

The impacts of Covid-19 on the economy of marine fish traders' households in Bengkulu City, Indonesia

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Abstract. The presence of the Covid-19 pandemic has brought changes to the world with various challenges that were never imagined before. Efforts to inhibit the spread of the Covid-19 virus have hampered economic activity. Its impact on social welfare is increasingly felt by the community, especially by coastal communities that have a high dependence on nature. This study aims to analyze marine fish traders' income and consumption patterns before and during the Covid-19 pandemic. The paired t-test showed that there were significant differences in the income and consumption of fish traders before and during the pandemic. Covid-19 has impacted household incomes and consumption patterns, especially food and non-food consumption.

Key Words: consumption pattern, Covid-19, income, marine fish traders.

Introduction. Covid-19 threatens to reverse years of progress on poverty, hunger, health care and education. The World Bank estimated that the Covid-19 crisis could push between 40 and 60 million people into extreme poverty (Mahler et al 2020). Another report found that under a scenario in which income and consumption contract by 20%, between 420 and 580 million people would be pushed into poverty, reversing decades of decreasing poverty trends (Sumner et al 2020). The Covid-19 pandemic has put pressure on economic and social conditions (Bene et al 2021; Gupta et al 2021; Deriu et al 2022) in Indonesia since the end of 2019. This economic impact was felt throughout the region.

The Indonesian government immediately took aggressive steps so that the spread of Covid-19 could be suppressed as much as possible. One of the impacts of Covid-19 is the weakening of household consumption or people's purchasing power. The economy of a country will increase if the purchasing power or consumption of the people is high. The level of income affects the level of public consumption. The relationship between income and consumption is important in various economic problems. The consumption expenditure increases with increasing income, and vice versa, if income decreases, consumption expenditure also decreases. The level of expenditure is highly dependent on the ability of the family to manage their income (Suroto 2000).

Human nature in consumption activities will have a patterned tendency toward income. If income increases, the elasticity of demand due to changes in income (income elasticity of demand) is low for food consumption. In contrast, the need for clothing, housing and industrial consumer goods is preferable (Sukirno 2007). Consumption is represented by the spending on goods and services carried out by households to meet the needs of people who make purchases (Nur 2012). Household spending on food, clothing and other necessities is classified as expenditure or consumption. The amount of consumption spent by each person is influenced by the diversity of their needs. The variety of requirements that must be met encourages a person to make choices of primary and secondary consumption. Goods produced for households to meet their needs are called consumer goods (Dumairy 2004). Household consumption can be grouped into two categories, namely food and non-food consumption. Food consumption consists of

rice, tubers, fish, meat, eggs, vegetables, nuts, fruit, oil, beverage ingredients, kitchen spices, and others, and prepared food and beverages.

Households will allocate their income to meet these two needs at a certain income level. The amount of expenditure for food consumption in a household can be used to indicate the level of welfare of the household. In other words, a higher expenditure on food consumption means a lower level of household welfare. On the other hand, a smaller expenditure on food consumption means a more prosperous household (Arida et al 2015). The consumption pattern is the allocation of income spent to buy basic and secondary goods. So far, there has been an understanding that the small proportion of expenditure on food consumption for all households can provide an overview of the household's welfare. Households with a larger proportion of expenditure on food consumption indicate low incomes. A higher level of household income means a smaller proportion of expenditure on food to all household expenditures, so it can be said that households will be more prosperous if spending on food is lower than spending on non-food items (Mayasari et al 2018).

As a result of the Covid-19 pandemic that lasted for several months, there was a weakening of economic activity ranging from the tourism sector to trade. The number of confirmed cases of Covid-19 in Indonesia was increasing in 2020. Due to this increase in the number of cases, the Government of Indonesia issued a regulation for the Enforcement of Restrictions on Community Activities (PPKM), intending to break the chain of the spread of the Covid-19 virus. Since the enactment of PPKM regulations, people had to carry out activities at home, including work. This negatively impacted entrepreneurs and workers from various sectors, such as the agriculture, mining, trade, and tourism sectors. They were forced to close their businesses until the virus pandemic ended. The implementation of PPKM also caused the economy to slow down due to declining income from various sectors. Related to this, national production also experienced a decline which resulted in a decrease in economic growth in Indonesia (Figure 1).

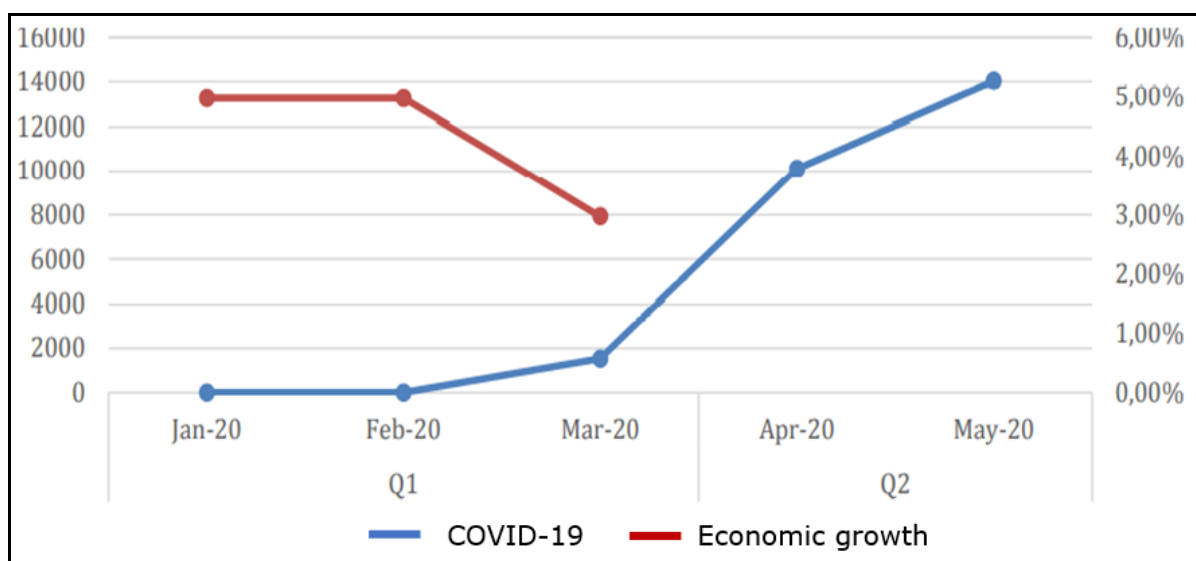


Figure 1. The linkage between Covid-19 and economic growth (Thenisia et al 2020).

