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The Impacts of COVID-19 on Returned Migrants' Livelihood Vulnerability in the Central Coastal Region of Vietnam

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Abstract: This study investigated the impacts of the COVID-19 pandemic on livelihoods of households with migration workers, who returned home to the central coastal region during the peak disease outbreak in Vietnam. Five hundred and twenty-nine households with returned migration workers aged eighteen and above in the coastal areas of Quảng Bình, Quảng Trị, and Thừa Thiên Huế provinces participated in this study. Results showed that the livelihoods of all studied households were highly vulnerable due to impacts of the COVID-19 pandemic, with almost 90% at moderate or high risk according to the vulnerability index. All livelihood assets were negatively affected, and financial, psychological, and social assets were the most affected, with Common Vulnerability Score System scores of 3.65, 3.39, and 3.17, respectively. Male, younger workers, or those with a lower education level and fewer social networks were found to be more vulnerable than others. This study suggests that young laborers could aim to attain a higher level of education and/or practical skills to be able to obtain stable employment with benefits such as social insurance if they desire to out-migrate. Further, social programs which allow for migration workers at the destination to meet each other may have positive impacts on their vulnerability.

Keywords: COVID-19; livelihood vulnerability; coastal population; migrant workers

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1. Introduction

Since being discovered in Hubei province, China, in December 2019, coronavirus 2 (SARS-CoV-2, COVID-19) has spread throughout the world and had severe impacts on human life [1], the global economy, and poverty [1–4]. The pandemic critically impacted the livelihoods of people in several respects, including socioeconomically, psychologically, and physically [5]. These impacts have not been restricted to urban populations, but have extended to rural communities [6], particularly those dependent on migrant workers [7].

Due to the contagious nature of the virus, numerous protection measures have been adopted by various administrations (country, region, state/province, or district level), with the "zero-COVID" approach (i.e., elimination strategy) undertaken by several countries (for example, Australia, Cambodia, New Zealand, Iceland, and Vietnam) [8]. Measures adopted under these elimination strategies severely restricted transportation, and production and consumption within industries, which resulted in millions of enterprises ceasing activities and millions of workers losing their livelihoods and incomes [9]. Vietnam is not the exception in this sense. Almost all joint ventures, companies, and enterprises in Vietnam's main economic zones (such as Bắc Ninh and Bắc Giang provinces in the North and Bình Dương, Long An, Tây Ninh, and Hồ Chí Minh City in the South) ceased operations during 2020 and 2021. These restrictions had serious socioeconomic implications, particularly broken contracts with international partners, thousands of workers stranded in cities, and subsequent waves of migration from urban areas to ancestral lands in rural areas.

Studies show that livelihoods of rural people have been affected by the COVID-19 pandemic in various ways. For example, in rural areas of Ethiopia and Bangladesh,

pandemic restrictions have limited farmers' access to their fields, resulting in reduced management, lost harvest, and reduced product sold [10,11]. The movement restrictions also contributed to labor shortages within agriculture production, with severe food losses along the value chain due to a lack of stakeholder engagement [12–14]. Additionally, the case of rural Myanmar shows that farmers' reduced income has led to reduced food expenditure, while landless households have been severely impacted through lost non-farm employment and lower remittances [15]. Gatto and Islam (2021) found that many rural people in Bangladesh, particularly out-migration workers, developed a fear of sickness when they travelled for livelihood activities. Rural people in Myanmar, Papua New Guinea, and Nigeria have suffered a severe lack of access to diversified foods due to long movement restrictions and an inability to afford to buy food to store for long periods [14–16]. The movement of unemployed people to their ancestral lands also created challenges for food security and income opportunities in those rural areas [17].

Within the coastal communities of central Vietnam, the picture of migration is an interesting case. Since a critical marine pollution event in 2016 [18], the area has been marked by out-migration of young laborers, resulting in the elderly and children left behind and dependent on remittances (payment of money, often by family members working elsewhere). However, the onset of the COVID-19 pandemic saw waves of migration of these laborers returning to these coastal communities [19]. While previous research has analyzed the impacts of the COVID-19 pandemic on people's livelihoods [10,20], income, food security, and psychology [14,21], these studies have not adequately considered the entirety of households' livelihood assets and their capacity to cope. COVID-19 impacts are not the same for different groups of people who have different livelihood vulnerabilities and capacities, and further research is required to unpack these nuances.

This study focuses on the livelihood vulnerability of the coastal communities of central Vietnam, where since the COVID-19 pandemic, thousands of migration workers have left the urban areas and returned to their rural villages. This study uses a livelihood vulnerability framework that considers all livelihood assets and capacities of the studied communities, in the hope of providing insight for policy development.

Out-Migration as an Adaptation Strategy in the Central Coastal Region of Vietnam

The North central coastal region of Vietnam stretches approximately 700 km of coastline, characterized by a relatively high population density with a poverty rate greater than 10% in 2020 [22]. It is among the most climate-vulnerable regions of Vietnam [23,24]. These communities have diversified livelihood activities, including crop cultivation, livestock keeping, aquaculture production, offshore fishing, aquatic resource processing (i.e., fish sauce), working as waged laborers, and out-migration. The central coastal communities are thus grouped into different household groups: fishing-based households, agricultural-based households, and aquacultural-based households. However, due to the land characteristics of white-sand dunes with poor fertility, the communities have been increasingly more reliant on aquaculture and fisheries for livelihoods [22,25], although this level of aquaculture and fisheries reliance depends on households' livelihood sources and capacity [22].

