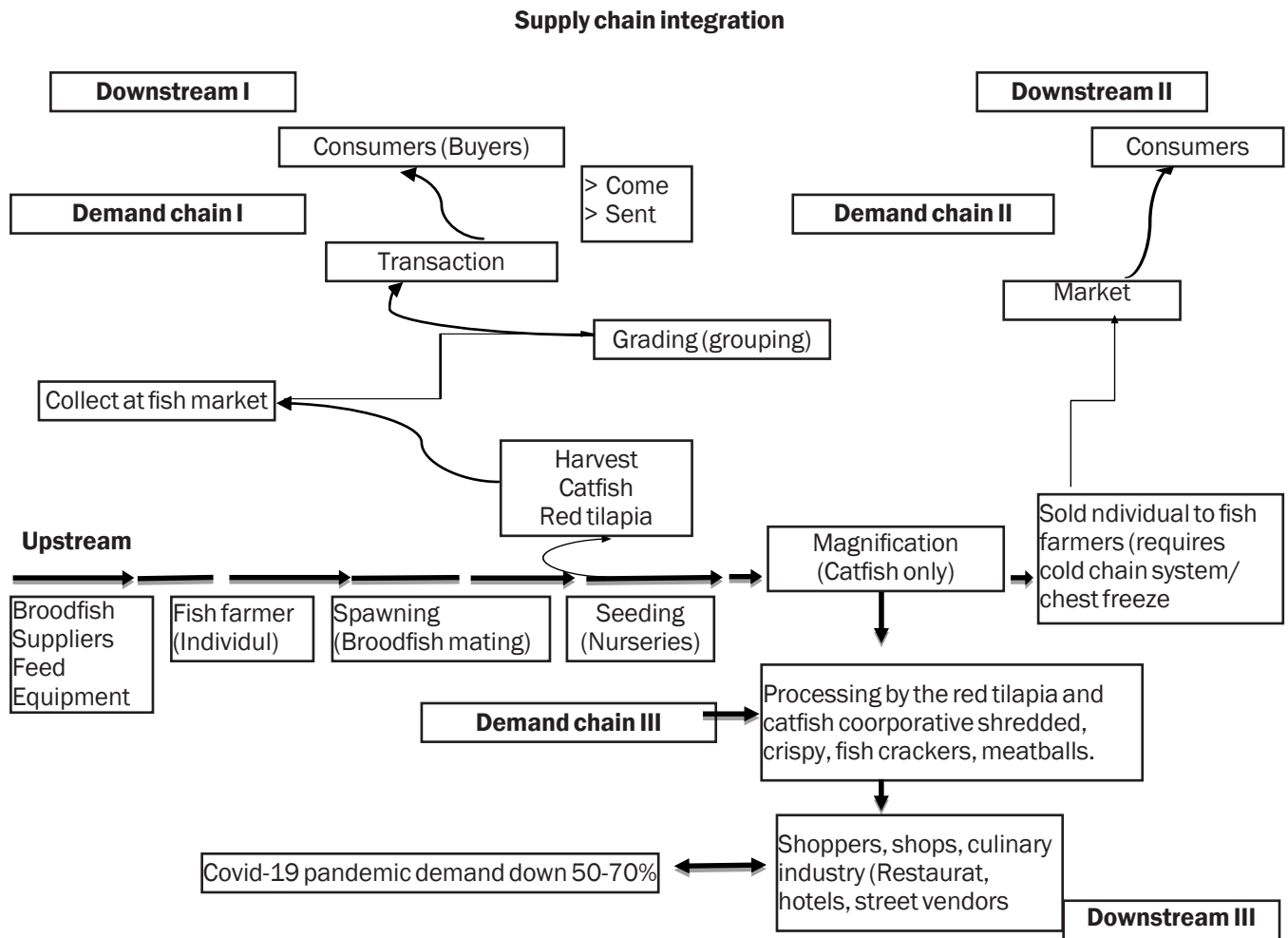


Figure 3. Mino Ngremboko Cultivator's supply chain integration (Primary Data Processed, 2021).

female catfish has a giant belly, and the female genitalia, when touched, are flexible and bluish. For mass spawning, pay attention to the male and female broodfish ratio, namely 2:3; in this case, the number of female broodfish is more than the male broodfish. The spawning process is carried out in a pond with clear water equipped with a net to attach African catfish eggs. The selected male and female broodstock were put into a spawning pond with clear water and a height of about 30 cm. At night, turn off the lighting (dark atmosphere); if the pond is shallow, it is better to cover it (with a ventilation hole) so that the broodfish does not jump out of the pond.

