

Shock and adaption: the economic impact of COVID-19 in the Mentawai Islands, West Sumatra, Indonesia

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Abstract. Remote coastal communities face many challenges yet often demonstrate considerable resilience to be able to survive. This study explores the effect of the COVID-19 pandemic on the household economy, and their adaptive responses to it, in two villages of the Mentawai Islands, Indonesia. Data were collected using FGD and household surveys. The survey was carried out in Sido Makmur village on Sipora Island and at Muntei village on Siberut Island. Thirty households were randomly selected in each village. Data collected included; household characteristics, type of income change, government subsidy received, and response to the income change. The research found that COVID-19 policies affected many parts of life. There were significant reductions in income level not only because of losing employment but also because disruption of supply chains also lowered demand for local produce. People responded to the lower-income by intensifying their involvement in the agricultural and fishery sectors to meet their food security needs. This study highlights the importance of strengthening access to local resources to cope with disasters in the island's region.

1 Introduction

Since December 2019, the coronavirus COVID-19 has spread rapidly around the world [1]. Infections occur through person-to-person contact and range from mild to deadly [2]. As of 7th June 2023, globally, there have been more than 750 million cases of COVID-19 with almost 7 million deaths attributed to the disease [3]. Alongside the direct health impacts, the COVID-19 pandemic, and subsequent government policies, has caused disruptions in global supply chains, threatened livelihoods and education, and profoundly changed human behavior and the social contexts of billions of people [4, 5]. According to the UNDP "The COVID-19 pandemic is far more than just a health crisis: it's affecting society and the economy at its core... it is likely to increase poverty and inequality on a global scale" [6]. COVID-19 has also fueled fears of an economic crisis and an impending recession [7]. Social distancing, self-isolation and travel restrictions have led to a reduction in the workforce in all sectors of the economy and caused many jobs to be lost [8]. Research conducted in South Asia found that There are also ecological implications from the pandemic, with some commentators arguing that, "our economy, our society, our communities must rediscover how to live with nature" [9].

Nature plays a profound role in the Indonesian economy. As an archipelago with more than thirteen thousand islands [10] many communities are directly

dependent on marine resources for their livelihoods. Several large islands including Sumatra, Kalimantan, Java, Sulawesi, Bali and Nusa Tenggara and Papua contain the majority of the population. The rest are small islands scattered across Indonesia's territory which are referred to as 3T (*Terluar, Terdepan, Tertinggal*) - the outermost, poorest, and lagging [11]. Although some of these islands may be biodiversity hotspots sought out by tourists, many are isolated and lacking in basic infrastructure.

There is a paradox with island communities. On the one hand, their isolation contributes to their deprivation by cutting them off from markets and innovation [12] and makes them more vulnerable to shocks because they are so far from aid in a time of crisis [13]. Yet, on the other hand, their continued existence in an isolated context points to their resilience and means that the communities that live there are already adapting to significant pressures and having to "fend for themselves". Their isolation also contributed a layer of protection against being infected.

The lack of connectivity of small islands led the Jokowi government to develop the concept of a maritime axis for the development of islands. This concept emphasizes the realization of inter-island connectivity through the development of the shipping industry and sea transportation [14]. Indonesia's outermost small islands need to be developed because they have strategic value for the sovereignty of the state [11]. COVID-19 has threatened these island communities. Connectivity

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between Asian-Pacific islands played a central role in the spread of COVID-19 [15]. Restricting movements between these islands to prevent the spread of COVID-19 also had far-reaching economic impacts. Many remote island communities are heavily dependent on fisheries and the pandemic has significantly disrupted the marine sector and global supply chains. These marine industries do not operate separately from each other, or from the marine environment in which they are part [6]. This has led to aggravating and interrelated impacts across the ocean economy, marine ecosystems and societies [16]. Some small islands are maritime tourist destinations [17-19]. Tourism development is very important for economic growth on these islands and restrictions on the movement of large-scale people or lock downs during the COVID pandemic have devastated community tourism businesses [20].