Recent studies show that these communities' livelihoods are increasingly vulnerable to multiple stressors, such as climate change, exhausted aquatic resources, marine environmental shocks, and unstable small-scale aquaculture production [26]. With this background, the region is famous for both domestic and international out-migration. The national or rural–urban migration has been increasing over time, mainly for young laborers, with the peak wave of rural–urban migration in the region after the marine environmental pollution shock in 2016 [26,27]. This wave of movement was considered as a livelihood adaptation strategy for majority of small-scale fishing households most affected [27]. Many of these households have kept their land resources and other livelihood capital at their homeland for security when facing risk at the migration destination, while others sold all their livelihood resources, such as land, house, fishponds, or fishing facilities before

migrating [26]. This may lead to different levels of livelihood vulnerability of the laborers who have now returned due to COVID-19.

2. Methods

2.1. Livelihood Vulnerability Indexes

Vulnerability is understood as the capacity to anticipate, cope with, resist, and recover from the impact of disaster or shock [28]. Vulnerability can be considered from different perspectives, such as social vulnerability (social and demographic vulnerability at the community level) [29] and environmental vulnerability (i.e., environmental change, often at the scale of nation states) [30]. A third type, livelihood vulnerability, can be encompassing of a range of relevant dimensions (i.e., sociodemographic, climatic, health) and focus on the scale of the household [31], making it a useful indicator for development and relevant to the present study. Household livelihood vulnerability to the COVID-19 pandemic is the capacity of households to anticipate, cope with, resist, and recover from the impact of the COVID-19 pandemic on their livelihoods.

According to the Department for International Development (DFID, UK) framework, sustainable livelihoods are built on five asset types: human, financial, physical, social, and natural. When one of the asset types is disrupted, household livelihoods are subjected to vulnerability. Thus, an assessment of livelihood vulnerability should consider all five of these household asset types. Recent studies [11,32,33] investigated all livelihood dimensions and household head perceptions of the COVID-19 pandemic, providing a relevant background for this study. This study took point of departure in the vulnerability indicators developed by Yazdanpanah et al. [33] and Paul et al. [32] and further developed these based on community consultation with key informants, to suit the local conditions. In addition to the five livelihood assets of DFID's framework, this study included a psychology asset in line with other studies [33] as this is a key component of COVID-19 vulnerability.

The financial asset dimension included six items related to losses of household income due to the pandemic. The natural asset was formed with four items about effectiveness of use of natural assets during the pandemic, the human asset was assessed with four items, including health and education, the physical asset included four items regarding physical protection from the infection, the social asset included seven items covering social issues of the pandemic, and finally, the psychological asset covered four items about people's perceptions of risks of the pandemic. Table 1 presents the 29 assessment items (indicators) covering 6 household asset dimensions, which will be used in this study to calculate the vulnerability index. All items are measured by a 5-point Likert scale. The higher the calculated score (1–5), the greater the vulnerability level.

Table 1. Household livelihood vulnerability indexes.

Livelihood Assets	Assessment Item/Indicator	Source
Financial vulnerability (6 items)	COVID-19 pandemic has reduced household income from agriculture	[11,33]
	COVID-19 pandemic has reduced household income from remittance	[15]
	COVID-19 pandemic has reduced household income from off-farm activities	[15]
	COVID-19 pandemic has pushed up food prices for households	[33,34]
	COVID-19 pandemic has increase costs to rural households	[32,33]
	If COVID-19 pandemic continues, poverty and inequality in rural communities will increase	[32,33]

Table 1. *Cont.*

Livelihood Assets	Assessment Item/Indicator	Source
Natural asset vulnerability (4 items)	Many farming activities delayed due to COVID-19 pandemic	[10,33]
	During COVID-19 pandemic, many natural and recreational facilities are unused	[33]
	Due to COVID-19, agricultural outputs decreased	[10,11]
	Due to COVID-19 pandemic, many land fields cannot be well-prepared for planting crops	[15]
Human asset vulnerability (4 items)	COVID-19 pandemic resulted in the closure of educational institutions: schools, education centers, universities	[33,35]
	Rural communities do not have adequate health information to reduce the risk of COVID-19 infection	[5,33]
	During COVID-19 pandemic, rural communities do not have adequate access to medical staff (nurses and doctors)	[5,33]
	Rural communities do not have sufficient counselling services to cope with effects of COVID-19 pandemic	[33]
Physical asset vulnerability (4 items)	Rural communities do not have adequate access to the required disinfectants and sanitary detergents (masks, gloves, washing gels)	[33]
	Rural communities do not have adequate access to pharmaceutical items during COVID-19 pandemic	[33]
	The rural community is not able to fully comply with the principles of quarantine and health needed for the containment of the COVID-19 pandemic	[33]
	Lack of reliable sources of information on the control and treatment of COVID-19	[33]
Social asset vulnerability (7 items)	COVID-19 pandemic has decreased people's trust in each other	[33]
	During COVID-19 pandemic, I do not trust national media information	[33]
	COVID-19 pandemic has caused the changing of traditions and customs: meetings, religious celebrations	[33]
	COVID-19 pandemic has changed the levels of social insecurity	[17]
	COVID-19 pandemic has changed ways of living, social behavior (increase saving, think of longer term and safety)	[33]
	COVID-19 pandemic has caused social discrimination (poor, returned migration)	[36]
	COVID-19 pandemic has created food shortage for households	[14,33]
Perceptions of risks of pandemic/Psychological asset (4 items)	People have a lot of anxiety and worry about getting COVID-19	[14,16,33]
	During COVID-19 pandemic, social tensions are very high	[15,33]
	During COVID-19 pandemic, depression and neurological diseases increase	[15,33]
	During COVID-19 pandemic, disappointment can be felt on the faces of farmers	[33]

2.2. Study Area and Sample Size

At the time of conducting this research, the COVID-19 pandemic was still a serious issue in the study area, with a third wave of COVID-19 causing deaths and urban–rural migration in Vietnam. With the appearance of Omicron cases in Vietnam at the beginning of 2022, movement restrictions were in force in many parts of the country, including the study provinces. Therefore, the selection of communes and households depended largely on the accessibility of the research sites and households.