The spawning process (broodfish mating) occurs from 10 pm to 3 am. If fish eggs are on the net in the morning, the broodfish are separated from the spawning pond. Fish eggs are transferred to a particular place (rice fields) or remain in the spawning pond. This activity is intended to protect the eggs due to the aggressive movement of the brooders after spawning. For two days, the fish eggs will hatch in hot weather conditions.

Meanwhile, fish eggs usually hatch for more than two days in cold weather. When the fish eggs have hatched, fish farmers need to prepare feed-in silkworms and add the modern feed as a supplement in pengli (flour) as the initial part of the hatchery process. If fish farmers want to spread fish hatchlings into seeds within 7-10 days, they must multiply silkworms. In addition, the water condition in the

pond or the fields must be reasonable and add fertiliser and leaves for catfish seeds (seedlings) shelter.

Within one month (30 days), the catfish seeds can be harvested and collected at the fish market (a place for selling fish). Catfish seeds were then graded into seven groups (grouping/uniforming catfish seed sizes). Then, the catfish seeds can be sold with baby tilapia or kept (rearing process). The transaction process (buying and selling) of catfish and red tilapia (baby tilapia) seeds utilises consumers coming directly to the fish selling point or sending them to the buyer's location-as demand chain 1 (downstream 1).

Upstream-Downstream II (Supply Chain-Demand Chain II): The rearing process for catfish seeds that are not sold. As for the red tilapia seeds, they are immediately sold as baby tilapia because they do not have the capability related to technology for rearing. A minimum of 7-8 cm in size is used for the rearing of catfish seeds. For consumption of African catfish, a pond is prepared 3-4 days in advance, filled with healthy freshwater (sufficient oxygen) and manure. Feeding (pellets) should be done twice a day, with a feeding interval of about 11 hours. This activity is applied, so the catfish only removes the pulp while the protein does not come out (into the fish's body). If the protein comes out, it produces ammonia. Within 40-45 days, if the catfish condition varies in size (incoherent), a grading process should be carried out (grouping the size of the catfish). However, if the size is

identical, there is no need for a grading process to wait for the harvest. The harvest period for consumption of African catfish takes 70-75 days. At harvest time, per kilogram contains 6-10 African catfish.

Before being marketed or further processing, fish products (rearing) must be stored in a frozen storage warehouse equipped with a chest freezer system. The purpose of refrigerated catfish storage facilities is to maintain the quality of African catfish. The marketing process or sales are carried out individually at the market (a place for selling fish). In this case, fish farmers should already have potential buyers (consumers) or sell them to collectors at a lower price risk as demand chain II (downstream II). Improvement of group management in Mino Ngremboko Cultivator needs to be prioritised for managing group marketing for African catfish consumption. Mino Ngremboko Cultivator's management must cooperate with the Sleman Fisheries Partner Network Cooperative to realise group marketing offline (fish selling points) and online (digital marketing). Support from the Sleman Fisheries Partner Network Cooperative is also needed to master tilapia seed rearing technology; to avoid being sold as baby tilapia.

Upstream-Downstream III (Supply Chain-Demand Chain III): The results of the African catfish rearing are processed by the Mino Ngremboko Cooperative, which the Sleman Fisheries Partner Network Cooperative supports. This process is driven by the growing public preference for processed fish products that are ready to cook, ready to consume, and user-friendly, such as shredded fish, fish crispy, nuggets, catfish steak, and brittle fish crackers, and

catfish meatballs. For processing, large catfish (above 1 kg) are used. To rear catfish seeds, a pond size of 2m x 3m (area = 6 m²) with a water depth of 1m for 3,000 fish is to rear catfish seeds required. One quintal of feed (pellet) is needed until it is harvested, plus meat supplements (waste from the meat market). In the future, Mino Ngremboko Cultivator needs to develop a Fish Processing Unit in collaboration with the Department of Agriculture, Food and Fisheries, Sleman, to encourage fishery downstreaming (processing and commercialisation) products.

