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Socioeconomic inequalities in household resilience capacity in the context of COVID-19 in the fisheries sector in Malawi

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ABSTRACT
Malawi relies on fish as a source of protein, and the fisheries sector employs many individuals. The COVID-19 shock has affected the fisheries sector. The current study measured household resilience in the fisheries sector. We collected primary data from 405 respondents. We used TANGO International's resilience capacity indices (RCI) and concentration indices (CI) to measure resilience and assess the inequality in the household resilience among fish value chain actors, respectively. Our findings show that the lowest average resilience capacities index (RCI = 31.14; p < 0.001) was among households in the lowest income quintile, and the highest resilience capacities index (RCI = 59.74; p <0.001) among the highest wealth category. Regarding inequality in resilience, an overall positive concentration index (CI = 0.12; p <0.001) was found. This means that wealthier households are likely to be more resilient than less wealthy households. In terms of policy, the government may consider extending the urban COVID-19 cash transfers to poor households in fishing communities.

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Resilience index; adaptive capacity index; transformative capacity index; absorptive capacity index; inequality; erreygers; Malawi

1. Introduction

The COVID-19 pandemic is a shock that has brought in some unprecedented changes that have affected so many aspects of life globally (Chirwa et al., 2022). The impacts of COVID-19 on food systems can generate economic disruptions because food shortage (Mardones et al., 2020) is a source of economic disruptions (Barman et al., 2021; Swinnen & Vos, 2021). Aquaculture and fisheries are among the hugely affected food systems because of the perishability of fish products (FAO, 2020b, 2020a) and the dependency of the sector on the transport system to distribute fish (Kaynak & Rice, 2015; Steenbergen et al., 2019; Yang et al., 2021). This underscores the need for building the resilience of actors in the fisheries sector (Chiwaula et al., 2022). Resilience is the capacity of a system to continue providing a desired set of services in the face of disturbances, including the capacity to recover from unexpected shocks and adapt to ongoing change (Biggs et al., 2015).

COVID-19 is a new pandemic, and thus, not much data is currently available, including the resilience of fish value chain actors during the pandemic. The absence of information about household resilience in the fisheries sector in Malawi existed even in the pre-COVID-19 period. The emergency of the pandemic has therefore increased the need to generate this information which will point to the design of interventions that can help build the capacity of households to withstand shocks. The unique feature of the COVID-19 pandemic is that it is both an idiosyncratic shock and a covariate shock (Milcheva, 2022). As an idiosyncratic shock, COVID-19 affects households through illness and death of the household members (Su et al., 2021). Although the incidence of the idiosyncratic

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aspects of the COVID-19 shock in Malawi is low (Mangal et al., 2021), the covariate aspect cannot be undermined because of the government-imposed restrictions (Chaziya et al., 2021; Dulani, 2005; Boniface Dulani et al., 2021; Ferree et al., 2021; Mzumara et al., 2021) affect everybody.

This is more important in the fisheries sector, considering the importance of fish to the diet and livelihoods of Malawians (Chiwaula et al., 2018). Although national statistics report that the fisheries sector contributes about 1.0% of the GDP in Malawi, the sector is very important as the fish value chain supports over 1.6 million people and substantially contributes to their livelihoods (Malawi Government, 2021). Fish is the primary source of animal protein in Malawi, contributing over 70% of the national dietary animal protein intake and 40% of the total protein supply (Torell et al., 2020). The sector is also a source of employment for about 65,000 fishers and 54,000 crew members, and over half a million people engaged in ancillary activities, such as fish processing, fish marketing, boat building and engine repair (Malawi Government, 2021).

Conceptually, the effects of the covariate aspects of COVID-19 in the fish value chain are both direct and indirect (Mnyanga et al., 2021). The direct ones relate to effects on activities in the value chain, such as fishing, fish processing, fish transportation, and retail and wholesale marketing. The indirect effects relate to the impact of a change in demand for fish because of the impact of the pandemic on consumer incomes. COVID-19 affects the fish sector through decreasing consumer demand, inability to access markets, logistical problems related to transportation and border restrictions(FAO, 2020b). The direct effects of COVID-19 are therefore expected to lead to a decline in fish supply (at all levels of the value chain), which would eventually lead to food and nutrition insecurity (Apostolopoulos et al., 2021; Elleby et al., 2020); and decline in incomes of fish value chain actors. For example, in Bangladesh, Kabir (2020) reported that COVID-19 halved demand for fish and fish products and massively disrupted the supply system, leading hatchery operations to close, feed imports to stop, and many value chain actors to suffer economic losses right from the beginning of the culture season. As such, there is a need to focus efforts on the operation of the fish value chain to maintain fish supply and support livelihoods.

Although creating an enabling resilience environment is of primary importance, the various socioeconomic factors may affect the level of resilience that the different actors can ably do. With this in mind, the main objective of this study is to assess the wealth-related inequalities in the resilience of the fish value chain to the COVID-19 pandemic in Malawi. We achieved this using data from a primary survey covering four districts along Lake Malawi. Our findings point to the fact that the wealthier are more resilient than the poor, which calls for social protection programs among the poor in the fisheries sector and other sectors in the face of COVID-19.