Communes and villages with "green" or "yellow" signs were accessible. Based on the list of "green" and "yellow" communes provided by the Provincial People's Committee of the studied provinces, 11 coastal communes were selected for the research (4 communes in Thừa Thiên Huế, 4 communes in Quảng Trị, and 3 communes in Quảng Bình province). In total, 529 households were randomly selected from the list of households who had

migrant laborers aged 18 and above entering the provinces during the third wave of the COVID-19 pandemic at the beginning of June 2021. This list was provided by the Provincial People's Committee of the three studied provinces. The location of the studied communes is presented in Figure 1.

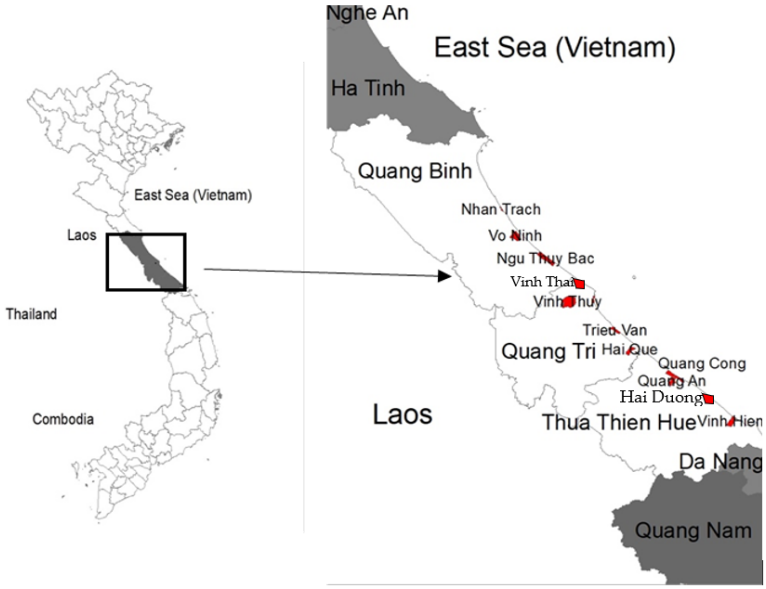

Figure 1. Location of the studied communes.

2.3. Data Collection

Data for the study were collected from household surveys and focus group discussions. A closed questionnaire covering 45 indicators focusing on household demographics, economic information, livelihood assets, and livelihood vulnerability indicators was designed. The questionnaire included two parts, one for migration workers and the other for their household head. In some cases, the migration worker was also the household head. The questionnaire was pre-tested prior to the main survey and adjusted accordingly. Then, 3 group discussions were organized with the involvement of 36 key informants, including return migrants and commune officers (12 key informants per group, 1 group discussion per province). The group discussions focused on verifying vulnerability indices/indicators due to impacts of the COVID-19 pandemic.

2.4. Data Analysis

Since all assessment items are measured by a Likert scale, Cronbach's alpha test was used to test the reliability of the assessment items. All assessment items needed to have a Cronbach's alpha coefficient greater than 0.7, otherwise they were removed from the adjusted index [37]. Households' livelihood vulnerability to the COVID-19 pandemic was scored through the mean of all asset items. The mean score was also calculated for each asset. ANOVA was used to analyze the distribution of the effects of the COVID-19 pandemic on livelihood assets, and the difference of vulnerability levels among households in the three provinces. To assess the vulnerability level of the studied households, this study adopted the Common Vulnerability Score System (CVSS) and classified household livelihood vulnerability to COVID-19 within 4 groups [38]: Low: $A \leq 2$; Moderate: $2 < B \leq 3.5$; High: $3.5 < C \leq 4$; Critical: $4 < D \leq 5$.

To improve households' livelihood adaptive capacity under the COVID-19 pandemic, it is important to identify factors influencing their levels of vulnerability. An OLS linear regression was applied to analyze factors shaping the level of livelihood vulnerability of households. The dependent variable was the estimated vulnerability score of each household and independent variables were households' socioeconomic characteristics, including family size, land areas owned, number of income sources, household income per

year, and demographic status of migrant workers such age, gender, education level, years of out-migration, number of memberships of social organizations, social and health insurance status, and province of origin. Thua Thien Hue province was the reference category of the variable of province of origin.

3. Results

3.1. Description of the Studied Variables

Five hundred and twenty-nine migrant laborers aged eighteen and over who returned home during the peak COVID-19 pandemic period in 2021 participated in this study. The proportion of female migration workers involved in the study was higher than males (52.4% and 47.6% for females and males, respectively) (Table 2). Respondents' age ranged from 18 to 69 years old. The average age was in the range of 30–35 years and they had left their home village for income generation activities for between 3.7 and 8.5 years. The education level of migration workers was quite high as the majority had completed secondary school. More respondents from Quảng Trị were female than male, and these respondents were generally younger but had higher levels of education than respondents from Quảng Bình and Thừa Thiên Huế provinces.

Table 2. Demographic information of migrant workers and their families.