This decline in people's income is the result of Termination of Employment (PHK) as a result of Covid-19 (Ngadi et al 2020). The weakening of people's purchasing power is also caused by mobility and economic activity limitations due to the Implementation of Restrictions on Community Activities (PPKM) (Supriyatna & Djailani 2021). With the implementation of this PPKM, the public is limited to direct buying and selling transactions, so that people must carry out all transactions online. Not all people have the means to make transactions online, so people's purchasing power decreases. After Indonesia achieved a reduction of the poverty rate in the past few years, the number has

increased again. This is because more and more activities cannot run as usual to fulfil the community's economy due to Covid-19.

One of the determinants of poverty in urban areas is the average monthly income (Esubalew 2006). When income and consumption expenditures decrease, a person's ability to meet the needs of life also decreases. Therefore, it can be said that the household is not prosperous. On the other hand, if consumption expenditure increases, it indicates that the needs of life are fulfilled (Arida et al 2015). The Covid-19 pandemic is a world-changing event that has led to a severe economic downturn in the fisheries sub-sector (Menhat et al 2021), changing the lives and livelihoods of workers, especially those related to small-scale fisheries and coastal fishing communities (FAO 2020; Hoque et al 2021), including in Indonesia.

Bengkulu Province is the seventh poorest province in Indonesia (BPS Indonesia 2021). It has potential in the coastal area, so that most people work in the capture fisheries sub-sector as fishermen, fishing laborers and marine fish traders. Most marine fish traders in Bengkulu City are community groups with an uncertain average income. This is because the marine fish sold by these traders are obtained from the catch of fishermen, which depends on weather conditions. Before the Covid-19 pandemic, fish prices were normal, and there were many buyers, so traders' income was relatively high. However, after the Covid-19, the government issued regulations regarding crowd restrictions and social distancing, which led to a decline in fish purchases. This causes the income of marine fish traders to decline and impacts the consumption patterns of traders' households during the Covid-19 pandemic.

Before Covid-19, food consumption patterns were larger than non-food consumption patterns. During the period of Covid-19, food consumption was still greater than non-food consumption. However, there was a shift in the amount and composition of consumption types, as seen from the declining value of expenditure. This decrease in expenditure is due to the reduced consumption type, and the number of consumption uses is also decreasing (Suryati & Amini 2021). This shift in household consumption patterns is due to declining incomes and changing lifestyles. This study aims to analyze the impact of Covid-19 on the income and consumption patterns of marine fish traders in Bengkulu City, Indonesia.

Material and Method

Description of the study site. This research was conducted in Bengkulu City, Indonesia, located on the west coast of Sumatra Island, with a coastline of more than 525 km. This coastal area lies parallel to the Bukit Barisan Mountain and faces the Indonesian Ocean. The research location was determined purposively with the consideration that the city of Bengkulu is one of the centers for selling marine fish in Bengkulu Province (Figure 2).

Sampling, questionnaire, and data collection. In this study, the unit of analysis was the household and the marine fish traders were key informants. 38 marine fish traders were interviewed. Data were collected using face-to-face interviews between February and March 2021. The questionnaire was carefully designed to obtain information on income and consumption patterns. The first part of the questionnaire was about marine fish traders' socio-economic characteristics consisting of age, education, experience, household size, and gender. Next, fisherman income and consumption patterns before and during the Covid-19 pandemic were explored. The collected data consisted of primary data and secondary data.

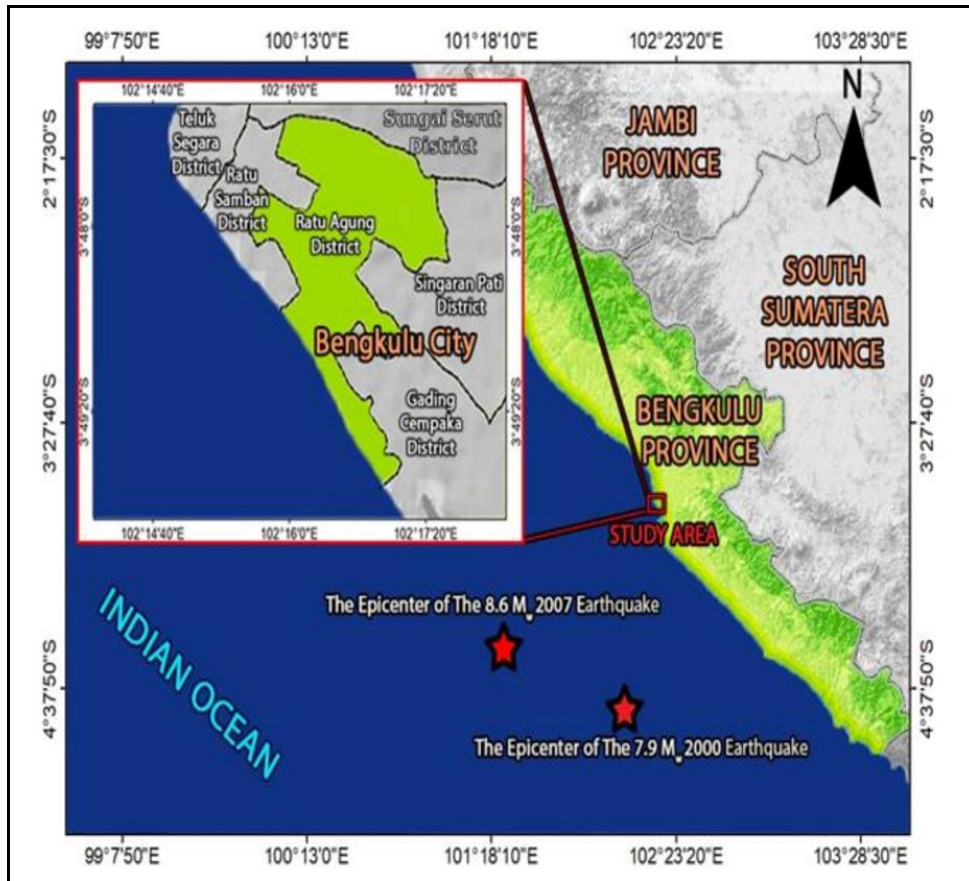


Figure 2. Study area.

Analysis of income and consumption patterns. Quantitative and qualitative descriptive analyses were employed to describe the fish traders' income and consumption patterns before and during the Covid-19 pandemic. Merchant income was calculated as the difference between revenue and total business costs incurred by traders before and during the pandemic, consisting of fixed and variable costs.

$$\pi = \{(PxQ) - (TFC + TVC)\}$$

Where: π - income (USD/month); P - selling price of fish (USD/kg); Q - amount sold of all species of fish (kg/month); TFC - total fixed costs (USD/month); TVC - total variable costs (USD/month).