The economic impacts of COVID-19 in Indonesia have been felt acutely on household finances, through inequality and food insecurity. A UNDP report [21] found that nearly three-quarters of households (74.3%) reported a reduction in household income, that social assistance programs have not reached 15% of those need and that 30% of respondents worry that they will be unable to feed their families. Income reductions and disruptions to food delivery systems are the main factors contributing to food insecurity.

Households and communities have not been passive during the outbreak. The isolated nature of small island community's conditions them to be self-reliant, to adapt and find a way out from the crisis [18], regardless of whether external aid is forthcoming. Seasonal variations in weather and oceanographic conditions already made small island communities vulnerable to food insecurity [22].

In the Solomon Islands communities adapted by increasing agricultural production, especially tubers and by the economy reverting from cash to bartering fish for other types of food [23]. While most respondents in the study experienced the benefits of strong social capital through family and community support that increased food production and distribution, some reported theft. In 15% of community's conflicts occurred as the management rules were violated. In most communities, community-based resource management committees (CBRMs) have responded by raising awareness about fisheries rules. In some cases, communities have increased law enforcement or organized activities, such as group harvesting. In other Pacific communities such as Tuvalu people responded by panicking and stockpiling food [24].

This paper explores the effect of the COVID-19 pandemic on communities in a small island cluster of Indonesia, (Mentawai islands) and their adaptive responses.

2 Method

The Mentawai Islands Regency is a cluster of non-volcanic islands located in the western part of Sumatra Island and surrounded by the Indian Ocean. The Mentawai islands are remote and relatively deprived with a population of 87,623 [25]. Sipora island was initially not inhabited by the Mentawai people but has now become the administrative capital. [26]. Agriculture, forestry, and fisheries are important economic sectors with bananas, coconuts, cassava and sweet potatoes dominating production. Rice is planted (580 ha), but is not sufficient to meet local demand. The Mentawai Islands Regency are prone to natural disasters (earthquakes and tsunamis). The Mentawai Islands Regency consists of 99 island clusters, with four main islands; Siberut, Sipora, North Pagai, and South Pagai. These two islands have opened direct access to the provincial capital Padang using a fast ferry that takes four hours. During the COVID pandemic, transportation services were suspended for several weeks.

Two villages were purposively selected based on different ethnic groups. On Siberut Island, research was carried out in Muntei village, a village inhabited predominantly by the Mentawai tribal community (Fig. 1). Muntei village has a population of 1685 (2021) and most villagers work in the agricultural sector and capture fisheries. On Sipora Island, the research was conducted in Sido Makmur village, North Sipora sub-district which is close to the capital of the regency. Sido Makmur is a Javanese immigrant settlement area. Javanese immigrants settled on Sipora from 1987 and the village now has a population of 894 with livelihoods dependent on bananas, coconuts and cassava.

This research used an interpretive approach attempting to find explanations about social or cultural events based on the perspective and experience of the person under study. The interpretive approach is adopted from a practical orientation. The interpretive approach is a social system that interprets behavior in detail by direct observation [27].

Primary data were collected using Focus Group Discussions (FGD) of men and women, and supplemented with household surveys. In both villages, 30 households were randomly selected. The household survey explored the economic impacts of COVID -19 and household adaptations to COVID-19. Data were collected from 3 – 12 June 2022.

Survey data included household characteristics; number of economically active workers in a household, land ownership (ha), ownership of productive assets, ethnicity, education attainment. Questions also explored household responses to various economic changes caused by COVID-19 and whether a government subsidy was received by the household. Data were analyzed descriptively at the location of village (Fig. 1).