#	Description Characters	Unit	Mean Value			Sig.	Total
			Quảng Bình (n = 122)	Quảng Trị (n = 120)	Thừa Thiên Huế (n = 287)		
1	Age of migration laborer	Year	31.22 (10.29) *	30.14 (8.07)	35.18 (11.49)	0.000	33.12 (10.49)
2	Gender						
	Male	%	43.4	64.2	42.5	-	47.6
	Female	%	56.6	35.8	57.5	-	52.4
3	Education level of migration laborer	Class	9.84 (2.05)	10.66 (2.97)	9.34 (2.76)	0.000	9.76 (2.44)
4	No. of years of out-migration	Year	3.7 (3.1)	6.0 (4.9)	8.5 (7.5)	0.000	6.58 (6.28)
5	Having health insurance	%	90.16	95.80	96.67	-	94.5
6	Having social insurance	%	39.80	26.67	38.33	-	32.8
7	Social network	Count	1.75 (0.95)	1.25 (0.92)	1.55 (0.98)	0.121	1.60 (0.96)
8	Family size	Person	3.66 (0.90)	4.21 (1.1)	3.89 (1.2)	0.001	3.91 (1.12)
9	Land area	Ha	0.13 (0.07)	0.21 (0.23)	0.22 (0.60)	0.000	0.18 (0.46)
10	Income sources	Count	2.93 (1.23)	2.54 (1.01)	3.21 (1.13)	0.036	2.78 (1.12)
11	Average annual income level	Million/year	37.24 (41.37)	43.77 (64.04)	39.28 (32.68)	0.000	46.58 (45.90)
12	Responsible for finances and income of the family	%	75.8	82.0	66.6		

*: Number in parentheses is standard deviation.

Almost all migration workers (94.5%) had health insurance, but a much lower proportion had social insurance (a guarantee to replace or partially compensate an employee's income when his/her income is reduced or lost due to illness, maternity leave, work accident, occupational disease, death, or retirement, based on contributions to the social insurance fund). The proportion of migrant workers who had social insurance was significantly lower in Quảng Trị than the other two provinces. On average, each migrant worker had 1.6 networks (i.e., a member of 1.6 networks or community organizations). The most popular was the "origin" network (i.e., a network of people from the same place of origin).

Quảng Trị had the lowest value (1.25) for the social network indicator, suggesting that migration workers in Quảng Trị had fewer social contacts or social networks than migrant workers from the other provinces.

The average family size of the migrant workers was 3.91 people. Annual income of their families was around 44.58 million VND (approximately USD 1938, USD 1 ≈ 23,000 VND) from 2.7 income sources, and each family had an average area of 0.18 ha for agricultural cultivation. There were significant differences in land area, sources of income, and income levels of studied households among the three provinces. Respondents from Quảng Trị province had the highest number of income sources, family size, as well as income level.

3.2. Livelihood Vulnerability Components and Indicators for Migrant Laborers' Families

As presented in the previous section, a set of 29 indicators (adopted from [33]) was used to assess migrant laborers' households' livelihood vulnerability due to impacts of the COVID-19 pandemic. The indicator set was adjusted and reduced to 27 indicators after a Cronbach Alpha test (2 indicators were removed, including "COVID-19 pandemic has caused social discrimination" and "During COVID-19 pandemic, rural communities do not have adequate access to medical staff"). Table 3 shows the results of calculating the vulnerability score for each livelihood asset and related components, indicating that all 6 livelihood components had a vulnerability score in the range of 2.62 to 3.65. Among them, the financial asset category had the highest vulnerability score, with 3.65, followed by psychological vulnerability with a score of 3.39. The physical asset category had the lowest vulnerability score (2.62). There was significant variation in vulnerability scores of the studied households among the three provinces.

Table 3. Impacts of the COVID-19 pandemic on livelihood assets of migration households.

Assessment Item/Indicator	Vulnerability Score			Sig.	Total (n = 529)
	Quảng Bình (n = 122)	Quảng Trị (n = 120)	Thừa Thiên Huế (n = 287)		
Financial vulnerability (6 items)	**3.79 (0.52) ***	**3.86 (0.57)**	**3.50 (0.84)**	**0.000**	**3.65 (0.74)**
COVID-19 pandemic has reduced household income from agriculture	3.16 (1.17)	3.73 (1.14)	3.03 (1.25)	0.000	3.22 (1.23)
COVID-19 pandemic has reduced household income from remittance	3.93 (0.93)	3.93 (1.03)	3.90 (1.16)	0.937	3.92 (1.08)
COVID-19 pandemic has reduced household income from off-farm activities	3.93 (0.69)	3.78 (0.87)	3.97 (1.15)	0.228	3.92 (1.00)
COVID-19 pandemic has pushed up food prices for households	3.99 (0.67)	4.05 (0.79).	3.74 (0.95)	0.001	3.87 (0.87)
COVID-19 pandemic has increased costs to rural households	3.96 (0.78)	3.95 (0.86)	3.63 (1.09)	0.001	3.78 (0.98)
If COVID-19 pandemic continues, poverty and inequality in rural communities will increase	3.80 (0.82)	3.73 (0.99)	3.47 (1.23)	0.007	3.61 (1.10)
Natural asset vulnerability (4 items)	**3.61 (0.90)**	**3.47 (0.95)**	**3.19 (1.00)**	**0.000**	**3.35 (0.98)**
Many farming activities delayed due to COVID-19 pandemic	3.24 (1.21)	3.37 (1.18)	3.15 (1.29)	0.295	3.22 (1.25)
During COVID-19 pandemic, many natural and recreational facilities are unused	4.36 (0.89)	4.05 (1.00)	3.76 (1.28)	0.000	3.97 (1.17)
Due to COVID-19, agricultural outputs decreased (lack of proper management and caring of farmers)	3.71 (1.22)	3.26 (1.3)	3.11 (1.22)	0.000	3.28 (1.26)
Due to COVID-19 pandemic, many land fields cannot be well-prepared for planting crops	3.17 (1.07)	3.20 (1.36)	3.05 (1.24)	0.462	3.11 (1.23)

