



Población y Salud en Mesoamérica

ISSN: 1659-0201

revista.ccp@ucr.ac.cr

Universidad de Costa Rica

Costa Rica

Miyamoto, Junko; Nakazawa, Minato
Community resilience of women in rural areas of Lempira in the Republic of Honduras
Población y Salud en Mesoamérica, vol. 21, núm. 2, 2024, Enero-Junio
Universidad de Costa Rica
San José, Costa Rica

DOI: <https://doi.org/10.15517/psm.v21i2.54965>

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<https://doi.org/10.15517/psm.v21i2.54965>

Volume 21, issue 2, Sci art. january-june 2024



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Cómo citar este artículo:

Miyamoto, J., & Nakazawa, M. (2024). Community resilience of women in rural areas of Lempira in the Republic of Honduras. *Población y Salud en Mesoamérica*, 21(2). <https://doi.org/10.15517/psm.v21i2.54965>



ISSN-1659-0201 <http://ccp.ucr.ac.cr/revista/>

Revista electrónica semestral
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Community resilience of women in rural areas of Lempira in the Republic of Honduras

Resiliencia comunitaria de las mujeres de las zonas rurales de Lempira en la República de Honduras

Junko Miyamoto ¹  y Minato Nakazawa ² 

Abstract: Introduction: Building community resilience is an important part of disaster preparedness. This study aims to determine the factors that influence the status of community resilience and their relationship with social capital. **Methods:** Data were collected between August and November 2021 by surveying a group of over 18-year-old females in the Republic of Honduras where hit by two hurricanes and a pandemic in 2020. Cluster sampling was used in this study, and face-to-face interviews were done while visiting their houses. The Conjoint Community Resiliency Assessment Measure (CCRAM) was used to examine community resilience score, while the association between social capital, basic attributes, disaster preparedness, and whether the damages by the two hurricanes in 2020, etc. For statistical analysis, we applied multiple regression analysis. **Results:** Bonding social capital was a factor that lowered community resilience, and bridging social capital was a factor that raised community resilience. The community resilience for those with an elementary school education was higher than those without education but not different from those with more than an elementary school education. **Conclusions:** Bridging social capital and completing primary education increased community resilience.

Keywords: Community Resilience; Social Capital; Disaster Preparedness; Republic of Honduras

Resumen: Introducción: El fomento de la resiliencia comunitaria es una parte importante de la preparación ante las catástrofes. Este estudio pretende determinar los factores que influyen en el estado de la resiliencia comunitaria y su relación con el capital social. **Métodos:** Los datos se recopilieron entre agosto y noviembre de 2021 mediante una encuesta a un grupo de mujeres mayores de 18 años en la República de Honduras, donde se produjeron dos huracanes y una pandemia en 2020. En este estudio se utilizó el muestreo por conglomerados y se realizaron entrevistas cara a cara mientras se visitaban sus casas. Se utilizó la Medida Conjunta de Evaluación de Resiliencia Comunitaria (CCRAM, por sus siglas en inglés) para examinar la puntuación de resiliencia comunitaria, mientras que la asociación entre el capital social, los atributos básicos, la preparación para desastres, y si los daños por los dos huracanes en 2020, etc. Para el análisis estadístico, se aplicó el análisis de regresión múltiple. **Resultados:** El capital social de vinculación fue un factor que disminuyó la resiliencia de la comunidad, y el capital social de vinculación fue un factor que aumentó la resiliencia de la comunidad. La resiliencia comunitaria de las personas con estudios primarios era superior a la de las personas sin estudios, pero no difería de la de las personas con más de estudios primarios. **Conclusiones:** La formación de puentes de capital social y la finalización de la educación primaria aumentaron la resiliencia de la comunidad.

Palabras clave: Resiliencia comunitaria; capital social; preparación para desastres; República de Honduras.