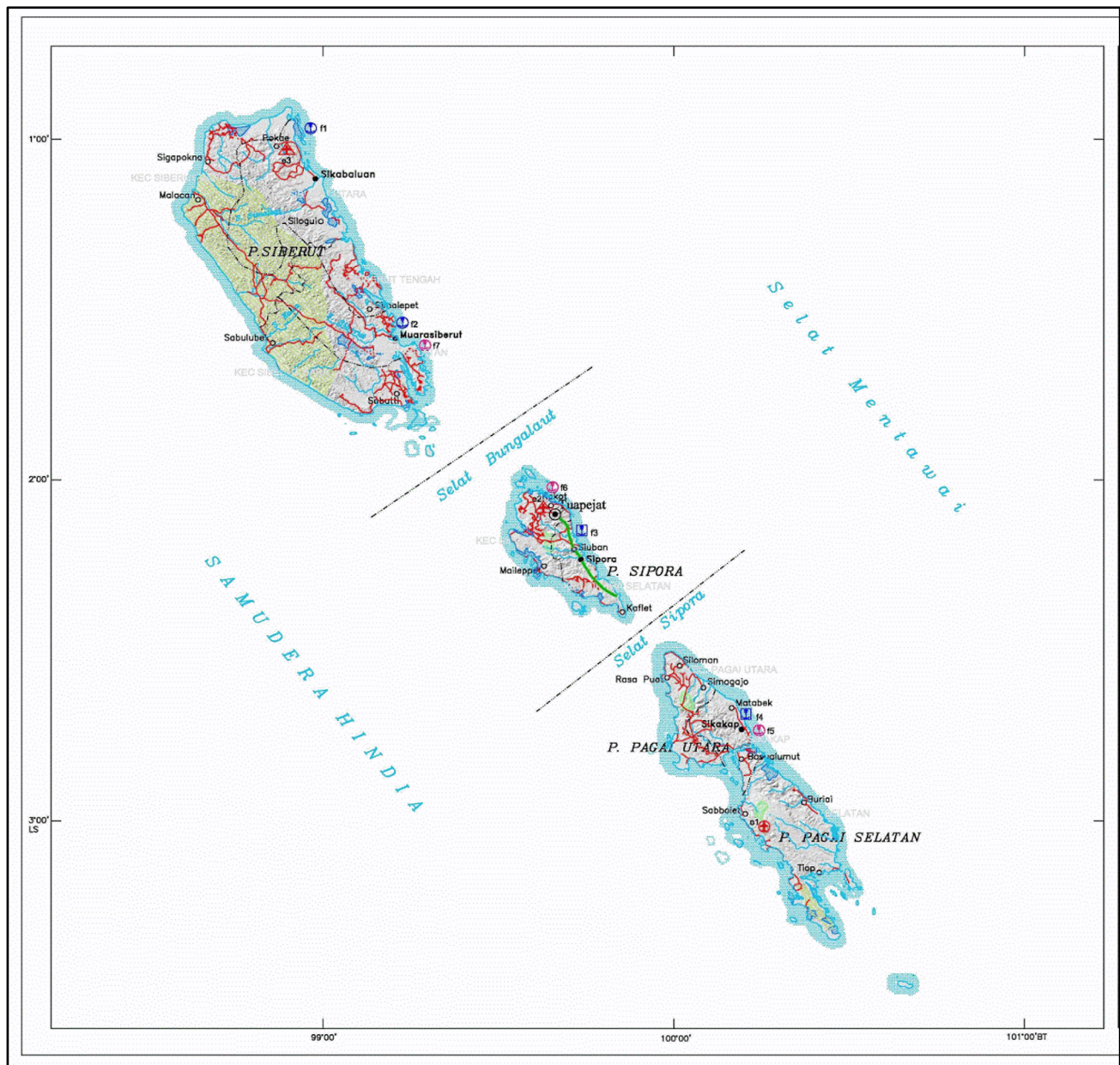


Fig. 1. Study village location map

3 Results and discussion

3.1 COVID 19 and government policy in the district of Mentawai Islands

On April 1st 2020, The Regent of the Mentawai Islands chose to quarantine his territory from April 1, 2020, for two weeks. It was the first regency to implement this policy in West Sumatra. During this quarantine period, all transportation services were suspended [28]. The lack of human capacity and medical infrastructure to deal with the coronavirus was the reason for the quarantine. Despite these efforts, the first case of COVID-19 in the Mentawai Islands was detected in Pogari, Goiso Oinan Village, North Sipora Sub-district on 12 April 2020, an imported case from Jakarta. This was followed by a cluster of cases from the Department of Fisheries.

A work-from-home policy was brought in for civil servants and contract workers to prevent the spread of COVID-19 [29]. To compensate for the economic impact, 16,000 underprivileged Mentawai Residents received direct cash assistance [30]. People's movement was controlled by halting passenger services [28]. As in many countries, the main policy to stop the spread of COVID-19 was to limit people's mobility. Although this had several negative impacts, the policy did restrict the spread of the pandemic and ensured Mentawai was one of the few regencies to never reach a red status on the pandemic zoning system.

Sixty households were interviewed (Table 1) with respondents representing a cross-section of backgrounds and ethnicities. The typical respondent was married (83%), aged between 36-50 (45%), Mentawai ethnicity (72%), Catholic (42%) and worked as a farmer (45%). Thirty per cent of respondents had not completed elementary school.

Table 1. Characteristics of respondents

Respondent criteria	Village		Total	%