2. COVID-19 Situation in Malawi

The first confirmed coronavirus case in Malawi was registered on 2 April 2020 (Chirwa et al., 2022). The country declared a state of national disaster due to the COVID-19 pandemic two weeks earlier, on 20th March 2020 (Chaziya et al., 2022; Mzumara et al., 2021). As of 31 December 2020, the month when this study was conducted, Malawi had registered 6583 COVID-19 cases and 189 deaths (United Nations Malawi, 2021). Following the declaration of the state of national disaster, the COVID-19 response is multisectoral and implemented through 15 working groups termed clusters (Mzumara et al., 2021). There is no specific policy that targets the fisheries sector, implying that the response in the fisheries sector has been through a broad national response. The main policies in the broad national response include the ban on international travel, cancellation of public events– including political rallies – to a maximum of 100 people (Dulani et al., 2021), school closures at all levels, decongesting workplaces and public transport, mandatory face coverings, and a testing policy covering symptomatic people (Kao et al., 2020; Mzumara et al., 2021; Nkhata & Mwenifumbo, 2020; Tenga-tenga et al., 2021).

Apart from the above-narrated COVID-19 related interventions, other approaches such as risk communication and community engagement in multiple languages and various mediums. In addition to the government's actions indicated above, there are also efforts to improve access to water, sanitation, nutrition (Mzumara et al., 2021) and unconditional social-cash transfers for poor urban and rural households (Mnyanga et al., 2021). Malawi also adopted COVID-19 vaccines as a response, but the uptake has been sub-optimal because of misinformation about the likely effects of the vaccines. However, the roll-out of COVID-19 vaccines in Malawi slowed down the spread and impacts of the pandemic in line with global trends.

Evidence has shown that both the pandemic and the measures to contain the pandemic have significant socioeconomic effects on the people (Nkhata & Mwenifumbo, 2020; Tengatenga et al., 2021; UNDP Malawi, 2020). For the fisheries sector, the transmission mechanism through which the measures affect it was through the limitations on human interactions and movements (Chiwaula et al., 2022). Limiting interactions and movements of the actors involved in the fish value chain slow down the fisheries sector's productivity.

3. Methods

3.1 Sample size and sampling procedure

The study subjects were identified in a two-stage process. We randomly selected 48 fish landing sites representing 10% of all the fish landing sites in the four districts understudy in the first stage. To identify individual respondents, we randomly sampled fish value chain actors in the selected fish landing sites. We allocated sample sizes to the fish landing sites proportional to the number of actors plying their trade within site. We followed the recommended minimum sample size in surveys (Adam, 2020; Twisk, 2021). The formula for establishing the sample size was expressed as follows:

$$n = Z^2_{1-\frac{\alpha}{2}} p(1-p)/d^2 \tag{1}$$

where n is the sample size, d is the level of accuracy (sampling error), and Z is the normal standard deviation (1.96% Confidence interval). Based on the formula, the rule of thumb is that assuming the target population is not known and the population proportion is not known, it is advisable to use $p = 0.5$, $Z = 1.96$, CI = 95% and $d = 0.05$. This yields a minimum sample size of 384. We, however, increased our sample to 405 respondents to account for possible nonresponse. All the data were collected using the Computer Assisted Personal Interview (CAPI) and administered face-to-face. Data were collected using questionnaires which were then programmed using CSPro 7.4.1 in December 2020. Data analysis was done in Stata 17.

3.2 Ethical clearance

Ethical clearance was obtained from the University of Malawi Research and Ethics Committee (UNIMAREC). All participants were asked to give verbal or written consent because the study involved human participants. All procedures performed in this study complied with the 1964 Helsinki declaration or equivalent ethical (Shamoo & Khin-Maung-Gyi, 2021) standards. The IRB approval and the consent forms are added in Appendix 1 and 2, respectively.

3.3 Measuring household resilience

Household resilience was measured using the resilience capacity index (RCI) proposed by TANGO International (Tango International, 2018). In this measure, household resilience capacities are measured as indices, one for each of the three dimensions of resilience capacity—absorptive capacity, adaptive capacity, and transformative capacity—and one overall index combining these three indexes. *Absorptive capacity* is the ability to minimise exposure to shocks and stresses through preventative measures and appropriate coping strategies to avoid permanent, negative impacts. *Adaptive capacity* is the ability to make proactive and informed choices about alternative livelihood strategies based on understanding changing conditions. While *transformative capacity* involves the governance mechanisms, policies/ regulations, infrastructure, community networks, and formal and informal social protection mechanisms that constitute the enabling environment for systemic change. This approach generates resilience indices that lead to policy conclusions similar to the ones that are arrived at when the widely used and competing approach that was developed by FAO's resilience index measurement and analysis (RIMA) model (Constas et al., 2019; d'Errico et al., 2016) is used.

We applied factor analysis to indicators and variables to derive three dimensions of resilience capacity indices. Summary statistics of the indicators used are presented in Appendix 1a. These are also presented per district to explore the differences in the factors between the districts. The factor analysis was further applied to the three indices to derive the overall resilience capacity index. We used the Kaiser–Meyer–Olkin (KMO) test to confirm that the index components have enough in common to warrant a factor analysis (TANGO International 2018), and we noted that all KMO values were greater than 0.50 implying that all indicators used to derive the indices are acceptable. Appendices 2a to 5b present the obtained statistics when deriving the indices. Results in the appendices show that the KMO values are greater than 0.50, implying that the data used is appropriate for factor analysis. For straightforward interpretation, the calculated indices were rescaled to be between 0 and 100 by using the following formula:

$$Index\_rescaled = \frac{(Index - min\_Index)*100}{(\max\_Index - min\_Index)} \quad (1)$$

Where *Index_rescaled* stands for rescaled index, *Index* stands for the calculated Index, *min_Index* is the minimum level of calculated index, and *max_Index*. stands for the maximum level of the calculated index.