Received: 09 may, 2023 | **corrected:** 08 nov, 2023 | **accepted:** 30 nov, 2023

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1. Introduction

The frequency of weather-related disasters is increasing mainly because of the continuous increase in floods and storms, with floods alone accounting for 47 % of all weather-related disasters between 1995 and 2015, affecting 2.3 billion people (United Nations Office for Disaster Risk Reduction [UNDRR], 2015) in the world. Disaster has caused significant damage and impacted people's health and social life. Natural disasters are a substantial threat to health and "human security." Sustainable Development Goals (SDGs) 2015-2030 have led to greater coordination and coherence towards standard climate change and disaster prevention and mitigation goals.

Community resilience is essential for community recovery after disasters, and building community resilience regularly leads to preparedness (Norris et al., 2008). Community resilience has recently been a novel approach to public health emergency preparedness and response and has become an essential component of national policy (Plough et al., 2013). Community disaster resilience holds excellent promise as a guiding paradigm for promoting disaster risk reduction and enabling recovery from disasters by focusing on and investing in local capacity to adapt to a changing and uncertain environment (Mayer, 2019).

Social determinants of health (SDOH) are the conditions in the environments where people affect a wide range of health, functioning, and quality-of-life outcomes and risks. Examples of SDOH include safe housing, transportation, neighborhoods, racism, discrimination, violence, education, job opportunities, income, access to nutritious foods and physical activity opportunities, language and literacy skills (U.S. Department of Health and Human Services., 2010).

From experience, people often say that women are more vulnerable than men in times of disaster. There are gender difference, with women being the victims of many disasters, gender-based gender roles are reinforced during disasters, which increases women's workload, disadvantages women in accessing reconstruction resources, and human rights are less likely to be protected after disasters, such as increased violence against women (Okaniwa, 2013). However, it is important to note that women are not generally "vulnerable" to disasters and are resilient as they take on many roles. Women played a significant role in reconstruction after the Great Hanshin-Awaji Earthquake. The women's strengths include the fact that they had to create new relationships to provide food, clothing, and shelter; that they developed horizontal relationships that were not bound by titles; that they spun networks backed by trust between individuals; and that in the process of collaboration between women in public and private sectors to create reconstruction systems, networks became a driving force on the frontline (Ito, 2011).

The characteristics of disaster in Latin America, earthquakes and tsunamis account for the highest number of deaths, followed by wind and flood disasters such as storms and floods (Japan International Cooperation Agency [JICA], 2017). In disaster-affected regions, economic losses are significant, making recovery and reconstruction more difficult, especially in low- and middle-income

countries. The cost of damage also rises to \$103.113 billion in Central America, significantly affecting people's lives and health. Regarding the medical human resources that influence the maintenance of people's health, it is noteworthy that nurses are not evenly distributed across the globe. In the American region, eighty-seven percent of the region's nurses are located in Brazil, Canada, and the United States. The difference in density depends mainly on income level, with 9.1 nurses per 10,000 people in low-income countries compared to 107.7 nurses in high-income countries (World Health Organization [WHO], 2020). Thus, Latin America is a region vulnerable to geographical, economic, and healthcare human resources.

The situation in the Republic of Honduras, which is located in the Central American region, is vulnerable to natural disasters such as earthquakes, tsunamis, hurricanes, and volcanic eruptions, the losses incurred between 1995 and 2015 are equivalent to 6.4 % of the country's GDP (UNDRR, 2015). The land was hit by two hurricanes and a pandemic in 2020. In the Republic of Honduras, the number of nurses, who account for about 60 % of the health professionals who play an essential role in the Coronavirus disease 2019 (COVID-19) response, is less than 10 per 10,000 people, and there was a shortage of health professionals (WHO, 2020). To address this situation, the government has implemented a project to promote primary health care since 2013, in which doctors, nurses, and promoters form home health teams centered on health centers.

The relationship with social capital in the response of local residents to disasters, including recovery and reconstruction, has been described as an important factor in previous studies (Aldrich, 2012; Kawachi et al., 2007). In recent years, social capital continues to be a central mechanism through which community resilience reduces disaster impact and enhances recovery (Mayer, 2019). Community resilience is used to describe a community's ability to deal with crises or disruptions (Leykin et al., 2013). In all systemic phases of disaster risk management - response, recovery, prevention, mitigation, and preparedness - social capital is a valuable driver of disaster risk and vulnerability reduction and plays a contributory role in building people's capacities (Bahera, 2023).