	Muntei	Sido Makmur		
Sex of respondent				
-Male	18	20	38	63
-Female	12	10	22	37
Respondent age				
-20 - 35	10	9	19	32
-36 - 50	15	12	27	45
-51 -65	5	6	11	18
->65	0	3	3	5
Marital status				
-Single	5	0	5	8
-Widow	2	3	5	8
-Married	23	27	50	83
Ethnicity				
- Aceh	0	1	1	2
-Mix Batak	0	1	1	2
-Javanese	0	6	6	10
-Mentawai	27	16	43	72
- Minang	1	5	6	10
- Nias	2	1	3	5
Religion				
-Islam	3	17	20	33
-Catholic	24	1	25	42
-Protestant	3	12	15	25
Education attainment				
- No formal education	5	0	5	8
- Incomplete Elementary School	8	5	13	22
- Complete Elementary School	1	1	2	3
- Complete Junior High School	7	4	11	18
- Complete Senior High School	6	10	16	27
- Tertiary	3	10	13	22
Occupation				
- Contractor	1	9	10	17
- Daily wage labor	1	0	1	2
-College student	1	0	1	2
- Religious worker	0	1	1	2
-Fisher	2	0	2	3
-Civil servant	0	11	11	18
-Trader	1	2	3	5
-Sago processor	1	0	1	2
-Farmer	20	7	27	45
-Carpenter	3	0	3	5
Total	30	30	60	100

Motorbikes (79%) were the most commonly owned assets (Table 2). These play an important role in accessing farmland, going to fish and when securing food supply during COVID-19. This was followed by crop sprayers and canoes (Muntei only). In addition, motorized canoes are a common asset in Muntei village. The solo sprayer is important for people in Sido Makmur and in Muntei villages. These assets remain important for economic purposes during COVID-19.

Table 2. Asset ownership

Item	Numbers owned	Village		Total	%
		Muntei	Sido Makmur		
Number of motor bike per household					
	0	10	3	13	22
	1	18	16	34	57
	=>2	2	11	13	22
Small shop					
	0	29	25	54	90
	1	1	5	6	10
Fishing net					
	0	22	28	50	83
	1	7	1	8	13
	2	0	1	1	2
	3	1	0	1	2
Canoe					
	0	10	28	38	63
	1	18	1	19	32
	2	2	1	3	5
Motorized canoe					
	0	13	30	43	72
	1	16	0	16	27
	3	1	0	1	2
Crop sprayer					
	0	19	17	36	60
	1	11	9	20	33
	2	0	3	3	5
	3	0	1	1	2
Amount		30	30	60	100