The analysis of household consumption patterns was conducted using the household expenditure equation model approach (Sajogyo 1997):

$$C_t = C_p + C_{np}$$

Where: C_t - total household expenditures (USD/month); C_p - total household food expenditures (USD/month); C_{np} - total household non-food expenditures (USD/month). C_p was established with the following equation:

$$C_p = \sum_{i=1}^n (P_{Cp1} \times \varepsilon_{Cp1}) + (P_{Cp2} \times \varepsilon_{Cp2}) + (P_{Cp3} \times \varepsilon_{Cp3}) + (P_{Cp4} \times \varepsilon_{Cp4}) + (P_{Cp5} \times \varepsilon_{Cp5}) \\ + (P_{Cp6} \times \varepsilon_{Cp6}) + (P_{Cp7} \times \varepsilon_{Cp7}) + (P_{Cp6} \times J_{Cp6}) + (P_{Cp8} \times \varepsilon_{Cp8}) \\ + (P_{Cp9} \times \varepsilon_{Cp9}) + (P_{Cp10} \times \varepsilon_{Cp10}) + (P_{Cp11} \times \varepsilon_{Cp11}) + (P_{Cp12} \times \varepsilon_{Cp12}) \\ + (P_{Cp13} \times \varepsilon_{Cp13}) + (P_{Cp14} \times \varepsilon_{Cp14})$$

Where: P - price of food commodities (USD/month); Cp1 - grains (kg/month); Cp2 - meat (kg/month); Cp3 - side dishes (kg/month); Cp4 - eggs (kg/month); Cp5 - vegetables (kg/month); Cp6 - spices (kg/month); Cp7 - beverage ingredients (kg/month); Cp8 - fruits (kg/month); Cp9 - other consumption (kg/month); Cp10 - ready-made food and drinks (pieces/month); Cp11 - cigarettes (cigarette/month).

Analysis of the impacts of Covid-19 on income and consumption patterns. Comparative hypothesis testing of two correct paired samples using the paired t-test was carried out to determine the differences in income and consumption patterns of fish traders' households before and during the Covid-19 pandemic. The test uses a paired t-test (before-after) using the SPSS software to test the sample data as a whole (Sutrisno 1995):

$$t = \frac{\sum D}{\sqrt{\frac{n \cdot \sum D^2 - (\sum D)^2}{n-1}}}$$

Where: D - difference in income/consumption patterns before and during Covid-19 pandemic; N - sample size. The hypotheses are:

H₀: There is no significant difference in income or consumption patterns of fish traders before and during the Covid-19 pandemic.

H₁: There is a significant difference in income or consumption pattern of marine fish traders

The characteristics of marine fish traders. The socio-economic characteristics of the respondents and the household were collected using multiple-choice questions, and they include gender, age, education, household size, and experience (Figure 3).

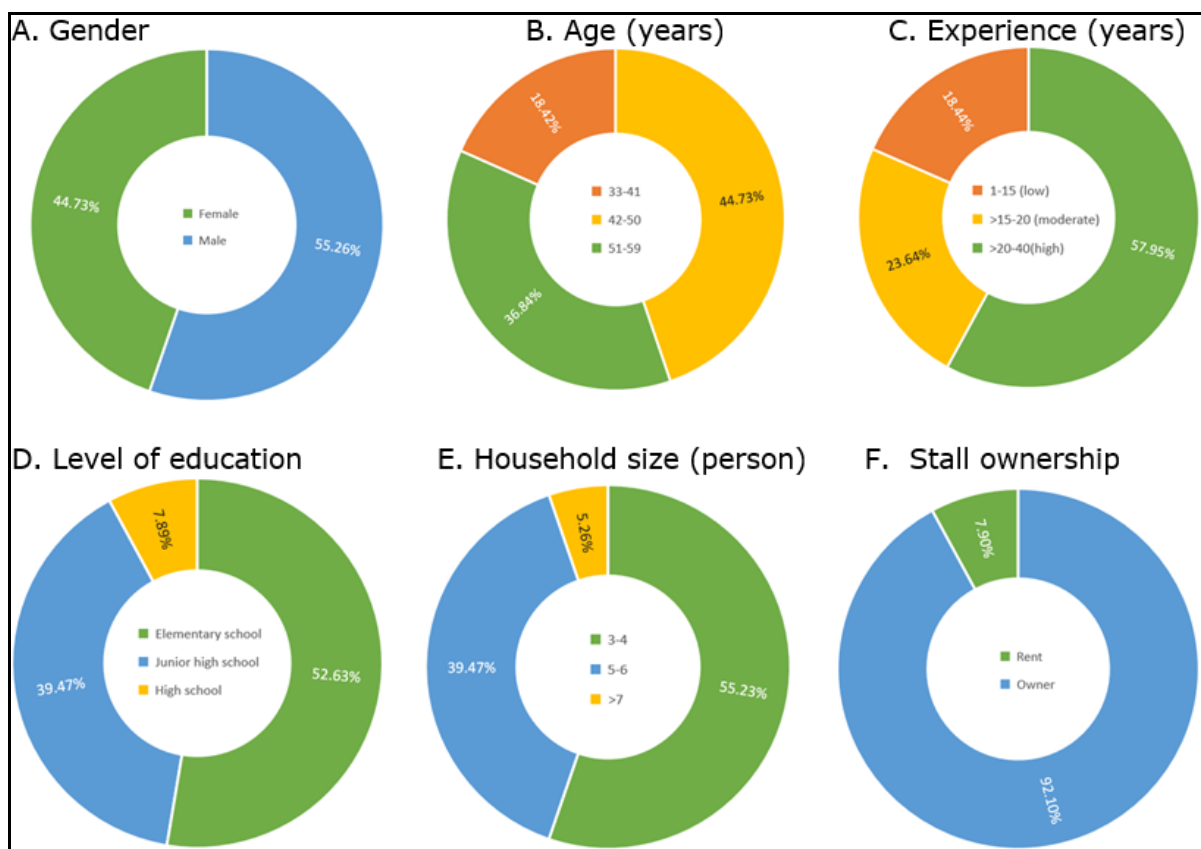


Figure 3. Socio-demographic characteristics of the respondents in the survey.