The Social Capital Assessment Tool (SOCOT/SCAT), an initiative of the World Bank, and the Adapted version of SCAT (A-SCAT), clear distinction is made between the Structural aspect and the Cognitive aspect (Yoshikazu & Tsuyoshi, 2007). The Social Capital Community Benchmark Survey (SCCBS) conducted by Putnam and Harvard University takes a multi-pronged approach (Yoshikazu & Tsuyoshi, 2007). Szreter and Woolcock (2004) create a scale that distinguishes between bonding, bridging, and linking social capital. Bonding is an aspect of "inward" social networks that reinforce exclusive identities and homogeneous groups; bridging is an aspect of "outward" social networks between different social and ethnic groups that do not necessarily share similar identities; and linking represents the norms of respect and trust associated with power and authority gradients (Poortinga, 2012).

There are the Communities Advancing Resilience Toolkit (CART) (Pfefferbaum et al., 2013), Resilience Performance Scorecard (Khazai et al., 2018) to illustrate the dynamics of urban resilience and recovery, and Conjoint Community Resilience Assessment Measure (CCRAM) . As a component of

community resilience, CCRAM facilitates the estimation of an overall community resiliency score, but furthermore, it detects the strength of five important constructs of community function following disaster: Leadership, Collective Efficacy, Preparedness, Place Attachment, and Social Trust (Leykin et al., 2013) . There is a shortened version of the CCRAM-10, a 10-item self-report questionnaire (Rapaport et al., 2018).

The aim of this study is to determine the factors that influence the status of community resilience in a rural area in the western part of the Republic of Honduras that experienced two hurricanes in 2020 during the COVID-19 pandemic and their relationship with social capital.

2. Methodology

2.1 Approach

Cross-sectional studies.

A cross-sectional study is a research design that collects, analyzes, and examines data at a single point in time for a specific population. In this study, a cross-sectional study was chosen to investigate community resilience in the aftermath of two hurricanes during the COVID-19 pandemic.

2.2 Study population

This study selected the Lempira Department of the Republic of Honduras for this study. This Department was identified as a target area for the Strengthening Systems Based on the National Health Model project for 2013-2018 in the Republic of Honduras that promoted primary health care. This study collected data from a total of 139 households in the community in Lempira from August to November 2021.

Cluster sampling was used in this study. All households under the jurisdiction of one of the ten health centers in Lepaera city, Lempira department, were included in the study. Based on the list prepared by the health center, local collaborators face-to-face interviews were done while visiting their houses. The eligibility criteria for the survey were participants at least 18 years old and females who could respond to the questionnaires.

The purpose and significance of the study, preservation of anonymity, freedom to participate, no disadvantages associated with non-participation, and freedom to withdraw from this study were explained verbally to the participants, and informed consent was obtained before the study was conducted.

Ethical approval was obtained from the Scientific Research Unit Biomedical Research Ethics Committee (CEIB) of the Faculty of Medicine of the National Autonomous University of Honduras (IRB 00003070) and the Research Ethics Committee of Himeji University (IRB 2020-N09).

2.3 Collection techniques

In this study, community resilience was the outcome variable. The CCRAM-10 was selected for this study as a measure of community resilience "recovery from crisis" as it relates to disaster recovery and reconstruction. The CCRAM-10 was assessed using the scale was back-translated to confirm retaining the scale's original meaning. The Cronbach's alpha was found within the acceptable level, i.e., 0.823-0.950 in this study. Responses were rated on a 5-point Likert scale.

We chose the CCRAM-10 methodology because it has identified factors that indicate community resilience, including expert opinion, and because CCRAM-10 can provide information that will help residents and decision makers anticipate emergency challenges and plan based on the results of this study. It was recognized as an indicator that could be used to identify community and resident characteristics for community building.