Table 3. *Cont.*

Assessment Item/Indicator	Vulnerability Score			Sig.	Total (n = 529)
	Quảng Bình (n = 122)	Quảng Trị (n = 120)	Thừa Thiên Huế (n = 287)		
Human asset vulnerability (3 items)	**2.46 (1.10)**	**3.40 (0.90)**	**2.90 (1.02)**	**0.000**	**2.91 (1.06)**
COVID-19 pandemic resulted in the closure of educational institutions: schools, education centers, universities	2.08 (1.29)	2.84 (1.41)	2.27 (1.30)	0.000	2.35 (1.35)
During COVID-19 pandemic, rural communities do not have adequate access to medical staff (nurses and doctors)	2.96 (1.22)	3.93 (0.91)	3.27 (1.19)	0.000	3.35 (1.19)
Rural communities do not have sufficient counselling services to cope with effects of the COVID-19 pandemic	2.35 (1.28)	3.43 (1.06)	3.19 (1.32)	0.000	3.05 (1.31)
Physical asset vulnerability (4 items)	**2.17 (1.06)**	**2.82 (1.02)**	**2.73 (1.13)**	**0.000**	**2.62 (1.12)**
Rural communities do not have adequate access to the required disinfectants and sanitary detergents (masks, gloves, washing gels)	2.11 (1.27)	2.93 (1.21)	2.80 (1.33)	0.000	2.67 (1.33)
Rural communities do not have adequate access to pharmaceutical items during COVID-19 pandemic	2.37 (1.06)	2.88 (1.16)	2.83 (1.34)	0.001	2.73 (1.25)
Due to the existing facilities and physical structure, the rural community is not able to fully comply with the principles of quarantine and health needed for the containment of the COVID-19 pandemic	2.13 (1.23)	2.73 (1.20)	2.79 (1.34)	0.000	2.63 (1.31)
Lack of reliable sources of information on the control and treatment of COVID-19	2.08 (1.24)	2.75 (1.20)	2.53 (1.40)	0.000	2.47 (1.33)
Social asset vulnerability (6 items)	**2.85 (1.02)**	**3.50 (0.68)**	**3.17 (0.79)**	**0.000**	**3.17 (0.85)**
COVID-19 pandemic has decreased people's trust in each other	2.68 (1.51)	3.69 (1.13)	2.90 (1.43)	0.000	3.03 (1.44)
During COVID-19 pandemic, I do not trust national media information	2.13 (1.29)	2.71 (1.14)	2.65 (1.42)	0.001	2.54 (1.35)
COVID-19 pandemic has caused the changing of traditions and customs: meetings, religious celebrations	3.07 (1.54)	4.15 (0.77)	3.78 (1.02)	0.000	3.70 (1.18)
COVID-19 pandemic has changed the levels of social insecurity	2.66 (1.34)	3.29 (1.15)	3.25 (1.31)	0.000	3.12 (1.31)
COVID-19 pandemic has change lifestyle, ways of living, social behavior (increased saving, think of longer term and safety)	3.22 (1.13)	3.86 (0.97)	3.53 (1.28)	0.000	3.54 (1.20)
COVID-19 pandemic has created a food shortage for households	3.43 (0.90)	3.31 (1.083)	2.99 (1.37)	0.001	3.16 (1.23)
Perceptions of risks of pandemic/Psychological asset (4 items)	3.06 (1.22)	3.99 (0.67)	3.27 (0.94)	0.000	3.39 (1.02)
People have a lot of anxiety and worry about getting COVID-19	3.16 (1.54)	4.37 (0.70)	3.76 (1.14)	0.000	3.76 (1.23)
During COVID-19 pandemic, social tensions are very high	3.36 (1.63)	4.44 (0.70)	4.06 (0.89)	0.000	3.98 (1.14)
During COVID-19 pandemic, depression and neurological diseases increase	2.94 (1.33)	3.61 (1.06)	2.88 (1.40)	0.000	3.06 (1.34)
During COVID-19 pandemic, disappointment can be felt on the faces of farmers	2.81 (1.17)	3.54 (1.23)	2.56 (1.44)	0.000	2.84 (1.39)
Total vulnerability score	**2.94 (0.60)**	**3.52 (0.56)**	**3.09 (0.63)**	**0.000**	**3.15 (0.64)**

*: Number in parentheses is standard deviation.

The financial asset category scoring the highest vulnerability index was due to a reduction in all sources of income due to the application of strict prevention measures, such as social distancing, lockdowns, and quarantining during COVID-19, particularly for income from remittance and on-farm activities. Migration households of Quảng Trị had significantly higher financial losses due to COVID-19 than those in the other two provinces ($p < 0.000$). The losses in agriculture for Quảng Trị households were due to an inability of farmers to sell their produce in the market due to lockdowns, despite the time being peak harvest season. Additionally, these lockdowns encompassed the entire commune in Quảng Trị and Quảng Bình provinces, unlike in Thừa Thiên Huế where smaller areas such as communities or a group of households were affected. This meant that households not only suffered more agricultural losses but also had increased household expenses due to lockdowns.

The natural asset category for the study households also showed very high scores of vulnerabilities due to the impacts of COVID-19. The results indicated that many natural assets such as farmland and recreational facilities were unused due to the lockdown or quarantine measures. In all three provinces, households' natural assets also received a high vulnerability score (3.35), and respondents of Quảng Bình province had a considerably higher vulnerability score for this asset than respondents in Quảng Trị and Thừa Thiên Huế ($p < 0.000$). Lack of use of the household's natural and recreational facilities during the COVID-19 pandemic was scored highly by respondents in Quảng Bình province (4.36).

Human asset and physical asset categories had lower vulnerability scores than other categories (only 2.91 and 2.62, respectively), although respondent households did not have adequate access to medical staff, had insufficient counseling services to cope with the effects of the COVID-19 pandemic, and had a lack of reliable sources of information regarding the control and treatment of COVID-19. COVID-19 significantly influenced social tensions and psychological assets of migration workers and their family members.