Results and Discussion

Business costs before and during Covid-19 pandemic. The costs incurred by the respondents in this study represent the value of the expenditure used to run a fish trading business and are divided into fixed costs and variable costs. Fixed costs incurred by fish traders are equipment depreciation costs, stall rental, security and cleaning costs (Table 1). In comparison, the variable costs consist of gasoline, electricity, ice cubes, plastic packaging, delivery costs, fish purchase costs, damage costs, and labor costs (Table 1).

Table 1
Fixed cost before and during Covid-19 pandemic

Fixed cost item	Before Covid-19		During Covid-19	
	USD/month	%	USD/month	%
Depreciation cost				
a. Balance of 10 kg	0.49	3.46	0.49	3.45
b. Balance of 20 kg	0.82	5.80	0.82	5.78
c. Cooler box	0.96	6.79	0.96	6.77
d. Steoroform box	1.74	12.31	1.74	12.25
e. Calculator	0.39	2.77	0.39	2.75
f. Machete	0.34	2.41	0.34	2.40
g. Tarpaulin	1.12	7.93	1.18	8.32
h. Bucket	1.16	8.21	1.16	8.17
i. Chair	0.19	1.34	0.19	1.34
Stall rental cost	4.63	32.77	4.63	32.63
Security and hygiene cost	2.29	16.21	2.29	16.14
Total Fixed Cost (TFC)	14.13	100.00	14.19	100.00

The results showed that depreciation costs had the highest fixed cost percentage before the pandemic and during the Covid-19 pandemic. The depreciation cost of equipment used by traders in running their business was calculated based on the economic life of each item used. Fixed costs before and during the Covid-19 pandemic did not change because these costs were not affected by the production process carried out by traders.

The highest variable cost incurred by traders in their business was buying fish from fishermen (Table 2). The cost of purchasing fish before the Covid-19 pandemic was higher than during the pandemic. During the Covid-19 pandemic, there was a decline in consumer demand for fresh fish, so traders reduced their fresh fish purchases for fear of spoilage. The following highest cost was the quality cost. During the Covid-19 pandemic, the costs borne by traders to maintain the quality of fresh fish have increased. This is due to the low demand for fish and the lack of buyers. The high cost of fish damage caused traders' income to decline during the Covid-19 pandemic, and merchant households consumed the remaining unsold fish to reduce household consumption costs. McKibbin & Fernando (2020) note that infectious diseases of a pandemic nature can affect households, governments, and businesses through, among other ways, increased business costs and changes in labour supply due to mortality and morbidity.

Fish traders have also reduced several cost items during the Covid-19 pandemic to anticipate declining revenues, for example, the cost of electricity, gasoline, and labor. Before the pandemic period, traders used workers from outside the family. During the pandemic, traders chose to employ workers from within the family, like their children, who studied online to help in business activities. The impacts of Covid-19 reported a large degree of heterogeneity in the responses on agricultural activity, income, and food security (Ceballos et al 2020; Harris et al 2020).

Table 2

Variable costs before and during Covid-19 pandemic

Variable cost item	Before Covid-19		During Covid-19	
	USD/month	%	USD/month	%
Fuel	23.40	0.83	17.45	0.71
Electricity	12.31	0.43	8.45	0.35
Ice blocks	2.65	0.09	2.49	0.10
Plastic bag	2.98	0.10	1.93	0.09
Delivery	2.35	0.08	2.35	0.10
Fish purchase	2688.30	93.79	2233.50	91.44
Damage	57.26	2.00	165.70	6.78
Labor	76.93	2.68	10.61	0.43
Total Variable Cost (TVC)	2866.18	100.00	2442.48	100.00

Business revenue before and during Covid-19 pandemic. The species of fish sold vary because Bengkulu City has a high potential for capture fisheries. Based on the study results, the selling price of fish before the pandemic and during the Covid-19 pandemic were normal and relatively the same, because the fishing was carried out in the same season. Although the selling price of fish remained relatively unchanged, the income received by fish traders has decreased during the Covid-19 pandemic (Figure 4). This is due to a decrease in fish purchases by consumers (Figure 5). With the Covid-19 pandemic, the government issued a regulation to implement a crowd ban and was required to keep a distance (Bengkulu Governor Regulation Number 22 of 2020). This caused people to reduce activities outside the home, such as shopping directly at the market, so the demand for fish decreased.

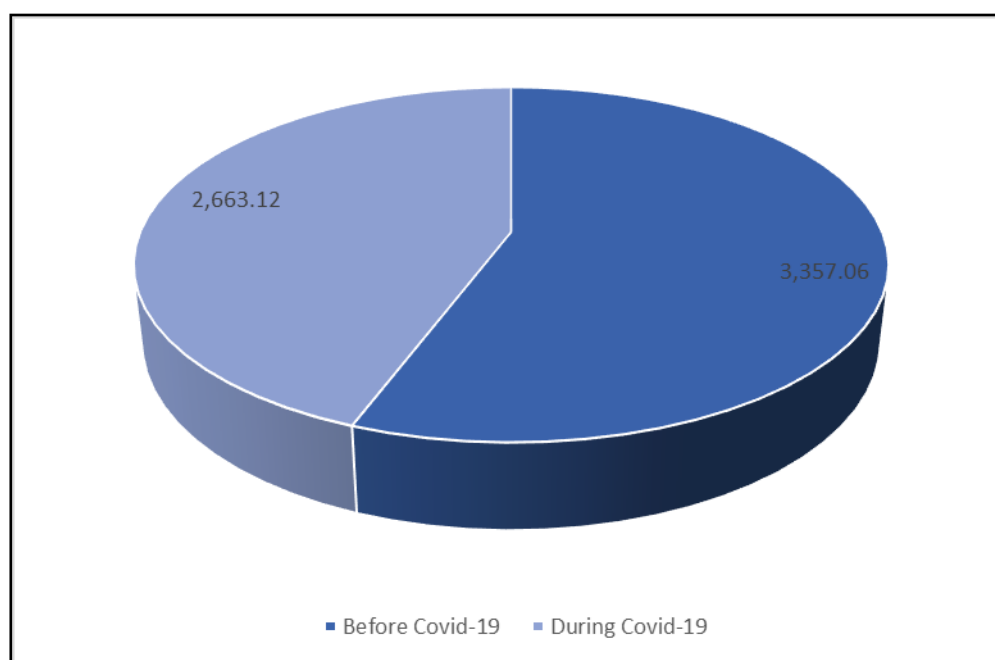


Figure 4. Revenue (USD/month).