Another scale in this study was social capital as an explanatory variable. As a measure of social capital, this study used Szreter and Woolcock's (2004) bonding, bridging, and linking social capital framework. Responses were rated on a four-point Likert scale. For the social capital scale's indicators, Cronbach's alpha ranged from 0.75 to 0.815.

Other measurements were socio-demographic characteristics, including age, gender, education level, marital status, religion, employment, and years of residence. Similarly, other variables included disaster preparedness and whether the damages by the two hurricanes in 2021.

View the original survey: <https://revistas.ucr.ac.cr/index.php/psm/article/view/54965/58332>

2.4 Analysis processing

This study calculated the descriptive statistics such as frequencies, percentages, and means at first. For the analytic study, this study applied multiple regression analysis. The statistically significant threshold level was set to p less than 0.05. Data analysis was performed using Jamovi version 2.3.0.0 (The jamovi project, 2022).

3. Result

3.1. Basic Attributes

Table 1 shows that the mean age of the respondents (housewives) was 38.4 years (SD 16.5). The average length of residence was 37.9 years (SD 17.5). Occupation is employee or housewife 130 people (93.5%). People had elementary school-level education 106 people (76.3%), higher education 24 people (17.2%), and none 9 people (6.5%). 127 people (91%) have a partner, and 9 (6.5%) are single. 113 people (81%) were Catholic, and 22 (16%) were none. The household income is low at 97 people (70%) and, on average, 42 people (30 %). Regarding their health status, 106 people (77 %) have no chronic diseases, and 29 people (21 %) have chronic diseases and no problems.

The target population of this study is characterized by healthy housewives who have completed elementary school.

Table 1
Demographic data

		n	mean(sd)	(%)
Gender	Female	139		
Age (group)		138	38.4(16.5)	
Year of residence		138	37.9(17.5)	
Occupation	Professional or boss	4		(2.9)
	Industry or manufacturing Merchant.	0		(0)
	Student	4		(2.9)
	Employee or housewife	130		(93.5)
	Retired or unemployed	1		(0.7)
Education	Elementary school	106		(76.3)
	Higher education	24		(17.2)
	None	9		(6.5)
Marital status	Single	9		(6.5)
	Married /Free union/Living with partner	127		(91.4)
	Single parent	0		(0)
	Separated/Divorced/Widowed	3		(2.2)
Religion	Catholic	113		(81.3)
	Protestant	0		(0)
	None	22		(15.8)
	Evangelica	4		(2.9)
Household income	Much lower than average	0		(0)
	Low	97		(69.8)
	Average	42		(30.2)
	Higher	0		(0)
	Much higher than average	0		(0)
Health Status	Chronic disease no problem	29		(21.0)
	Chronic disease problem	3		(2.2)
	No Chronic disease	106		(76.8)

3.2. Disaster prediction and preparedness in the area of residence

Table 2 shows that the types of disasters that were expected to happen in their place of residence were landslides (97.1%), floods (20.1%), hurricanes (19.4%), and earthquakes (0.7%), with almost all respondents expected landslides. The response asked about their preparedness; nearly all had done nothing (99.3%).

Table 2
Expectations and preparedness for disaster

Preparedness		n	%
Type of disaster that people imagine may occur in my residence (choose more than one answer)			
	Flood	28	20.1
	Hurricane	27	19.4
	Earthquake	1	0.7
	Land slide	135	97.1
	Others	0	0
	None	0	0
Preparedness for disasters (choose more than one answer)			
	I have not done anything.	138	99.3
	A shelter (bunker) or safe room.	1	0.7
	Food and water for emergency use.	0	0.0
	Waterproofing equipment and protective accessories.	0	0.0
	Medication and first aid kit.	0	0.0
	Hygiene items such as masks and soap.	0	0.0
	Identify shelters and evacuation routes near your home.	0	0.0
	Are ready to take their valuables with them at any time.	0	0.0
	Have a good line of communication with my neighbors.	0	0.0
	Others	0	0.0

Table 3
Damage from hurricane Eta and Iota

Disaster Experience		n	%
Damage from hurricane Eta and Iota			
	No	114	82.0
	Yes	25	18.0
Type of damage			
	House roof damage	1	4.0
	Landslide	22	88.0
	Flooding	0	0.0
	others	2	8.0

3.3. Disaster experience

Table 3 shows that in the two hurricane disasters experienced in 2020 (Eta and Iota), 25 people (18.0 %) experienced damage. Most of those affected were affected by landslides (88.0%), followed by damage to house roofs (4.0%).