3.4 Measuring wealth-related inequality

To assess wealth-related inequalities in household resilience, we use the Concentration Index (CI). The CI is in the category of bivariate rank-dependent indices, used to measure the distribution of inequality in a variable of interest (Heckley et al., 2016; Makate et al., 2019; Wagstaff et al., 2009); in our case, the resilience index. The value of the CI falls between −1 and +1. A positive CI value indicates that resilience is concentrated among the wealthier individuals; in other words, resilience is concentrated among the rich. A negative index means that resilience is concentrated among individual with low wealth status. A zero CI value means that there is no wealth-related inequality in the distribution of the resilience index. The CI is expressed as:

$$CI = \frac{2}{\mu} cov(h_i, r_i) \quad (2)$$

where h_i is the resilience index, and r_i is the household relative rank in the wealth distribution and μ. is the mean level of resilience index. Visual presentation of the CI is in the form of concentration curves. To understand how each factor contributes to the observed inequality, we decompose the concentration index using the Wagstaff methodology (Larraz et al., 2021; O'Donnell et al., 2008).

4. Results

4.1 Socioeconomic characteristics

Table 1 shows the characteristics of the respondents. More than half were male (62%); the majority age group was 35–44 (36%), followed by those in the age group 25–34 (25%). Very few had tertiary education (0.30%), and primary education was the predominant level of education attainment, representing an aggregate of 66%. Concerning occupation, most household heads owned fish gear (32%) – they were fishers and were involved in fish trading (1) and fish processing (11%). Casual workers in the fisheries were represented by 8% of the sample. These are individuals who lack assets but have fishing and fish processing skills. They are important actors in the fish value chain, but their lack of assets makes them very vulnerable to the impact of shocks.

4.2 Level of household resilience

The estimated overall level of household resilience capacities index was 45.49. Among the three dimensions of resilience, the adaptive capacity resilience index was the highest (44.90), while the transformative capacity resilience index was the lowest (31.94). The distribution of the level of resilience and its dimensions are shown in Kernel density functions presented in Figure 1. The distributions show that the transformative capacity resilience index is skewed to the left, implying that most households have a low capacity to transform their livelihoods in the face of a shock. However, there are still few households that have high levels of transformative capacity. Absorptive capacity is almost normally distributed but has a low mean implying a generally low level of this dimension of resilience in the sample.

4.3 Level of resilience across districts

In Figure 2, we show the summary level of resilience across the four districts, and we found that, on average, households from Mangochi district were the most resilient. Households from Nkhotakota

Table 1. Socioeconomic characteristics of the respondents

Variable	Frequency	Percent
Sex of respondent		
Male	249	61.48
Female	156	38.52
Total	405	100.00
Age groups of respondents		
17–24	33	8.15
25–34	105	25.93
35–44	146	36.05
45–54	75	18.52
>55	46	11.36
Total	405	100.00
Highest education of household head		
None	66	16.5
Junior Primary	128	32
Senior Primary	133	33.25
Junior Secondary	41	10.25
Senior Secondary	30	7.5
Above secondary	2	0.5
Total	400	100
The main occupation of the household head		
Wage employee (%)	5	1.25
Farmer (%)	31	7.75
Business (%)	40	10
Household work (%)	11	2.75
Casual work(Fisheries) (%)	33	8.25
Casual work other (%)	8	2
Fishing/gear owner (%)	127	31.75
Fish processing (%)	45	11.25
Fish Trading (%)	73	18.25
Other (Specify) (%)	27	6.75
Total	400	100.00