3.2 Economic impact of COVID-19

Economic impacts were explored at the household level (Table 3). More than half of respondents (52%) had experienced a decline in income due to price reductions and many had lost income due to a decline in demand (35%). Previously bananas and betel nuts had been exported out of the village by external buyers but during the pandemic, these buyers stopped coming because ferry services were suspended and the prices dropped from 20,000 Rupiah to 0 Rupiah per bunch of bananas and from 19,000 Rupiah to 9000 Rupiah for betel nuts. Most households (57%) found a scarcity of goods during COVID-19. Many experienced price increases and reduced household spending to account for this. Most respondents (53%) intensified economic activities to try and cover the shortfall, while a few (8%) experienced economic blessings during COVID-19. Seventy-eight per cent of respondents received cash transfers from the government during COVID-19. Behind the numbers were

individual stories like, for example, the person who lost his job at the boarding school when students returned home. Households coped with losing an income source by shifting to informal work in other sectors (e.g. becoming a farm labourer), reducing expenses (e.g. by stopping supporting needy relatives) or eating into savings. In the absence of other paid employment, people defaulted to collecting forest products or growing vegetables.

Table 3. Household economic impacts COVID-19

Economic impact indicator	Village		Total	%
	Muntei (n=30)	Sido Makmur (n=30)		
Household member losing job	1	5	6	10
Income lost due to price reduction of local product	19	12	31	52
Income lost due to decline in demand of local product	12	9	21	35
Goods scarcity during COVID-19	22	12	34	57
Increasing household expenses during COVID-19	7	20	27	45
Declining household spending	7	11	18	30
Gaining income from commodity price during COVID-19	3	4	7	12
Economic blessing during COVID-19	2	3	5	8
Intensifying economic activity during COVID-19	16	16	32	53
COVID 19 subsidy received from government	0	1	12	22
	1	11	8	19
	2	16	7	23
	3	2	3	5
Total		30	30	60

3.3 Adaptive response

In response to these stresses, households intensified the utilization of natural resources for their livelihoods. Even outside the pandemic, Indonesia is characterized by occupational multiplicity, many people have a side job. So those who were technically 'working from home' during the pandemic went to their smallholdings and harvested betel nuts, coconuts and other crops. Partly this was to supplement their income and also because they wanted to avoid mixing with others.

On land, respondents intensified chicken farming, betel nut, banana, coconut and sago farming. At sea, some increased fishing while other households collected crabs and other crustaceans. A few (3%) households opted to do small-scale food processing activities such as doughnut making, rice cakes, and other cakes. Others processed agricultural products to make copra, sago flour, and processed betel nut.

Table 4. Production intensification during COVID-19 in Mentawai Island

Village	Production activity intensification during COVID-19	Number of HH Intensifying economic activity	%
Muntei (n=30)	Agricultural base	7	23
	Marine resources base	6	20
	Agricultural product processing	1	3
	Other	1	3
	Total	15	50
Sido Makmur (n=30)	Agricultural base	7	23
	Marine resources base	2	7
	Agricultural product processing	3	10
	Other	3	10
	Total	16	53

Levels of household consumption were also affected by the pandemic. In 2012 the government began to promote rice as a staple food in the Mentawai Islands through the 'National Food Safety Improvement Program' intensified agriculture and built 600 hectares of new rice fields. Steadily people's staple food began to change from sago and tuber to rice [31]. But the rice productivity is very low, only 1 ton unhusk rice per ha. As a consequence, dependence on rice from Sumatra Island has increased (Table 5). During COVID-19, when the supply of rice was disrupted and when respondents did not have the cash to buy rice, some local people went back to the traditional staples of sago in Siberut and cassava in Sipora Island. This shows the unintended consequences of moving people away from locally produced goods and making them dependent on imports.