Catfish consumers are individual buyers and the culinary industry (hotels, restaurants, and street vendors). As for processed catfish products, consumers are souvenir shops. The marketing process of catfish was complicated at the beginning of the Covid-19 pandemic (2 March-31 July 2020). Individual fish farmers (cultivators) try to make sales using social media (internet). Buyers ask for catfish that has been cleaned of stomach contents and then delivered to their homes (for example, to the Kotagede, Bantul Regency, Yogyakarta Special Region). Individual sales are made because the Mino Ngremboko cultivator prioritises managing the hatchery process. Members seek to find potential buyers or sell consumption catfish through collectors as a third (downstream/downstream III) demand chain.

Mino Ngremboko cultivator's business recovery strategy

The three business recovery strategies of Mino Ngremboko Cultivator are presented in Table 2 below. Mino Ngremboko Cultivator's recovery strategy links and matches the triple-A supply chain: Agility, Adaptability,

Table 2. Recovery strategy matrix.

Triple A supply chain	3 PS of sustainability strategy		
	Profit	People	Planet earth
Ability	Agility in capturing business opportunities digitally (online) and creatively and innovatively of catfish and red tilapia cultivation	-	-
Adaptability	-	Organizational capability to adapt to change (dynamics) in the mindset and behavior of fish farming stakeholders from upstream to downstream to maintain the sustainability of customer/supplier relationship management-based business networks	-
Alignment	-	-	Harmonization/ synchronization of the interest of fish farming stakeholders in maintaining the ecological/natural environment of the place of business in a hygienic, humanistic, and sustainable manner

Source: Primary Data Processed (2021).

Alignment, and the 3 Ps of Sustainability Strategy.

Recovery strategy 1 is an agility-profit strategy. The first strategy encourages Mino Ngremboko Cultivator to increase agility in capturing business opportunities. Online or digital marketing is needed to support the downstreaming and commercialisation of fish farming products.

Recovery strategy 2 is the adaptability-people strategy. This second strategy requires improving organisational capabilities (especially managers and members of Mino Ngremboko Cultivator) to adapt to the changing dynamics of the fish farming and processing business environment. Thus, the fish farming and processing business network from upstream (on-farm) to downstream (off-farm) can increase business cost efficiency, supporting business productivity and profitability.

Recovery strategy 3 is a planet-earth alignment strategy. The third strategy requires Mino Ngremboko Cultivator to build an alignment of interests with stakeholders in developing a hygienic, humane, and sustainable fish cultivation and processing business. Mino Ngremboko Cultivator became a pioneer in implementing SDGs (#14 and #15) related to the green and blue economics in Sleman Regency, Yogyakarta Special Region.

CONCLUSION AND RECOMMENDATION

Conclusion

Analysis of supply chain resilience or SCRES demonstrates that the business productivity performance of Mino Ngremboko Cultivator is quite good (average 1.10) during the Covid-19 pandemic. The Mino Ngremboko Cultivator Supply Chain Integration Model explains that the Mino Ngremboko Cultivator supply chain integration practice is not yet optimal, especially related to red tilapia cultivation and the downstreaming and commercialisation of fish.

Upstream-Downstream 1: describes the chain of activities and value-added processes from spawning broodstock to catfish and red tilapia (baby tilapia) seeds which are sold in groups to consumers through fish sales points (markets) – for red tilapia, it is not yet optimal;

Upstream-Downstream II: develop a value-added process for the rearing of African catfish seeds into catfish for consumption to be sold individually through fish sales points (markets) – group sales are not yet optimal;

Upstream-Downstream III: processing the use-value process of fresh catfish into processed products by cooperatives such as shredded, crispy, catfish steak, fish cracker, tilapia dawet, fish balls, lemper filled with shredded catfish, and fish skin chips have not been implemented optimally.

A business recovery strategy matrix for Mino Ngremboko Cultivator can be made in the resilience and supply chain integration analyses. Three recovery strategies are being considered by Mino Ngremboko Cultivator, namely: Recovery Strategy 1 (Agility-Profit), Recovery Strategy 2 (Adaptability-People), and Recovery Strategy 3 (Alignment-Planet Earth). These three recovery strategies are executed simultaneously to realise the green and blue economics (SDG #14 and SDG #15).