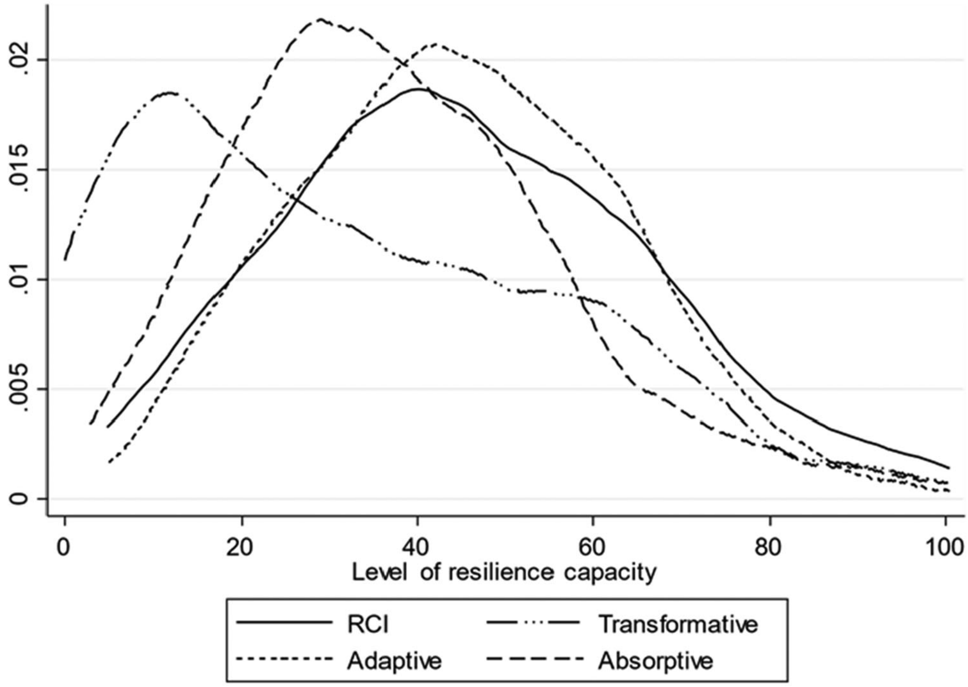

Figure 1. Distribution of the resilience indices

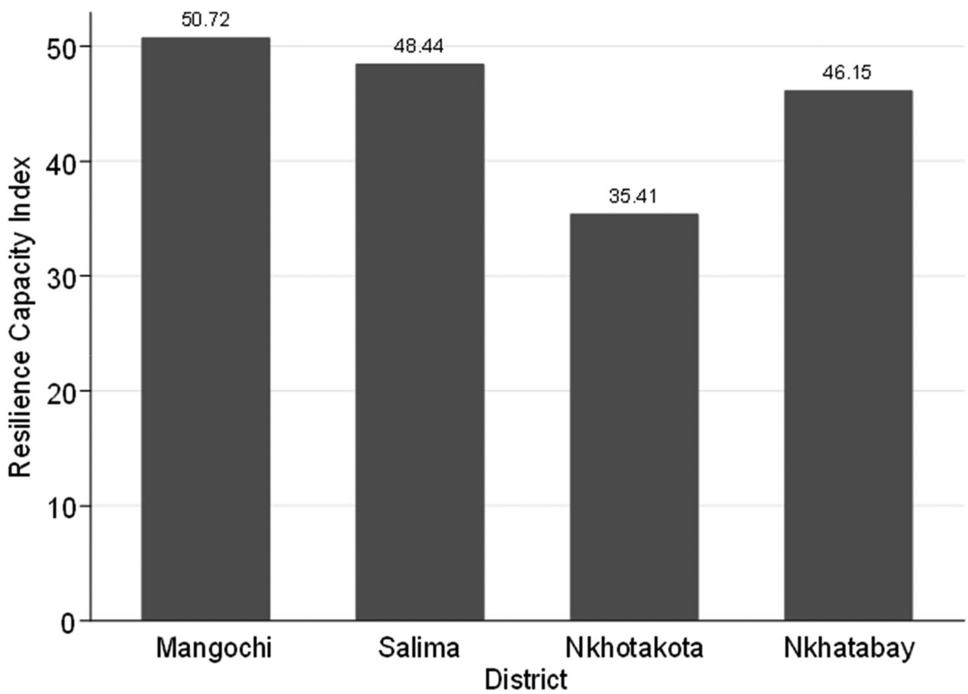

Figure 2. Distribution of the resilience indices by district

district were the least resilient on average. The t-tests show that the levels of resilience between the districts are statistically different. An exploratory assessment of the factors used to construct the resilience capacities index (Appendix 1) shows that Nkhotakota district had the lowest values of almost all factors while Mangochi had the highest values. This indicates that resilience-building activities in different areas within the fishing community require various activities with different intensities.

4.4 Resilience by wealth status

Our hypothesis was that the level of resilience varies with the household's wealth, and we compared the level of household resilience and wealth status of the households in Figure 3. We measured the wealth status of the households by categorising a wealth score into five quintiles.[1] The wealth score was computed using the multiple correspondence approach (Poirier et al., 2020). The findings show that the levels of household resilience seem to be increasing with the increase in household wealth score. Households in the lowest quintile had the lowest average resilience capacities index (31.14), while the households in the highest wealth quintile had the highest average resilience capacities index (59.74). This shows that increasing household wealth through asset acquisition improves the resilience of households to shocks.

4.5 Inequalities in resilience

We now present the results for the wealth-related inequality in household resilience among the fisher folks, using the concentration curves. The findings are shown in Figures 4–7. All the figures show that the concentration curves are above the line of equality. This means that resilience is concentrated among the wealthier households. In this case, wealthier households have more ability to withstand the effects of the shocks, including COVID-19 related shocks, than less-wealthy households.