Table 5. Staple food sources in the Mentawai Islands.

Village	Staple food	Source of staple		Total
		Purchase	Own production	
Muntei	Rice	20	1	21
	Sago	0	9	9
	Total	20	10	30
Sido Makmur	Rice	26	4	30
	Total	26	4	30

When the ferry service was suspended, goods (chili, cooking oil and onions) from Padang became scarce in

Siberut Island but this was less the case in Sipora Island, the administrative capital. When ferries were suspended, the prices of these goods increased sharply. Panic buying happened when cooking oil was scarce. In a statement from State Ferry company, Mr Tohap said, “*Inter-island ferry can only operate to carry the basic needs of the community, then also allowed to carry passengers who carry out the official duties of the acceleration and handling task force COVID-19.*” [28].

3.4 Implication

There are significant implications of this research regarding small islands development in the areas of food security, disaster management, and small islands regional development.

Food security: This study found that during COVID-19 as rice supplies became scarce or expensive, Mentawai people from Muntei returned to sago. Although the government attempted to change the food culture of the Mentawai people in 2012 from Sago to rice by developing 600 hectares of new rice fields the COVID-19 pandemic which disrupted supply chains showed the deficiencies in this policy. Looking ahead, the Indonesian government must make parallel policies that can accommodate the needs of the community instead of just prioritizing the national development agenda [31].

Natural resources-based economy: The Mentawai Islands are blessed with rich natural resources but the people are still poor and the region remains in the group of deprived/isolated 3T Islands. Development policies have increased value added but reduced self-sufficiency by encouraging dependence on imports. During the COVID-19 pandemic, Mentawai Islanders complained about the high prices/scarcity of cooking oil and sugar. Both these commodities can be produced from coconuts. A policy that encourages communities in small remote islands to maximize their potential may be more effective in the long term than creating dependency on supply chains.

4 Conclusion

The main agenda when COVID-19 started was to reduce the virus spread. Since the virus spread through interpersonal contact, reducing people's movement was a key pillar in the Indonesian government's response to the pandemic. This policy was implemented by suspending transportation services and limiting people's mobility. In the Mentawai Islands, the consequence of this policy reduced income for people working in both the formal and informal sectors. It also reduced purchasing power and level of consumption. However, people still retained access to natural resources and compensated by increasingly using these to meet their basic needs.

The COVID-19 pandemic was an unforeseen shock for the world. Many nations, dependent on global supply chains and an interconnected world, had to rapidly make decisions balancing people's health needs with protecting the economy. Small islands were no exception. Restricting people's movement to and from the Mentawai

Islands reduced infections in the short term but also hurt people's livelihoods. However, the COVID-19 pandemic also identified other lessons learned both for natural resource-dependent communities and for government policy. Firstly, that there is a wealth of occupational multiplicity in livelihoods in many traditional cultures. People are adept at shifting from one crop to another, or from fishing to farming, depending on circumstances. Secondly, economic specialization or becoming dependent on outside imports can be dangerous in such a context. The Mentawai Islands are prone to natural disasters and ensuring food security by continuing production of local staples is an important part of disaster mitigation. Thirdly, some goods imported from outside such as sugar and cooking oil should be made using local raw materials. The Mentawai Islands are rich in coconuts and coconuts are a raw material for sugar and cooking oil but local people tend to export raw coconuts rather than process them locally. Fourthly, there is a worse spectre on the horizon for small islands than COVID-19, namely, climate change. Although we may not see another pandemic in our lifetimes, we will most certainly continue to see an increasing intensity of storms, flooding events, saltwater intrusion and coastal erosion. These will also negatively impinge on coastal livelihoods and threaten the very existence of small island communities. Strengthening the ability of communities to adapt to climate change does not seem as urgent as responding to the COVID-19 pandemic yet is more crucial than ever.

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