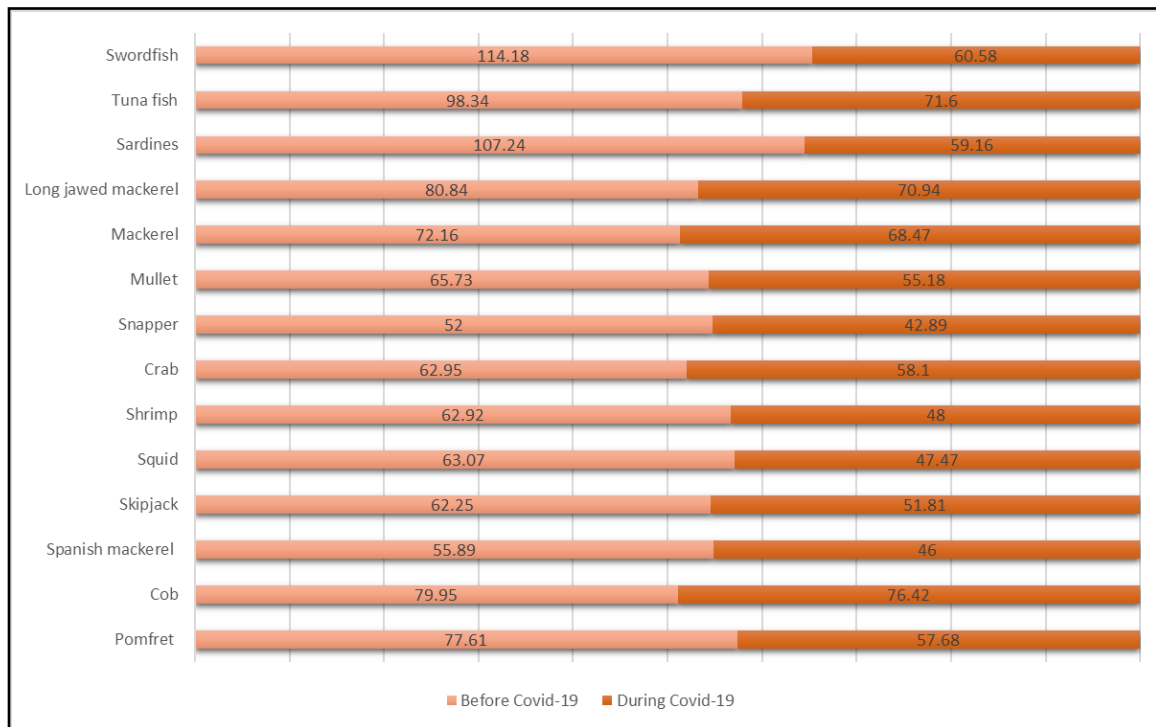


Figure 5. Sales (kg/month).

Business income before and during Covid-19 pandemic. The average income of fish traders before the pandemic was higher than during the Covid-19 pandemic (Figure 6). The income of fish traders before Covid-19 could meet household needs, but during the Covid-19 period, traders had to reduce business costs so that the income earned could meet household needs. The results of interviews with respondents showed that the implementation of PPKM caused traders to experience losses due to declining sales (Azimah 2020).

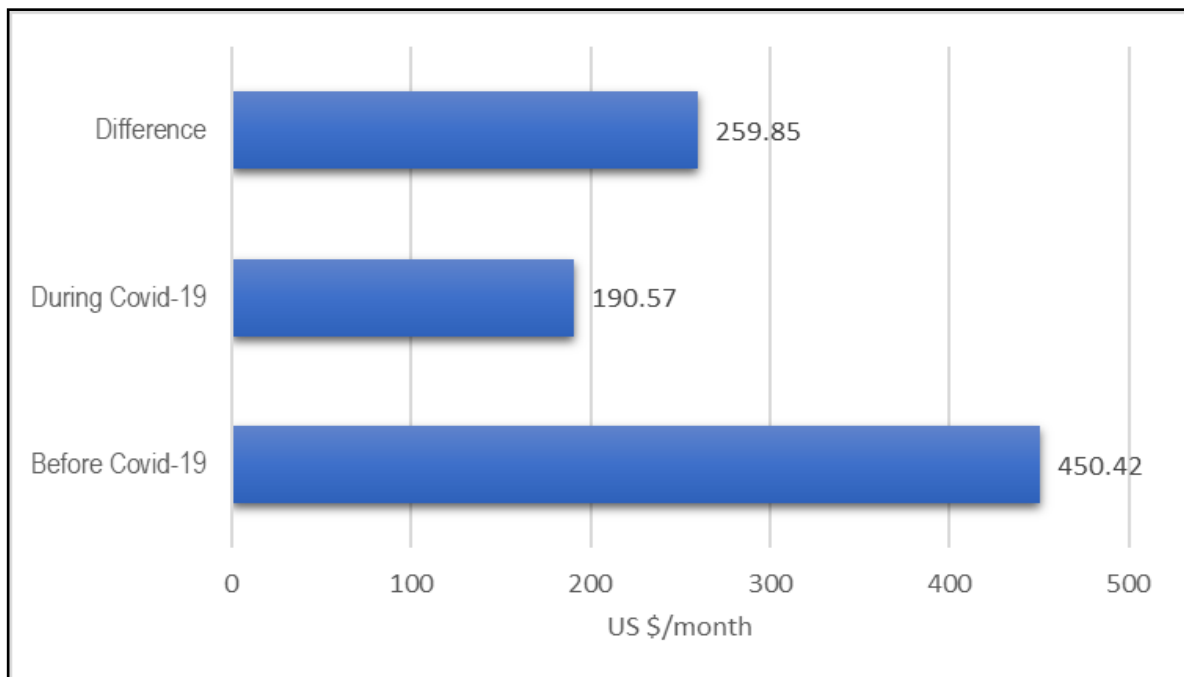


Figure 6. Income before and during Covid-19 (USD/month).

Consumption pattern before and during Covid-19 pandemic. The household expenditure model approach measures the consumption pattern of fish traders' households. Each fish merchant household has different food consumption expenditures in meeting their needs. Consumption patterns depend on the income and number of dependents of the family. Sugiarto (2008) explains that the value of household expenditure generally varies according to the amount of income its members earn. This phenomenon occurs when people with low incomes prioritize food needs. In contrast, if the income earned is higher, there will be a shift between food and non-food requirements. Differences in income do not always affect consumption patterns. Consumption patterns can also be influenced by other aspects such as changes in lifestyle and the existence of a simple lifestyle in the household.

The results of the study (Figure 7) show that the number of types of food consumption before and during the Covid-19 pandemic was the same, but some types of food experienced a shift in the amount of consumption. For example, the amount of household consumption of meat decreased due to high meat prices. However, there was an increase in household consumption of eggs during the pandemic. Consumption of eggs was high because many households make eggs as side dishes, as they are relatively cheap and have a high protein content. In addition, fruit consumption during the Covid-19 pandemic increased along with public awareness to increase body immunity (Kansiime et al 2021).