3.4. Factors affecting community resilience

To determine the factors that influence the status of community resilience in the aftermath of two hurricanes during the COVID-19 pandemic in this section.

To examine the impact of social capital and background information on general community resilience, this study used general community resilience and its five components (Leadership, Collective efficacy, Preparedness, Place Attachment, and Social trust) as objective variables and the explanatory variables Multiple regression analysis was conducted using "Bonding Social Cohesion," "Bridging Social Cohesion," and "Political Trust" for social capital, and "Year of residence" and "Education Level" for background information.

No influence of other explanatory variables such as "Household income" and "Marital status" was found in the Background information.

The possibility of multicollinearity was examined by VIF and was determined to be less than 3 for all explanatory variables, indicating that multicollinearity was unlikely to occur.

The coefficient of determination R^2 of the model was .423, and the adjusted coefficient of determination for degrees of freedom was .39. A total of five variables (three variables for social capital and two sociodemographic factors) explained approximately 40 % of the variance in general community resilience.

Table 4 shows that the number of subjects in the model, and the partial regression coefficients with a 95 % confidence interval.

3.4.1 General community resilience

The multiple regression model significantly explained the data ($F(7, 122) = 12.8, p < .001$),

Interpreting the partial regression coefficients, the most significant estimate was 0.688 (95 % CI [0.325, 1.052]) for "Bridging Social Cohesion." An increase of one point in "Bridging Social Cohesion" resulted in an estimated increase of 0.688 "General community resilience." On the other hand, negative estimates were -0.429 (95 % CI [-0.797, -0.061]) for "Bonding Social Cohesion" and -0.478 (95 % CI [-0.821, -0.135]) for None and Elementary school in "Level of Education." Increasing

"Bonding Social Cohesion" by one point would result in a decrease of 0.429 and None and Elementary school in "Level of Education" by one point would result in a decrease of 0.478.

The results were significant "Bonding Social Cohesion", "Bridging Social Cohesion", "Political trust", "Year of residence" and "Level of Education" explanatory variables. There was a positive association between "Bridging Social Cohesion", "Political trust", "Year of residence". There was a negative association between "Bonding Social Cohesion" and background information for None and Elementary school in "Level of Education."

3.4.2 Leadership

Leadership includes general faith in decision makers, specific faith in local leaders' perception of fairness in the way local authority provide services, and functioning of the community.

The results were significant "Political trust," "Year of residence" and "Level of Education" explanatory variables. There was a positive association between "Political trust" and a negative association between None and Elementary school for "Level of Education."

3.4.3 Collective efficacy

Collective efficacy includes collective efficacy, support, involvement in the community, and mutual aid.

The results were significant "Political trust", "Year of residence" and "Level of Education" explanatory variables.

There was a positive association between "Political trust" of social capital and "Year of residence" of background information, and a negative association between None and Elementary school for "Level of Education."

3.4.4 Preparedness

Preparedness includes family and community acquaintance with emergency situations, and a view of the town's preparedness for emergency situations.

The variables "Bonding Social Cohesion," "Bridging Social Cohesion," "Political Trust," "Year of residence," and "Level of Education" were significantly associated with preparedness. "Bridging Social Cohesion" and "Political Trust" were positively related with preparedness.

There was a negative association between "Bonding Social Cohesion" and background information for None and Elementary school in "Level of Education."

3.4.5 Place attachment

Place attachment includes emotional attachment to the community, sense of belonging, pride in community and ideological identification with the community.