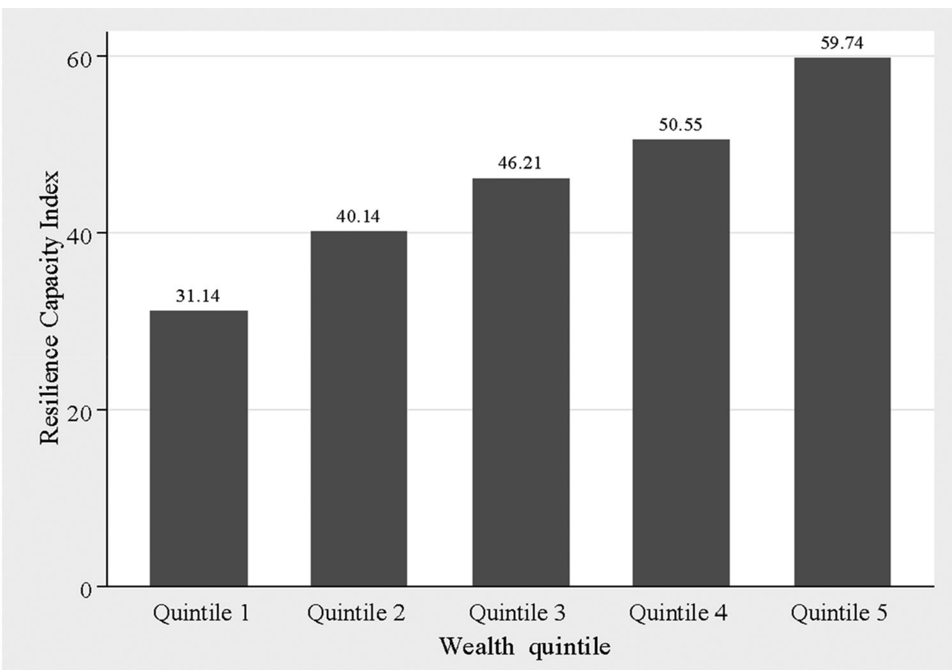

Figure 3. Level of resilience by wealth quintile

In Table 2, we present the summary statistics for wealth-related inequality in the level of resilience using concentration indices. The analysis used concentration indices derived following the method by Erreygers & Van Ourti (2011), which has also been applied in assessing wealth-related inequality in the adoption of drought-tolerant maize and conservation agriculture in Zimbabwe (Makate et al., 2019).

From the visual inspection of the concentration curves and the magnitudes of the concentration indices, we see that the largest inequalities exist in the household capacity to absorb the effect of shocks, followed by the household capacity to adapt to shocks and, finally, the household capacities to transform themselves. This implies that the environment is not conducive for households in different wealth groups to transform their livelihoods in the case of shocks. These findings show that interventions that aim at building the capacity of households to transform their livelihoods in the face of shocks should be implemented across all wealth groups. Further, the findings show that more emphasis on the interventions that aim to build the households' capacity to absorb shocks should be directed to poorer than wealthier households.

Table 3 shows the concentration indices for the various household resilience indices across the four districts of Mangochi, Salima, Nkhotakota and Nkhatabay. For inequality in the resilience index, all the concentration Indices across the four districts are positive and significant at 1%. Likewise, the adaptive capacity index across the four districts is positive and significant at 1%. The meaning of the positive index is that resilience is concentrated among wealthier households. On the absorptive capacity, the indices are significant at 1%. Unlike the other indices, the transformative capacity index is only significant for Mangochi and Salima. This insignificant sign means no difference in resilience among the individuals in Nkhotakota and Nkhatabay.

We decomposed the concentration index into its contributing determinants (Table 4). We focus on the column that shows the relative contributions. The overall message from the findings is that