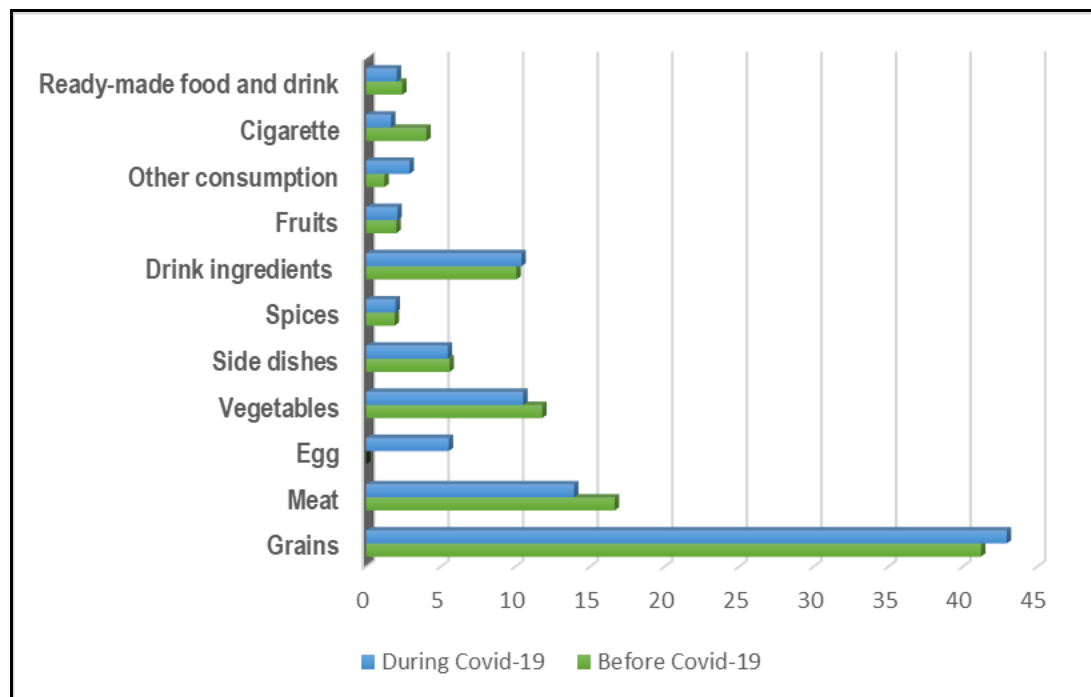


Figure 7. Food consumption (%).

Fish traders' business income is low during the pandemic, so households prioritize food consumption. Households are required to balance income by changing household consumption patterns. However, not all households make drastic changes in food consumption patterns because food is an important need, so efforts should be made under any circumstances. During the Covid-19 pandemic, households only adjusted to their needs or eliminated certain types of family expenses where possible. Some households only changed specific consumption patterns to maintain the old spending patterns rather than changing household spending patterns. Just as household consumption of grains does not alter or replace other carbohydrate sources, the consumption increases. Expenditures that have changed drastically are on meat. Before the pandemic, spending on meat was high, at 16.66%, but during the pandemic, households reduced the amount of meat consumption to 13.95% due to high meat

prices. Thus, some households replaced it with other foods with protein, such as eggs, which are relatively affordable.

The pattern of non-food consumption before and during the pandemic has shifted both in terms of number and composition. This shift can be seen from the value of consumption expenditures (Figure 8), which decreased during the Covid-19 period, due to a decrease in income and changes in household lifestyles during the pandemic. The enactment of the rules for wearing masks and always washing hands caused an increase in the number of types of consumption, namely the purchase of masks and disinfectants/sanitizers.

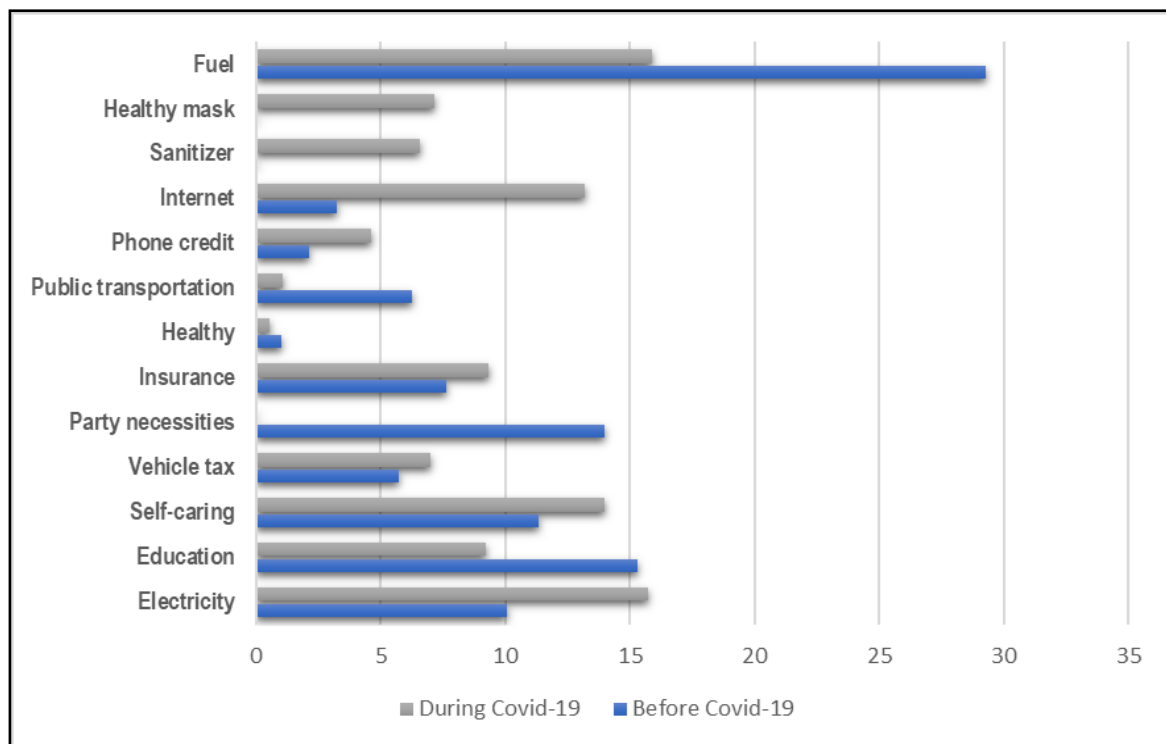


Figure 8. Percentage of non-food consumption (%).