The explanatory variables of "Political Trust" and background information "Year of residence" and "Education level" showed significant association with place attachment. "Political Trust" and "Year area of residence" were positively related.

There was a negative association between Non and elementary school for "Level of Education."

3.4.6 Social trust

Social trust includes trust and the quality of relationships between members of the community.

The explanatory variables "Bridging Social Cohesion", "Political Trust", "Year of residence" and "Level of Education" were significant. "Political Trust" and "Year of residence" were positively related with social trust.

There was a negative association between the None and Elementary school in "Level of Education" and social trust.

Table 4
Multiple regression analysis predicting community resilience by social capital

	Estimated value	Standard error	95%CI	t	p
General community resilience					
Bonding Social Cohesion	-0.429	0.186	[-0.797, -0.061]	-2.31	0.023
Bridging Social Cohesion	0.688	0.184	[0.325, 1.052]	3.748	< .001
Political trust	0.372	0.089	[0.195, 0.548]	4.157	< .001
Year of residence	0.008	0.003	[0.003, 0.013]	3.128	0.002
Level of Education					
Higher Education - Elementary school	-0.015	0.108	[-0.228, 0.198]	-0.138	0.891
None - Elementary school	-0.478	0.173	[-0.821, -0.135]	-2.757	0.007
n = 139	Adjusted R² total model = 0.423				
Leadership					
Bonding Social Cohesion	0.112	0.165	[-0.215, 0.439]	0.676	0.500
Bridging Social Cohesion	0.177	0.165	[-0.149, 0.503]	1.077	0.284
Political trust	0.436	0.099	[0.239, 0.632]	4.381	< .001
Year of residence	0.005	0.003	[1.46e-4, 0.011]	1.821	0.071
Level of Education					

	Estimated value	Standard error	95%CI	t	p
Higher Education - Elementary school	0.137	0.118	[-0.096, 0.370]	1.163	0.247
None - Elementary school	-0.469	0.186	[-0.836, -0.102]	-2.53	0.013
n = 139	Adjusted R² total model = 0.345				
Collective Efficacy					
Bonding Social Cohesion	-0.011	0.162	[-0.333, 0.310]	-0.068	0.946
Bridging Social Cohesion	0.273	0.162	[-0.047, 0.594]	1.689	0.094
Political trust	0.428	0.098	[0.235, 0.621]	4.39	< .001
Year of residence	0.006	0.003	[4.07e-4, 0.011]	2.128	0.035
Level of Education					
Higher Education - Elementary school	0.099	0.116	[-0.130, 0.329]	0.859	0.392
None - Elementary school	-0.412	0.191	[-0.794, -0.038]	-2.18	0.031
n = 139	Adjusted R² total model = 0.343				
Preparedness					
Bonding Social Cohesion	-0.4	0.158	[-0.714, -0.088]	-2.532	0.013
Bridging Social Cohesion	0.621	0.158	[0.309, 0.933]	3.938	< .001
Political trust	0.384	0.095	[0.196, 0.571]	4.045	< .001
Year of residence	0.008	0.003	[0.003, 0.014]	3.076	0.003
Level of Education					
Higher Education - Elementary school	0.04	0.113	[-0.183, 0.264]	0.358	0.721
None - Elementary school	-0.513	0.177	[-0.864, -0.162]	-2.893	0.004
n = 139	Adjusted R² total model = 0.381				
Place Attachment					
Bonding Social Cohesion	0.261	0.158	[-0.053, 0.574]	1.645	0.102
Bridging Social Cohesion	0.035	0.158	[-0.278, 0.377]	0.219	0.827
Political trust	0.399	0.095	[0.212, 0.587]	4.208	< .001
Year of residence	0.005	0.003	[1.85e-4, 0.011]	2.048	0.043
Level of Education					
Higher Education - Elementary school	0.079	0.113	[-0.145, 0.302]	0.699	0.486
None - Elementary school	-0.47	0.178	[-0.821, -0.119]	-2.646	0.009
n = 139	Adjusted R² total model = 0.349				
Social Trust					
Bonding Social Cohesion	-0.211	0.189	[-0.585, 0.162]	-1.121	0.265
Bridging Social Cohesion	0.501	0.187	[0.131, 0.870]	2.681	0.008
Political trust	0.346	0.09	[0.167, 0.525]	3.821	< .001
Year of residence	0.007	0.003	[0.002, 0.012]	2.756	0.007
Level of Education					