Psychological assets were also shown to be significantly affected by the pandemic due to COVID-19 infection spread, exposure, and related health risks. It was hard for respondents to access hospitals and receive advice for treatment, despite most respondents having health insurance during the period of high daily infection rates and death.

Both migration workers and their family members in their homelands were found to have high social vulnerability during the pandemic (3.17). For migration workers, it was revealed that the pandemic was a shock, and they were in a situation of high social risks and social insecurity at the destination (prior to returning to their rural home) because of a lack of information, lack of income, and reduced food access during periods of strict movement regulations of unknown duration (was not clear when the movement restrictions would be eased). Due to lockdown measures, respondents stated that they stayed with other migrant workers (in the destination place prior to returning to their rural homes) in rented houses for many weeks in very poor conditions, such as: small rooms (most migration workers shared a room with others to save money), poor facilities for food storage, drinking water, and other daily necessities, and people had to wait for others to supply them with food and were unsure when they would receive the food. Many migrant workers did not receive any support from their workplace, and they did not know where and who they should call for help during the lockdown period. Some of the interviewees reflected that they did not experience these social insecurity problems and unsafe life until the COVID-19 pandemic.

At the place of origin (i.e., rural homeland) during the peak COVID-19 pandemic, people also faced social problems, such as a lack of reliable information, an inability to visit and take care of relatives, and an inability to attend social events such as funerals, weddings, traditional festivals, and family meetings. Respondents stated that in many cases, there was social tension and disappointment as people did not trust each other in providing support, information, and obeying the COVID-19 regulations.

The pandemic significantly disrupted traditions and customs, such as funerals, weddings, traditional group meetings, visiting, and taking care of relatives, leading to the respondents' perceived high social vulnerability (3.70). This was particularly the case in

Quảng Trị province, with the score of 4.15. Anxiety, worry about getting COVID-19, and social tensions contributed to a very high vulnerability score (3.98). Quảng Trị respondents again had a higher score of anxiety and social tension than those in Quảng Bình and Thừa Thiên Huế province ($p < 0.000$). This might be due to the number of studied households in Quang Tri with male migration workers, who traditionally have greater responsibility for the family's livelihood, being much higher than the other two provinces. Additionally, more migrant workers in Quảng Tri than in the other two provinces did not have social insurance and were in unstable employment (no written contract) at the destination. However, additional studies are needed to investigate this relationship further.

Overall, according to the CVSS classification, livelihoods of a very large proportion of migrant workers and their families in the studied region were highly vulnerable to the impacts of COVID-19. Up to 10.2% of respondents and their families were at critical vulnerability and 42.7% were at moderate vulnerability (Table 4). Among the three studied provinces, Quảng Trị had the highest percentage of households at high (55.0% > 43.6% and 41%) and critical vulnerability (18.3% > 5.7% and 8.7%).

Table 4. Distribution of vulnerability level among livelihood assets.

Household Groups	Frequency (%)			
	Low: A $\leq$ 2	**Moderate: 2 < B $\leq$ 3.5**	**High: 3.5 < C $\leq$ 4**	**Critical: 4 < D $\leq$ 5**
Quảng Bình	0	53.3	41.0	5.7
Quảng Trị	0	26.7	55.0	18.3
Thừa Thiên Huế	2.8	44.9	43.6	8.7
Total	1.5	42.7	45.6	10.2

Factors shaping the livelihood vulnerability level of migration workers and their families are presented in Table 5. The results show that the age and education level of migration workers, province, number of social memberships, livelihood responsibility, household land area, household's income sources, and household's average annual income were significant determinants of the level of livelihood vulnerability of migration workers and their families due to the impacts of the COVID-19 pandemic. The results indicated that keeping all other variables constant, a one-year age increase of a migrant worker would reduce their and their family's livelihood vulnerability score by 0.011. Migration workers with an increase of one year of education would lead to a reduction of 0.031 in their family livelihood vulnerability score. Being a member of one extra social network would result in a decrease of 0.11 for their livelihood vulnerability score. Responsibility of migration workers for the livelihood of their family indicated the importance of remittances to ensure their financial assets and resilience of the family at the home village. Migrant workers who were responsible for the livelihood of their family at home had a higher vulnerability score than those who were not (by 0.275). Among the three provinces, migrant workers and their families from Quảng Trị province were significantly more vulnerable than those in Quảng Bình and Thừa Thiên Huế provinces ($p < 0.000$).

Table 5. Factors shaping the levels of COVID-19 impacts on livelihood (dependent variable: level of vulnerability, a higher vulnerability score indicates higher vulnerability of the household).

Variables	Coefficient (B)	STD	t-Value
Age of migration laborer (year)	−0.011 ***	0.002	−4.731
Gender (male = 0)	0.005	0.047	0.109
Education level of migration worker (class/year)	−0.031 **	0.010	−3.139
Family size (person)	0.010	0.020	0.494
Land areas (ha)	−0.581 ***	0.109	−5.320

Table 5. *Cont.*

Variables	Coefficient (B)	STD	t-Value
Income sources (#)	−0.214 ***	0.023	−9.195
Having health insurance (0 = No)	−0.001	0.001	−1.772
Having social insurance (0 = No)	−0.003 *	0.100	−0.029
Number of years of out-migration (years)	0.057	0.052	1.111
Number of social organizations as a member	−0.11 **	0.004	−2.940
Household income per year (million VND)	−0.142 ***	0.025	−5.609
Responsible for livelihood of people at home (No = 0)	0.275 ***	0.052	5.238
Quang Tri	0.658 ***	0.062	10.601
Quang Binh	0.074	0.061	1.216
Constant	4.386	0.184	23.818
R square	56.0		