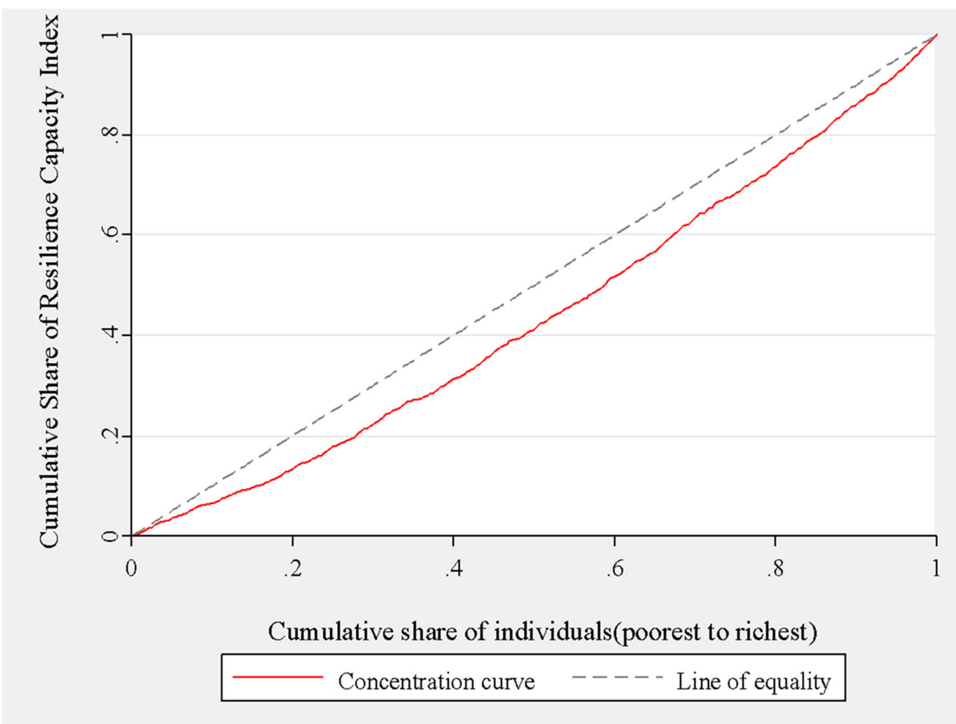

Figure 4. Concentration curve for resilience capacity index

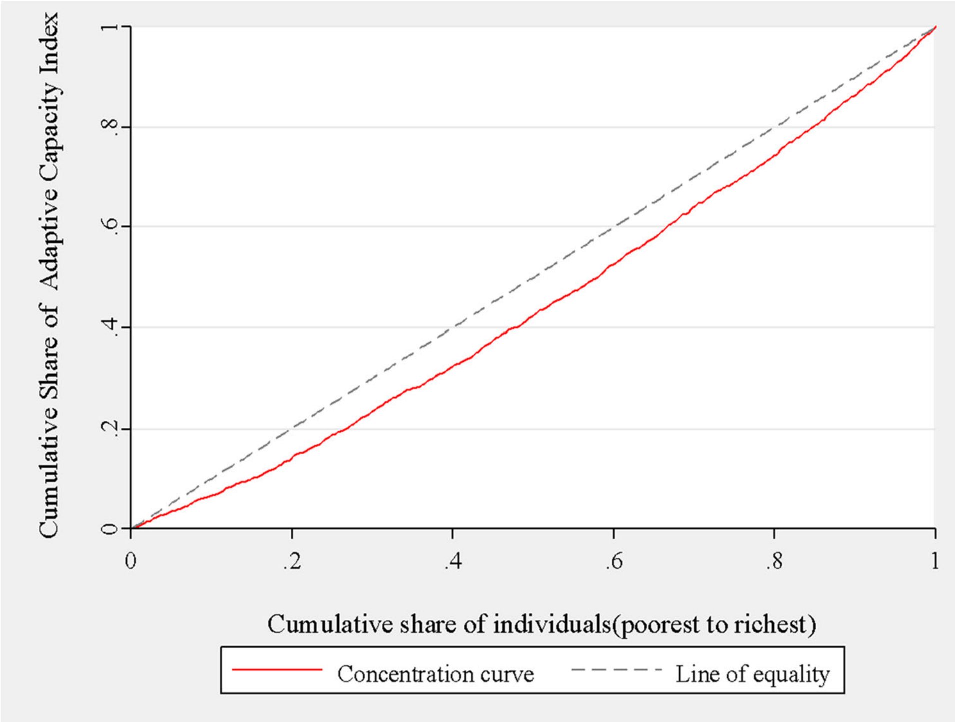

Figure 5. Concentration curve for adaptive capacity index

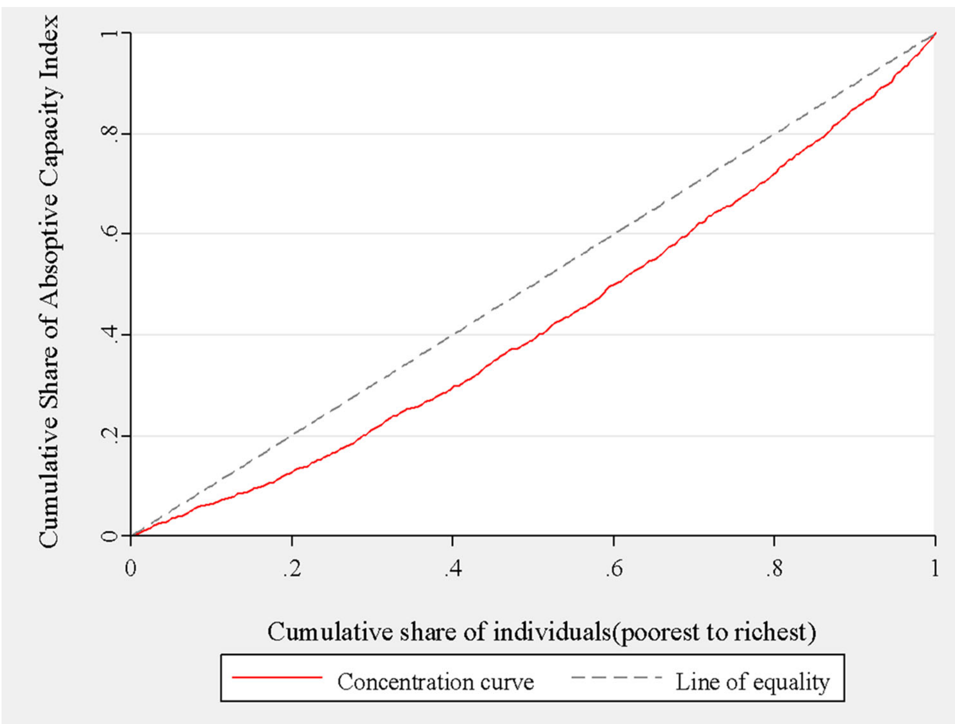

Figure 6. Concentration curve for absorptive capacity index

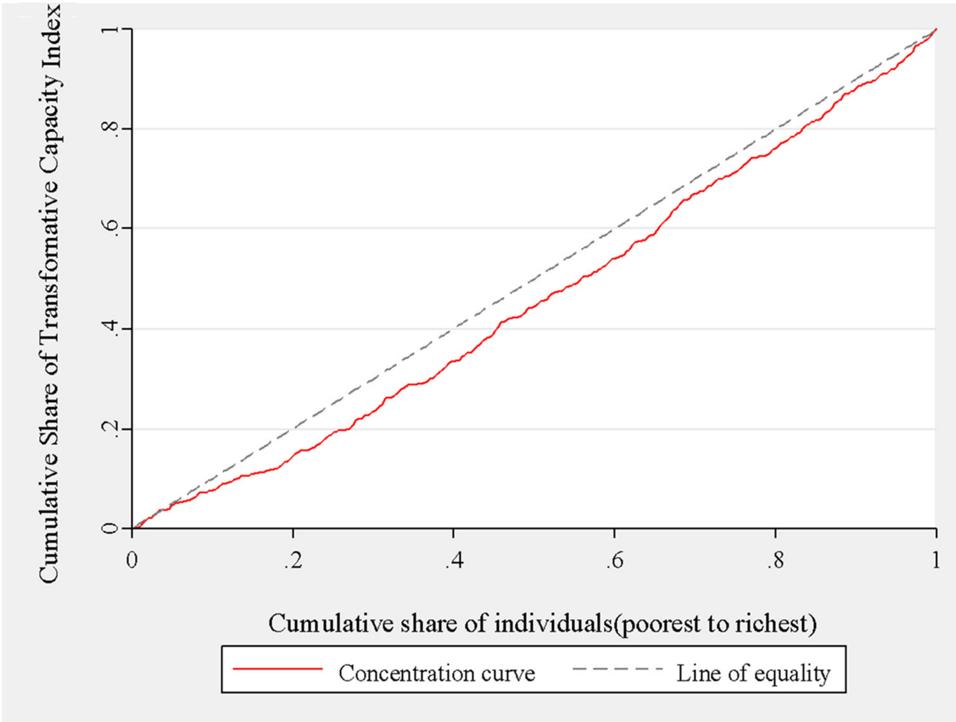

Figure 7. Concentration curve for transformative capacity index

Table 2. Concentration indices for resilience capacity cndex, adaptive capacity index, absorptive capacity index, and transformative capacity index

	Resilience capacity index	Adaptive capacity index	Absorptive capacity index	Transformative capacity index
Concentration Index	0.122***	0.109***	0.148***	0.083***
95% confidence	[0.100,0.145]	[0.089,0.129]	[0.124,0.172]	[0.042,0.124]
N	405	405	405	405

95% confidence intervals in brackets
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

wealth level is the overall contributor to the difference in the inequalities observed. However, there was also some small spatial difference, as indicated by the difference in the significance of the district level variable.

5. Discussion

The paper aimed to assess the socioeconomic related inequality in household resilience in the context of the COVID-19 pandemic in Malawi. We used data from a survey conducted in four districts in Malawi. To our knowledge, this study presents the first of its kind on this angle in a low-resource country. The main message emanating from the study is that we found significantly positive concentration indices, which means that inequality in overall resilience capacity, adaptive capacity, transformative capacity, and absorptive capacity is concentrated among the wealthier individuals. Our results are appealing, and we provide a discussion below.

The finding that wealth-related inequalities in resilience to shocks in the context of the COVID-19 pandemic in terms of adaptive, transformative and absorptive capacities add to the other results on

Table 3. Concentration Indices for inequality in resilience, adaptive, absorptive and transformative indices

	Resilience capacity index		Adaptive capacity index		Absorptive capacity Index		Transformative capacity index	
District	Concentration Index	95% CI	Concentration Index	95% CI	Concentration Index	95% CI	Concentration Index	95% CI
Mangochi (N = 172)	0.130***	(0.100,0.160)	0.126***	(0.100,0.152)	0.164***	(0.130,0.197)	0.060**	(0.006,0.113)
Salima (N = 52)	0.116***	(0.066,0.167)	0.090***	(0.046,0.133)	0.133***	(0.072,0.194)	0.133**	(0.031,0.235)