The Covid-19 pandemic caused the pattern of household consumption of traders to change due to new government policies. The implementation of physical distancing, Work From Home (WFH) and School From Home (SFH) had implications for social behavior carried out by the community. The number of activities at home that make electricity use increase, such as television, cellphone chargers, fans, the internet have also increased because of the school system from home and working from home. The central and regional governments devised a policy to terminate all educational institutions. This was done as one of the efforts to prevent the spread and transmission of Covid-19. The policy proposed that all educational institutions stop carrying out teaching and learning activities as usual to reduce the effect of the spread of Covid-19 (Wargadinata et al 2020). Because schools have been changed to schools from home/online, the costs of some schools, especially public schools, were free of charge or borne by the government.

The household consumption expenditures of fish traders in Bengkulu City before and during the Covid-19 pandemic was lower than the average household expenditure per capita in Bengkulu City (Table 3). Based on the Bengkulu City BPS (2019), the household expenditure of Bengkulu City people who are classified as poor is 50.86 USD per capita, medium households of 117.42 USD per capita and rich households of 243.87 USD per capita. The decreasing income of fish traders has caused the average household expenditure of traders during the Covid-19 pandemic to be included in the category of expenditure for the poor. Households made various adjustments to the arrangement of types of household consumption during the Covid 19 pandemic.

Table 3

Average expenditure per capita based on commodity group

<i>Consumption</i>	<i>Expenditure of Bengkulu City (USD/month)</i>	<i>Expenditure before Covid-19 (USD/month)</i>	<i>Expenditure during Covid-19 (USD/month)</i>
Food			
Grains	4.08	9.70	9.66
Meat	2.31	3.88	3.09
Egg	4.50	1.32	1.25
Vegetables	3.24	0.70	1.22
Side dishes	0.99	2.86	2.44
Spices	0.59	0.45	0.45
Drink ingredients	0.95	2.36	2.35
Fruits	2.10	0.50	0.50
Other consumption	0.84	0.31	0.65
Cigarette	5.64	0.83	0.35
Ready-made food and drink	16.71	0.57	0.48
Total food consumption (a)	41.95	23.48	22.43
Non food			
Electricity	33.31	2.11	2.72
Education	17.64	2.94	1.70
Self-caring	4.37	2.48	2.48
Vehicle tax	4.07	1.23	1.23
Party necessities	3.13	3.15	0.00
Insurance	4.07	1.69	1.69
Healthy		0.24	0.10
Public transportation		1.39	0.38
Phone credit		0.47	0.84
Internet		0.67	2.29
Sanitizer			1.18
Masks			1.25
Fuel		5.01	2.82
Total non-food consumption (b)	66.61	21.37	18.68
Total consumption (a+b)	108.56	44.85	41.11

Note: source: BPS Bengkulu City (2019).

The impacts of Covid-19 on income and consumption patterns. The results showed that the Covid-19 pandemic caused a decrease in household income and consumption expenditure of fish traders (Table 4). There were significant differences in the average income and consumption of fish traders before and during the Covid-19 pandemic. This is in line with the research proposed by Khofifah (2020), who stated that three sectors were seriously affected due to the pandemic, namely tourism, trade, and investments. Trade was greatly affected due to a decrease in income and a decrease in the level of people's purchasing power. Kurniawan (2021) also explains that people's consumption patterns have changed, but not drastically. People only made adjustments as needed or eliminated certain types of family expenses where possible. The Covid-19 pandemic in Indonesia had many impacts on the community's economy, especially on traders in traditional markets. Since several regions have imposed restrictions on the movement of people, crowds have carried out partial quarantines, so that many traders lost profit because the number of buyers decreased.

From the primary data results, it is known that fish trading households also carried out strategies in consumption patterns during the Covid-19 pandemic. Households saved money by shopping at a cheaper place. The types of side dishes often eaten are fish, vegetables and chilli sauce, and noodles or eggs are even cheaper. Some traders smoke, but because of Covid-19, traders chose to reduce cigarette costs. The expenses that traders reduced are also pocket money for children.

Table 4

The impact of the Covid-19 pandemic on income and consumption patterns

Variable	Paired differences			t	Df	Sig. (2-tailed)
	Mean	Std. deviation	Std. error			
Income before and during Covid-19	259.851	156.588	25.402	12.351	37	0.000***
Consumption pattern before and during Covid-19	15.106	16.973	2.753	6.417	37	0.000***

Note: *** - significant at $p < 0.01$ (H_1 accepted).

Kurniawan (2021) explained that household consumption weakened due to changes in people's consumption patterns during the Covid-19 pandemic. Based on a McKinsey survey, 67% of respondents in Indonesia are more concerned about spending money, 59% look for ways to save more money when shopping, and 56% switched to buying cheaper products to save money (Bayu 2020). The McKinsey survey also shows that Indonesians are starting to reduce spending in various product categories, except for necessities and entertainment at home (katadata.co.id).

Conclusions. The Covid-19 pandemic caused difficulties in all sectors, including the trade sector, especially for fish traders in Bengkulu City. Traders experienced a decrease in income and changes in the consumption patterns, which had to be adjusted in line with the decline in income during the Covid-19 pandemic. The decline in revenue was due to the low number of sales compared to before the pandemic. In addition, the implementation of restrictions on community activities (PPKM) made it difficult for consumers to shop directly at the market. Instead, consumers preferred to buy finished products purchased online. The Covid-19 pandemic also required fish-trading households to buy sanitizers and masks, reducing other household expenses.

Conflict of Interest. The authors declare that there is no conflict of interest.