***, **, and * Represent 99%, 95%, and 90% significance levels, respectively.

4. Discussion

This study investigated the livelihood vulnerability of households that had a migrant laborer return home due to the impacts of the COVID-19 pandemic, and the associated factors affecting their level of vulnerability. It is the first research investigating livelihood vulnerability of returned migration workers and their households in the north central coastal communities of Vietnam. Findings showed that almost all returned migration workers (98.5%) and their families had livelihoods at moderate or high levels of vulnerability due to COVID-19. A high percentage (67.2%) of returned migrant workers did not have social insurance, indicating that many of them had no stable or long-term contract job at the destination. Almost all migrant workers lost their job and had no income for many months and fell into critical financial vulnerability as a consequence of the COVID-19 prevention measures, such as extensive lockdowns, quarantine, social distancing, and traffic and commercial restrictions. These preventative measures also significantly reduced family incomes through reduced farm productivity (unable to manage their farm properly), reduced product quality (farm products could not be harvested on time, creating significant losses), and reduced market opportunities. This finding was consistent with previous research in other parts of the Vietnam [5,20], as well as in India, Bangladesh, and Myanmar. Further, our research found that there were no interventions from related agriculture departments and the local governments to help locked-down or quarantined households. The impacts of the pandemic may not have been so severe on households if agricultural departments and local governments (i.e., commune and village leaders) could have collaboratively managed agriculture fields with farmers and distributed goods and agriculture products throughout the country to reduce food shortages and avoid increased living costs.

Results showed that the working environment and life for migrant workers at the destination place were socially unsafe/insecure and led to critical social vulnerability caused by the COVID-19 pandemic, which had indirect impacts on their families. The third wave of COVID-19 was a serious outbreak, with thousands of severe new cases and hundreds of daily deaths that pushed many people, particularly migrant workers and the poor, into psychological vulnerability. The score of 3.39 (Table 3) indicated a relatively high psychological vulnerability of migrant workers and their families due to the COVID-19 pandemic. Respondents worried about getting COVID-19 experienced increasing depression and psychological strain, as well as other social tensions such as shortages of food, living in isolation from relatives (lonely) when infected, and difficulties accessing hospitals or medical services. These findings support the results of previous research in Vietnam and other countries [5,35,39]. It was also found that migrant workers without social insurance were more vulnerable than those who had social insurance, as

those with social insurance normally have a stable job with a long-term contract. Many migrants were able to become a long-term resident and setup their family at the destination place, without considering returning home. A large number of migration workers who decided to leave their migration destination for home during the crisis do not think of remigration/out-migration again. They prefer to seek out a living on their marginal farms or find work in their nearby town [40].

The regression results highlighted that the age of migration workers was an important deciding factor of households' livelihood vulnerability. The older the migration workers were, the less they perceived social vulnerability. Older migration workers felt happy with their return to their rural home and did not feel vulnerable, as they perceived they would have a safe and stable life with their family members, taking care of each other during and after the pandemic. The results section showed that, almost all migrant workers who returned home during the COVID-19 pandemic did not have stable jobs or worked in unorganized sectors without written contracts at their destination place. Their purpose of migration was to earn money to send home for their family members. Respondents stated that they considered returning to their home village with their family members: "when we get older, we think more about returning home. Many of us considered the COVID-19 pandemic as a good time to decide to return home".

A high education level is a pre-condition to obtain a long-term contract and higher wages. With more education, workers not only have more job opportunities but are also more proactive in accessing job information and a better income, and thus are less vulnerable to crises than those with low education [41]. The migrant workers with a lower education level, thus, were more vulnerable to the impacts of the COVID-19 pandemic than those with higher education. This finding confirmed results of previous studies [5,42].

Further, the regression results also showed that migration workers' networking plays a very important role in reducing the negative impacts of the COVID-19 pandemic. Participating in diversified networking or being a member of diverse social organizations, such as the origin association (group for people who have migrated from the same place), classmates, or living communities (i.e., roommate or job mate), workers can access more socioeconomic information and job opportunities, engage in reciprocal relationships, and help each other when any members are in trouble. A migration worker in Thừa Thiên Huế said that: "I was able to be confident and felt less stress during the COVID-19 outbreak than others thanks to the support of people within the origin association, my child's parental group, and youth union at the destination place. We had formed Zalo groups for information during the COVID-19 crisis. I was always informed and shared information, supported with food and necessary living stuff during lockdown period. These Zalo groups are very valuable for all, particularly for who still stay at the destination [due to some reasons, they couldn't return to their homeland]. Without membership of such networks and organizations I would have been very stressed". However, many respondents, particularly from Quảng Trị province, expressed that they did not have time to join groups, or did not know about these groups prior to the pandemic as they focused on alternative ways to earn money and worked extra hours to send money home. Therefore, they were not connected to these groups at the onset of the pandemic. These respondents experienced greater psychological tension returning to their homeland because they think other villagers see them as jobless or a source of COVID-19 for the community. This led to mistrust and influenced the traditional ways of living and treating others among community members. This indicates the importance of participating in community networks and social activities to increase social integration and resilience.

For migrant workers' households, the results of the livelihood vulnerability indexes showed that the COVID-19 pandemic impacted negatively on all households' livelihood assets. The levels of vulnerability varied among asset types. The linear regression analysis showed that land resources were among the important natural assets that significantly decided the level of a household's livelihood vulnerability due to the impacts of COVID-19 ($p < 0.001$). The results indicated that the larger the agricultural land areas owned by

households, the lower their overall livelihood vulnerability score. It was explained by respondents and key informants that those households who owned more agricultural land were more vulnerable in relation to financial assets due to the loss in farm income due to the COVID-19 pandemic, however larger agricultural land helped migrant workers and their family members have less social and psychological vulnerability. With larger agricultural land, they feel more secure in the long term and they have more alternative livelihood options than landless farmers. This finding is consistent with the results of some studies [10,35], but contradicts others [43] that state that the COVID-19 pandemic reduced availability and increased costs of farm labor, which in turn resulted in a decline in land area cultivated. However, quite a large number of respondents in this study sold or rented out their agriculture and/or aquaculture land to others when their main laborers out-migrated. Others kept land unused or unproductively used, but as they still owned the land, they were less social and psychologically vulnerable than those who had already sold their land.