Nkhotakota (N = 109)	0.092***	(0.031,0.152)	0.079***	(0.028,0.129)	0.108***	(0.049,0.167)	0.069	(−0.039,0.177)
Nkhatabay (N = 72)	0.095***	(0.052,0.139)	0.089***	(0.047,0.131)	0.127***	(0.083,0.171)	0.043	(−0.057,0.142)

95% confidence intervals in brackets
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Decomposition of the concentration Index results

	Concentration Index b/se	Coefficient b/se	Elasticity b/se	Contribution (%) b/se	prcnt_1 b/se
Age	0.041***	0.074	0.064	0.003	2.119
	(0.009)	(0.086)	(0.074)	(0.003)	(2.838)
Sex	−0.045***	−2.078	−0.063	0.003	2.338
	(0.010)	(2.502)	(0.076)	(0.003)	(2.832)
Education: Standard 1 to standard 5	−0.015	2.533	0.019	−0.000	−0.245
	(0.039)	(2.798)	(0.023)	(0.001)	(0.827)
Education: Standard 6 to Standard 8	0.007	5.197*	0.035*	0.000	0.193
	(0.060)	(3.083)	(0.021)	(0.002)	(1.943)
Education:Form 1 to Form 2	0.014	2.660	0.006	0.000	0.067
	(0.104)	(4.037)	(0.009)	(0.001)	(0.975)
Education:Form 3 to Form 4	0.215	9.613**	0.013**	0.003	2.369
	(0.136)	(4.775)	(0.007)	(0.003)	(2.166)
Education:Above secondary	0.216***	−14.331***	−0.001	−0.000	−0.169
	(0.060)	(4.223)	(0.001)	(0.000)	(0.189)
Farmer	0.054	−2.181	−0.001	−0.000	−0.064
	(0.191)	(10.491)	(0.009)	(0.003)	(2.391)
Business	0.063	−1.718	−0.003	−0.000	−0.136
	(0.130)	(11.642)	(0.017)	(0.002)	(1.830)
Student	−0.109	−1.047	−0.001	0.000	0.062
	(0.235)	(9.182)	(0.006)	(0.002)	(1.538)
Household work	0.572***	−17.917*	−0.004	−0.002	−1.675
	(0.143)	(10.128)	(0.003)	(0.002)	(1.349)
Casual Work(Fisheries)	−0.331***	2.564	0.005	−0.002	−1.295
	(0.098)	(9.052)	(0.019)	(0.006)	(5.485)
Fishing/gear owner	0.237***	−7.961	−0.054	−0.013	−10.476
	(0.042)	(9.980)	(0.070)	(0.015)	(12.994)
Fish processing	−0.174***	3.898	0.015	−0.003	−2.072
	(0.053)	(10.478)	(0.046)	(0.007)	(6.307)
Fish trading	−0.087	3.196	0.018	−0.002	−1.262
	(0.057)	(9.922)	(0.053)	(0.006)	(4.706)
Other	0.076	−17.739*	−0.015	−0.001	−0.949
	(0.174)	(10.029)	(0.009)	(0.002)	(2.042)
Wealth quintile 2	−0.398***	7.823***	0.034***	−0.014***	−11.050***
	(0.043)	(2.638)	(0.011)	(0.005)	(3.994)
Wealth quintile 3	0.010	13.526***	0.062***	0.001	0.504
	(0.052)	(3.837)	(0.021)	(0.004)	(2.997)
Wealth quintile 4	0.410***	22.868***	0.096***	0.039***	32.057***
	(0.047)	(3.023)	(0.018)	(0.008)	(6.758)
Wealth quintile 5	0.800***	29.799***	0.131***	0.105***	85.769***
	(0.021)	(3.571)	(0.018)	(0.013)	(10.964)
Salima	−0.115	4.520*	0.013*	−0.001	−1.200
	(0.070)	(2.524)	(0.007)	(0.002)	(1.257)
Nkhotakota	−0.113**	−6.473**	−0.038**	0.004*	3.547*
	(0.051)	(2.977)	(0.018)	(0.003)	(2.018)
Nkhatabay	0.094	−3.686	−0.014	−0.001	−1.110
	(0.071)	(2.463)	(0.010)	(0.001)	(1.260)
N	405	405	405	405	405