	Estimated value	Standard error	95%CI	t	p
Higher Education - Elementary school	-0.018	0.109	[-0.234, 0.198]	-0.168	0.867
None - Elementary school	-0.506	0.167	[-0.838, -0.175]	-3.022	0.003
n = 139	Adjusted R² total model = 0.389				

4. Discussion

4.1 Disaster preparedness

The most striking result of this study was the gap in actual preparedness and awareness of disasters in Lempira. To the question "What have you done so far to prepare for disasters?" most respondents answered, "I have done nothing." However, most of the respondents answered "Agree" to the following two questions "My place of residence is prepared for emergencies" and "Residents know what their roles are in an emergency" on disaster preparedness in CCRAM-10.

One of the reasons for this is that instead of each household preparing for a disaster, people trust the ability of local leaders trained in disaster response. It is also likely that a part of the Honduran culture believes that if you have walls and a roof over your head, you will be able to survive a disaster. Many people do not want to leave their homes during a disaster. This study believe this is because even when there are storms or floods, they would rather die inside than leave their homes because of their culture.

In other regions, several previous studies have reported disaster awareness in local communities of developing countries. The Moken, an ethnic minority affected by the Indian Ocean tsunami, had no concept of tsunami or disaster. They saw the coming tsunami phenomenon as part of the flood myth Laboon (reminiscent of the flood myth recorded in the Book of Genesis in the Old Testament) and by the oral tradition that "when the tide suddenly recedes abnormally, Laboon comes," they fled to higher ground. Their lives were saved (Suzuki, 2011). A survey in Bangladesh found that few people evacuate during disasters, indicating a widespread fatalistic view of natural disasters among the local population. Other reasons for not evacuating included fear for the safety of property and livestock, overcrowded shelters, and unsafe places for women (Jagnoor et al., 2019).

Thus, in considering preparedness as one of the components of local resilience, people's awareness of disasters varies, and understanding the culture of each region is essential in enhancing preparedness, and a culturally sensitive response is required.

In understanding the awareness of disaster preparedness, this study have to know first how people in the community think about risk. In Australia, a checklist has been developed to link efforts to understand people's attitudes to behavior change. As a first step, they assessed their preferences and value priorities when at risk of being severely affected by disaster losses. By gaining new

knowledge in the form of stories, concepts, understandings, narratives, and data about key drivers of vulnerability from a broad range of people, these stories and identified system patterns highlight the tensions and value conflicts among different parts of society and various roles within organizations, and the other they highlighted how ideas could arise (UNDRR, 2022).

4.2. Factors influencing community resilience

The results of this study indicate that in general community resilience, which integrates the five items, the “Bonding Social Cohesion” hurt Community Resilience, while “Bridging Social Cohesion” and “Political Trust” had a positive impact on Community Resilience.

The classification of whether social capital is conjunctive, bridging, or linking is important (Berkman et al., 2014). Coupled social capital is a network whose members share similar background factors in terms of hierarchy, race/ethnicity, etc., or the resources members have access to within such a network. Bridging social capital is a resource that “bridges” across class, race/ethnicity, and other social characteristics and is accessible between networks (Berkman et al., 2014). In Lempira, a rural area in the target region of the Republic of Honduras, networks of remarkable homogeneity were a factor that lowered community resilience, and bridging networks among heterogeneity were a factor that raised community resilience.

There are several possible explanations for this result. In particular, the fact that those around them are not prepared for disaster preparedness leads to their lack of preparedness, causing homogeneity to drag them down in terms of disaster preparedness. This can be described as a homeostatic bias, where people around them are not doing it, so they do not need to prepare themselves. These behaviors during disasters are consistent with people are influenced by the evacuation behavior of those around them (Ohtake et al., 2020) in evacuation behavior.