Recommendation

Mino Ngremboko Cultivator's vision of "Ready to Step Forward to be Professional and Independent" with the credo (ethical work spirit) 'Working Together, Playing Equal Roles.' To realise its vision and credo amid the Covid-19 Pandemic, the cultivator should consider three constructive suggestions.

Mino Ngremboko Cultivator needs to innovate its business to increase added value and fish use-value along with the main actors of marine and fisheries MSMEs (fishers, fish cultivators, fish processing units, product marketers, and salt farmers) to build supply chain resilience in the face of the Covid-19 pandemic.

Mino Ngremboko Cultivator optimises supply chain integration through prioritising group work systems upstream to downstream in the fishery business (cultivating) African catfish and red tilapia. The group work system that is stranded in hatching African catfish and red tilapia must be continued until the process of rearing and processing fresh fish into processed fish products. This initiative needs to be supported by the empowerment of cooperatives, the support of non-fish farmers, mastery of rearing technology (especially red tilapia seeds), and the realisation of digital (online) marketing.

Following the meaning of 'Mino Ngremboko' as the initiator (pioneer, leader) of the fish farming business (especially African catfish and, in the future red tilapia), which continues to grow to provide value for the broader community in terms of economic-business, socio-cultural and ecological sustainability for the present and the future (2022 and beyond).

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REFERENCES

- Akintokunbo, O.O. & C.C. Adim. 2020. Covid-19 and supply chain disruption: a conceptual review. *Asian Journal of Economics, Business, and Accounting*. 19 (2): 40-47. <https://doi.org/10.9734/ajeba/2020/v19i230301>
- Ali, A., A. Mohfouz & A. Arisha. 2017. Analysing supply chain resilience: Integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management: An International Journal*. 22 (1): 16-39. <https://doi.org/10.1108/SCM-06-2016-0197>
- Awad, H.A.H. & M.O. Nassar. 2010. Supply chain integration: definition and challenges. *Proceedings of the International MultiConference of Engineers and Computer Scientists*. Hong Kong: IMECS, March 17 -19, 2010
- Bate, S.L., M.H. Stigler, M.S. Thompson, D.P. MacKinnon, M. Arora, C.L. Perry & K.S. Reddy. 2012. A Qualitative Mediation Study to Evaluate a School-Based Tobacco