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Note: standard errors in parenthesis

inequality which has been reported elsewhere in terms of general resilience to poverty and other shocks(Armitage & Nellums, 2020a, 2020b; Maree & Kampinda-Banda, 2020; Raginel et al., 2020) even in times of COVID-19 (Ansah et al., 2021; Ur Rahman et al., 2021). Even though the studies are not directly comparable to ours -which in this case provide the uniqueness of these findings, we may link them through the common theme of inequality. These inequalities imply that the emergency of COVID-19 and other shocks put the attainment of SDG10 (reduction of inequality of various forms) (UNDP, 2015) in the fisheries sector at threat. This is thus a warning shot as we drive towards attaining these goals.

The existence of high inequality in wealth-related inequalities in absorptive capacities implies that the poor do not have adequate means to absorb, adapt, and transform their livelihoods in the face of shocks. This means that in the event of shocks, wealthier households can continue with their normal lives while poorer households are not. This calls for targeted safety net programs in the fisheries sector in the face of COVID-19. In Malawi, the government provided cash transfers to the urban poor, but our findings show that this should have been extended to the rural poor. We can explain these results by speculating that these inequalities may be exacerbated by the high poverty (NSO & Word Bank, 2018), where almost half of the Malawian population lives below the poverty line. Moreover, this can end up worsening the wealth and income inequality, which has been worsening over time in Malawi (Mussa & Masanjala, 2015; NSO, 2017; UNICEF, 2016). This general inequality may deny other people the proper way to cushion themselves against shocks.

We also notice the variation in the inequality in district resilience. The inequalities are higher in Mangochi and Salima districts. These two districts are located adjacent to each other, although in different regions. Further to the above, our results of decomposition showed that apart from the district level variations, the wealth differences were the primary contributors to the resilience levels. The results may be explained by the variation in the poverty levels in these districts, which is higher in these two districts than in the other two - Nkhotakota and Nkhatabay (NSO & Word Bank, 2018). Not only that, but the factors also that may drive cushion against the factors associated with resilience within these districts, such as assets, are not better than the other districts. The resilience capacities index among fish value chain actors in Malawi is influenced by access to basic services, assets, and adaptive capacities. Social networks, which were also assessed, were not significant (Chiwaula et al., 2022).

6. Conclusion

COVID-19 affects the development of outcomes of households directly but also by reducing the capacity of the households to withstand the effects of shocks (Chiwaula et al., 2022). We have shown that the ability to withstand shocks is higher among wealthier households than among poorer households. More inequality relates to the ability to absorb the effects of shocks.

We are aware of the limitation of the current paper. The first relates to the fact that we may not be in a position to draw any causal link using the methods that have been used (Reich et al., 2021; Ullah et al., 2021; S. Yang et al., 2021). Rather associations may be implied in the current paper. To address this, the use of quasi-experimental approaches would probably prove to be relevant, of which we leave to other researchers to do, given that it is not the aim of the current paper. From the results which have been established, further research must be pursued. Firstly, it would be nice to assess how inequality in resilience has changed over time, as various organisations have stepped in to provide different forms of assistance to help alleviate the COVID-19 pandemic. Secondly, it may also be of prime interest to decompose the concentration index to evaluate how the various socioeconomic factors have contributed to the observed inequality in the calculated concentration indices.

Having said the above, our study has important policy implications. The government may consider extending the urban COVID-19 cash transfers to the fishing communities. The social cash transfers implemented during the COVID-19 period focus mainly in the urban and towards the urban poor.es Extending the cash transfers to the fish community is important given that the covid may affect the value chain in a negative way that disrupts the supply, and processing of fish in the country. In the end, having some implications in terms of the nutrition of some Malawians who primarily depend on fish as the main source of protein. Not only that, the incomes of the ones who are less resilient may be compromised.

Note

1. Wealth score was computed by applying multiple correspondence approach to assets owned by the households.

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