Household income per year was found to strongly influence livelihood vulnerability due to impacts of the COVID-19 pandemic. Results of group discussions pointed out that households with a high annual income might have had more financial vulnerability due to the COVID-19 pandemic, but they may have had less social tension and psychological vulnerability than those who had a lower annual income thanks to their savings and livelihood capacity (particularly earning capacity). Many respondents also believe that losses were just temporary, and that they are capable of adjusting their farming to adapt to the situation. This finding differs from the results of studies from South Wollo and Oromia zones of Ethiopia, where the effects of COVID-19 not only temporarily paused income sources but have also ceased livelihood activities on an enduring basis [10]. However, this study's respondents' perceptions and beliefs helped to release social tension regarding food shortages or psychological stress from a disappointing farming output.

Diversification of income sources helps rural households build resilience to shocks and crises [44]. A number of studied households had relatively diversified income sources, including agriculture, handicraft, aquaculture, fish processing, and remittances, while many others depended heavily on one or two sources, particularly remittances. These are households with old people and children staying at home, while the main laborers have out-migrated to earn a living. With the lack of a labor force, these households could not farm or undertake aquaculture. They then had to rent out lands or aquaculture ponds, or even sell all their farming equipment. The livelihood vulnerability of this household group was shown to be negatively and significantly affected when the migrant laborer(s) stopped sending remittances and returned home. The study also showed that migrant workers with more responsibility for the livelihoods of people at the home village were more affected by the pandemic. According to the survey, those who have greater responsibility for their family in the home rural village were more likely to experience a greater fear of job loss due to COVID-19 and stress from no longer being able to send remittances to their family. This may lead to significant impacts on their mental health. This study confirms the research of Bui et al. [5] in other parts of Vietnam that workers who decided to out-migrate for the family livelihood now experience a fear of themselves becoming dependent on the family due to their job loss.

In this research, the households' origin (province) was found to be very important to their livelihood vulnerability due to COVID-19 impacts. Respondents from Quảng Trị were more vulnerable than those of the other two provinces. Socioeconomic capacity and culture may be the main characteristics creating this difference among provinces. No previous studies have clearly addressed these factors, except for a report published by UNESCO [36], which indicates that culture and social relations are very important for reducing social tension and psychological vulnerability of individuals and communities during the COVID-19 outbreak. Key informants discussed the history of people in Quảng Trị province suffering greatly during the war (i.e., this was the Demilitarized Zone (DMZ)) and how the coastal areas of the province continue to experience multiple stressors, including extreme weather

and climate change (e.g., extremely hot and dry southwest wind, flood, drought, typhoon), poor and exhausted natural resources (including marine environmental pollution), as well as the more recent disappointment of job and income loss and subsequently becoming dependent on their family. In addition, the social activities of many workers, particularly Quảng Trị respondents, at their destination place depended largely on their origin association, and they had less diverse networks than respondents from Quảng Bình and Thừa Thiên Huế provinces, and thus did not integrate into society at the destination during the crisis. Consequently, they were more socially vulnerable and suffered more from the impacts of the COVID-19 pandemic.

This study has been able to provide key data in the area of livelihood vulnerability of returned migrant workers and their families in the central provinces of Vietnam. It should be noted, however, that this was a cross-sectional study and conducted during a severe period of the COVID-19 pandemic, and therefore there were some restrictions on methodology, such as not being able to capture the variation of households' livelihood vulnerability over time and grouping all migration workers and their households for analysis. Future research could build on this work by grouping households by the level of dependence on remittances, such as: high dependence, moderate dependence, and low dependence, or by household income strategy, such as: fishing-based households, aquaculture-based households, and agricultural-based households.

5. Conclusions and Implications

Similar to other studies, this research has shown that livelihoods of migration workers and their families at the place of origin were highly vulnerable due to the impacts of the COVID-19 pandemic. This study employed the livelihood vulnerability index and found that almost 90% of migrant workers and their families were at moderate or high vulnerability. While all livelihood assets were negatively affected, the degree of vulnerability varied significantly among assets. Financial assets were the most affected, followed by psychological and social assets. Alternatively, physical assets and human assets were the dimensions that respondent households were least vulnerable to.

Further, younger workers or those with a lower education level and fewer number of social networks were found to be more vulnerable than others. This suggests that to improve financial asset of the households, young laborers could aim to attain a higher level of education and try to participate in social insurance programs if they desire to out-migrate. Additionally, local governments should formulate appropriate polices to help promote education for young laborers, offering diversified types of continuous trainings and education on social skills and life skills for young laborers who intend to out-migrate. Related departments should formulate appropriate policies to promote the effective use of natural assets, particularly agricultural and aquaculture land available at the studied sites to ensure household income and reduce households' dependence on remittances. To improve social and psychological assets, more social programs which allow for migrant workers, particularly younger migrants, to meet each other at the destination place may have positive impacts on their vulnerability. This implication stems from the findings that respondents from Quảng Trị were more vulnerable than respondents from Quảng Bình and Thừa Thiên Huế provinces, and these provincial differences are rooted in social network membership in the destination place.

Finally, future research could aid in further unpacking these social dynamics by comprehensively investigating social networks, migration assimilation behaviors, and job opportunities for rural laborers who may be more sensitive to social upheaval.

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