- Prevention Program in India (Project MYTRI). *Field Methods*. Sage Publication. 24 (2): 194-215. <https://doi.org/10.1177%2F1525822X11420371>
- Cahyacipta, S.A. 2021. Integrasi Rantai Pasok: Studi Kasus Kelompok Pembudidaya (Pokdakan) Mino Ngremboko. Unpublished Master Thesis. Pasca Sarjana (M.Sc.) Program. Magister of Agribusiness Management Study Program. Faculty of Agriculture. Universitas Gadjah Mada.
- Christopher, M & L. J. Ryals. 2014. The supply chain becomes the demand chain. *Journal of Business Logistics*. 35 (1): 29-35. <https://doi.org/10.1111/jbl.12037>
- Ciptono, W.S., S.A. Cahyacipta & B. Bagaskara. 2017. Thinking of the blue economy-big data analytics for a sustainable fishery business development program. *Proceeding of the 5th Gadjah Mada International Conference on Economics and Business*. Yogyakarta: September 14-15, 2017.
- Creswell, J.W. 2013. *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. 3rd Edition. London: Sage Publication.
- Dinas Koperasi & UKM DIY. 2021. *Strategi Penguatan Ekonomi UMKM Pasca Pemberlakuan Pembatasan Kegiatan Masyarakat (PPKM)*. Yogyakarta: Dinas Koperasi & UKM DIY.
- Dinas Pertanian, Pangan dan Perikanan. 2018. *Profil Perikanan Sleman Tahun 2017: Keluarga Perikanan Sleman-Mandiri, Profesional*. Dinas Pertanian, Pangan dan Perikanan Sleman: Bidang Perikanan.
- EIB (European Investment Bank), EBRD (European for Reconstruction and Development). 2022. *Business Resilience in the Pandemic and Beyond: Adaptation, Innovation, Financing and Climate Action from Eastern Europe to Central Asia*. EIB, EBRD.
- Eikeset, A.M., A.B. Mazzarella, B. Daviosdottir, D.H. Klinger, S.A. Levin, E. Rovenskaya & N.C. Stenseth. 2018. What is blue growth? The semantics of “sustainable development” of marine environment. *Marine Policy*. 87: 177-179. <https://doi.org/10.1016/j.marpol.2017.10.019>
- Fernando, K.V. 2010. *Productivity + Business Success: Integrating productivity, process management & strategy for success in competitive markets*. Singapore: Strategy & Organizational Engineering (Asia Pacific) Pte Ltd.
- Hennink, M., I. Hunter, and A. Bailey. 2020. *Qualitative Research Method*. Thousand Oaks, California: Sage Publication.
- Kementerian Koordinator Maritim dan Investasi. 2020. *Big Policy—Green and Blue Economy*. Jakarta: Kemenko Marves.
- Khare, S. 2006. *Optimising the organisation: Unleashing the potential of practices, processes, and people*. New Delhi: Tata McGraw-Hill Publishing Company Limited.
- Lee, H.L. 2004. The 21st Century Supply Chain: The Triple-A Supply Chain. *Harvard Business Review*. October: 100-111.
- Madhani, P.M. 2016. Enhancing competitiveness: Moving from supply chain to demand chain management. *Materials Management Review*. 12 (4): 16-19. <https://ssrn.com/abstract=2732934>
- Martinez, S. & H. Stewart. 2003. From Supply Push to Demand Pull: Agribusiness Strategies for Today's Consumers. *Economic Research Service/USDA*. 1 (5): 22-29.
- Pauli, G. 2010. *The Blue Economy*. Taos, New Mexico: Paradigm Publications.
- Perdana, Y.R., W.S. Ciptono & K. Setiawan. 2019. Broad span of supply chain integration: Theory development. *International Journal of Retail & Distribution Management*. <https://doi.org/10.1108/IJRDM-03-2018-0046>
- Pokdakan Mino Ngremboko. 2014. *Profil Kelompok Pembudidaya Ikan Mino Ngremboko*. Dusun Bokesan, Desa Sindumartani, Kecamatan Ngemplak-Kabupaten Sleman, Provinsi DIY.
- Porter, M.E. 1992. Michael Porter's competitive advantage and business history. *Business and Economic History*. 21 (2): 228-236.
- SDG Indonesia. 2015. *The seventeen goals of sustainable development*. Jakarta: Sustainable Development Goals of Indonesia.
- Sunoto. 2013. *Menuju pembangunan kelautan dan perikanan berkelanjutan*. Dengan konsep Blue Economy. Yogyakarta: Kementerian Kelautan dan Perikanan RI.
- UNCTAD. 2020. *The Covid-19 pandemic and the blue economy: New challenges and prospects for recovery and resilience*. United Nations Conference on Trade and Development.
- UNEP. 2013. *Agenda 21: Green economy*. Rio de Janeiro. United Nations Environmental Programme.
- Wahyuni, S. 2019. *Qualitative Research Method: Theory and Practice*. 3rd Edition. Jakarta: Salemba Empat.
- Walters, D. 2006a. Effectiveness and efficiency: The role of demand chain management. *The International Journal of Logistics Management*. 17 (1): 75-94. <https://doi.org/10.1108/09574090610663446>
- Walters, D. 2006b. Demand chain effectiveness – Supply chain efficiencies: A role for enterprise information management. *Journal of Enterprise Information Management*. 19 (3): 246-261. <https://doi.org/10.1108/17410390610658441>
- Werbach, A. 2009. *Strategy for Sustainability: A Business Manifesto*. USA: Mixed Sources.
- Wibowo, J.A. 2020. *Investasi Biru, Memanfaatkan Potensi Alam Berkelanjutan*. *Harian Jogja: Aspirasi*, 30 Juli 2020.
- World Bank. 2015. *World Bank Group & The 2030 Agenda*. U.S: World Bank.
- Yin, R.K. 2003. *Case Study Research: Design and Methods*. 3rd Edition. London: Sage Publications.