It can also be explained with the Social Contagion Theory (Scherer & Cho, 2003), which states that people's attitudes and behaviors are formed under the influence of others with whom they are directly connected.

As a proposed solution, “informing people that their evacuation behavior is influenced by the evacuation behavior of others around them and making them aware and aware that their evacuation behavior affects others around them will promote evacuation behavior” (Ohtake et al., 2020, P.91). This study can propose a way to convey messages that lead to disaster prevention behavior by utilizing the nudges.

The UNDRR defines a disaster as

Serious disruption of the functioning of a community or a society at scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic and environmental losses, and Impacts. A disaster is a situation that exceeds the response capacity of the area and requires assistance from outside sources.(UNDRR, 2009, P.9)

It makes sense that bridging would be an effective tool for community resilience in the context of external relationships in situations that exceed the local response capacity to accept and receive support from outside sources. "Bridging" is a connection to the outside world that transcends generations and roles and can be interpreted as a "weak tie." Novel information is more likely to be obtained from "weak ties" with low frequency of contact and high heterogeneity than from "strong ties" with a high frequency of contact and high similarity (Granovetter, 1973). Disasters are a place and a time in which relationships in peacetime and "weak ties," loose relationships with the outside world, overlap. The weak ties with the outside world may work effectively as external support.

"Political trust" refers to the "linking social capital" in this study. Higher linking leads to higher community resilience.

4.3. Education and community resilience

The community resilience for those with elementary school education was higher than for those with no education, but not different from those with more than elementary school education.

There is no study about education and community resilience.

In Honduras, primary education is provided to children between 6 and 15. Although there is a movement to make nine years of primary education compulsory, a total of six years is currently compulsory.

Compulsory education in Honduras consists of one year of preschool, nine years of basic education, and two to three years of secondary education (two years only for the technology program), for a total of 12 to 13 years. However, students with poor grades repeatedly fail out of school, and only 50 % of children graduate from grades 1 to 6 of basic education (equivalent to elementary school in Japan) in 6 years, with some dropping out and the completion rate being 86 % (JICA, 2020).

One of the purposes of compulsory education is to nurture people who can live in a world of "I" and the world of "we" (Ministry of Education, Culture, Sports, Science and Technology, 2005). It is essential to have a view of oneself not only about oneself but also about the people around one.

This study found differences between those who had compulsory education and those who did not. The contrast between educational background and community resilience may be due to the difference between the world of "I" and "we" nurtured through compulsory education or the difference between the connection with other people and social skills.

Limitations of the current study are that the study subject was limited to women and that information on culture was not taken. Therefore it is difficult to determine how gender and cultural background affect disaster preparedness and community resilience. Future research should be conducted from these perspectives.

5. Conclusion

In the community resilience of housewives in western Honduras, bonding worked negatively while bridging worked positively. Enhancement of bridging may work effectively as external support. This study clarified the positive contribution of elementary school education to community resilience through fostering connection with others and social skills.

The results of this study suggest that local and national public policies can contribute to community resilience.

First, based on the finding that the acquisition of bridging networks and political trust (linking social capital) increase resilience, we believe that creating an environment where governments, residents, and external organizations can communicate regularly and build bridging and linking networks will lead to increased community resilience.

Second, because the presence or absence of primary education completion has a significant impact, policies to enable primary education completion should be strengthened.

This study gives a new insight into the relationship between social capital and community resilience.

6. Acknowledgments

The authors would like to thank our local collaborator María Fernanda Castro Flores and Melissa Valeska Sevilla González in the Republic of Honduras, and the residents of Lempira Province for their cooperation in the survey. This work was supported by JSPS KAKENHI Grant Number JP19H04354.

7. Authors' Contributions

Junko Miyamoto: conceptualization, research, formal analysis, writing - draft.

Minato Nakazawa: methodology, peer review/editing.

8. Declaration of competing interest

All authors have no conflicts of interest to disclose.

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