References

- Arida A., Sofyan, Fadhiela K., 2015 [Analysis of household food security based on the proportion of food expenditure and energy consumption (Case study of farmer households participating in the Food Independent Village Program in Indrapuri District, Aceh Besar District)]. *Agrisep Journal* 16(1):20-34. [In Indonesian].
- Azimah R. N., 2020 [Analysis of the impact of Covid-19 on traders' socio-economics]. *Jurnal Ilmu Kesejahteraan Sosial* 9(1):59-68. [In Indonesian].
- Bayu D. J., 2020 [The economy was hit by changes in people's consumption patterns during Covid-19]. Available at: <https://katadata.co.id/muhammadridhoi/analisisdata/5f72e0b3f3233/ekonomi-terpukul-perubahan-pola-konsumsi-masyarakat-selama-covid-19>. [In Indonesian].
- Bene C., Bakker D., Chavarro M. J., Even B., Melo J., Sonneveld A., 2021 Global assessment of the impacts of COVID-19 on food security. *Global Food Security* 31:100575.
- Ceballos F., Kannan S., Kramer B., 2020 Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India. *World Development* 136:105069.
- Deriu S., Cassar I., Pretaroli R., Soggi C., 2022 The economic impact of Covid-19 pandemic in Sardinia. *Research in Transportation Economics* 93:101090.
- Dumairy, 2004 [Indonesian economy]. Penerbit Erlangga, Jakarta, 264 p. [In Indonesian].
- Esubalew A., 2006 Determinants of urban poverty in Debre Markos. Master Thesis, Addis Ababa University, Addis Ababa, 158 p.
- Gupta J., Bavinck M., Ros-Tonen M., Asubonteng K., Bosch H., Ewijk E. V., Hordijk M., Leynseele Y. V., Cardozo M. L., Miedema E., Pouw N., Rammelt C., Scholtens J.,

- Vegelin C., Verrest H., 2021 COVID-19, poverty, and inclusive development. *World Development* 145:105527.
- Harris J., Depenbusch L., Pal A. A., Nair R. M., Ramasamy S., 2020 Food system disruption: Initial livelihood and dietary effects of COVID-19 on vegetable producers in India. *Food Security* 12(4):841-851.
- Hoque M. S., Bygvraa D. A., Pike K., Hasan M. M., Rahman M. A., Akter S., Mitchell D., Holliday E., 2021 Knowledge, practice, and economic impacts of COVID-19 on small-scale coastal fishing communities in Bangladesh: Policy recommendations for improved livelihoods. *Marine Policy* 131:104647.
- Kansiime M. K., Tambo J. A., Mugambi I., Bundi M., Kara A., Owuor C., 2021 COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Development* 137:105199.
- Khofifah N. I., 2020 [Impact of COVID-19 on micro, small and medium enterprises]. *Jurnal Inovasi Penelitian* 1(7):1325-1330. [In Indonesian].
- Kurniawan E., 2021 [Decrease in welfare due to Covid-19]. *Jurnal Pustaka Mitra* 192:60-67. [In Indonesian].
- Mahler D. G., Lakner C., Castaneda Aguilar R. A., Wu H., 2020 The impact of COVID-19 (Coronavirus) on global poverty: Why Sub-Saharan Africa might be the region hardest hit. Available at: <https://blogs.worldbank.org/opendata/impact-covid-19-coronavirus-global-poverty-why-sub-saharan-africa-might-be-region-hardest>.
- Mayasari D., Satria D., Noor I., 2018 [The pattern of food consumption based on HDI in East Java]. *Jurnal Ekonomi dan Pembangunan Indonesia* 18(2):191-213. [In Indonesian].
- McKibbin W. J., Fernando R., 2020 The global macroeconomic impacts of COVID-19: Seven scenarios. *CAMA Working Paper No. 19/2020*, 45 p.
- Menhat M., Zaiden I. M. M., Yusuf Y., Salleh N. H. M., Zamri M. A., Jeevan J., 2021 The impact of Covid-19 pandemic: A review on maritime sectors in Malaysia. *Ocean & Coastal Management* 209:105638.
- Ngadi, Meilianna R., Purba Y. A., 2020 [The impact of Covid-19 on worker layoffs and income in Indonesia]. *Jurnal Kependudukan Indonesia: Special Edition on Demography and Covid-19*, pp. 43-48. [In Indonesian].
- Nur E. M., 2012 [Indonesia's consumption and inflation]. *Jurnal Kajian Ekonomi* 1(1):57-77. [In Indonesian].
- Sajogyo T., 1997 [Poverty line and minimum food needs]. *LPSB-IPB, Bogor, Indonesia*, 42 p. [In Indonesian].
- Sukirno S., 2007 [Modern macroeconomics]. *PT Raja Grafindo Persada, Jakarta*, 568 p. [In Indonesian].
- Sumner A., Hoy C., Ortiz-Juarez E., 2020 Estimates of the impact of COVID-19 on global poverty. *WIDER Working Paper 2020/43, UNU-WIDER*, 14 p.
- Supriyatna I., Djailani M. F., 2021 [PPKM makes purchasing power decline, July inflation was only 0.08 percent]. Available at: <https://www.suara.com/bisnis/2021/08/02/114641/ppkm-buat-daya-beli-menurun-inflasi-juli-hanya-008-persen>. [In Indonesian].
- Suroto, 2000 [Development strategy and employment opportunity planning]. *Gajah Mada University, Yogyakarta, Indonesia*, 496 p. [In Indonesian].
- Suryati D., Amini R., 2021 [Islamic consumption patterns during the Covid 19 Pandemic in the city of Mataram]. *Econetica* 1(1):1-8. [In Indonesian].
- Sutrisno H., 1995 [Statistics II]. *PT Rineka Cipta, Jakarta*, 476 p. [In Indonesian].
- Thenisia S., Arjo P. A., Kurniati B., 2020 [The effect of COVID-19 on economic growth in Indonesia]. *Course Paper: Macroeconomics, Faculty of Economics and Business, Tarumanegara University, Jakarta*, 12 p. [In Indonesian].
- Wargadinata W., Maimunah I., Dewi E., Rofiq Z., 2020 Student's responses on learning in the early COVID-19 pandemic. *Tadris: Journal of Education and Teacher Training* 5(1):141-153.
- *** [Bengkulu Governor Regulation Number 22 of 2020 concerning the implementation discipline and law enforcement of health protocols as an effort to prevent and control corona virus disease]. [In Indonesian].

- *** Central Bureau of Statistics (BPS) Indonesia, 2021 [Statistics yearbook of Indonesia]. Available at: <https://www.bps.go.id>. [In Indonesian].
- *** Central Bureau of Statistics Bengkulu (BPS), 2019 [Bengkulu Municipality in figures (Bengkulu, Central Bureau of Statistics Bengkulu)]. [In Indonesian].
- *** FAO, 2020 COVID-19 pandemic - impact on food and agriculture. Food and Agriculture Organisation of the United Nations (FAO), Rome, 22 p.
- *** katadata.co.id
- *** Sugiarto, 2008 [Analysis of income, consumption patterns, and welfare of farmers on the basis of irrigated rice field agro-ecosystems in rural areas]. Seminar Nasional Dinamika Pembangunan Pertanian dan Perdesaan: Tantangan dan Peluang bagi Peningkatan Kesejahteraan Petani, Bogor, Indonesia. [In Indonesian].

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