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(TRANS)LOCAL SOCIAL CAPITAL AND ITS ROLE IN ENHANCING ADAPTATION TO COASTAL HAZARDS: EVIDENCE FROM URBAN COASTAL COMMUNITIES IN INDONESIA

Konstantin Gisevius[1]*, Lisa-Michéle Niesters[1], Ajeng Larasati[2] and Boris Braun[1]
[1]*Institute of Geography, University of Cologne, Germany, k.gisevius@uni-koeln.de , l.niesters@uni-koeln.de , boris.braun@uni-koeln.de*
[2]*Palawa Karya, Yogyakarta, Indonesia, ajlarasati@gmail.com*

(*Main presenter and corresponding author)

Abstract

Environmental change and sea level rise pose significant challenges to urban coastal communities worldwide, particularly in the Global South. Research on household and community-level adaptation highlights the central role of social capital to reduce vulnerability and enhance resilience. Although local social capital plays a crucial role in adaptation, the importance of translocal social capital, which encompasses social support and resources that extend beyond local boundaries, often remains overlooked by existing research. To broaden our understanding of how social networks and social capital can contribute to the adaptive capacity of vulnerable communities, we investigate the impact of (trans)local social capital on coastal adaptation of flood-prone households in Padang and Denpasar, Indonesia. Using household survey data (N=620) including social network data on flood-related support (N=1169), we analyze the support provided by local and translocal personal contacts. Our findings reveal that local and translocal networks for flood-response support primarily consist of bonding ties. Moreover, our analysis provides empirical evidence that translocal contacts are more likely to provide emotional and moral support, as well as financial and material support, while local contacts are more likely to share flood-related knowledge, skills, advice, and practical support (e.g., physical labor or caregiving). These findings show that local and translocal social capital give access to different types of support, demonstrating their individual benefits for household and community-level adaptation. These insights emphasize the complementary nature of local and translocal bonding social capital in enhancing responses to natural hazards, illustrating how spatial distance shapes support in social networks. This suggests that understanding local adaptation requires a translocal perspective, recognizing that family, household, and community ties transcend spatial boundaries.

Keywords: coastal hazards, social capital, translocality, adaptation, urban communities

1 Introduction and theoretical background

Environmental change and rising sea levels pose significant challenges for urban coastal communities, with particularly severe impacts felt in the Global South due to often heightened exposure to natural hazards and lower governmental capacities (Carmen et al. 2022). Coastal cities in the Global South face a myriad of problems including flooding, erosion, and saltwater intrusion, leading to profound socioeconomic implications such as displacement and loss of livelihoods (Wong et al. 2014). The

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cumulative effects of these challenges underscore the urgent need for effective and inclusive community resilience strategies in urban coastal settings.

Social capital is a key asset to hazard adaptation strategies for vulnerable communities. It can reduce vulnerability, enhance adaptive capacity, and foster risk reduction, response mechanisms, and recovery strategies (Wilkin et al. 2019). Empirical evidence supports the role of social capital in hazard adaptation, showing it provides access to emotional support (Pacoma & Delda 2019), critical and innovative information, and enables the mobilization of resources during crises (Wood et al. 2013). Social capital is typically classified as bonding, bridging, or linking. Bonding social capital refers to close-knit relationships within a homogenous group, such as family or close friends, bridging social capital encompasses more distant connections across diverse groups that can provide new perspectives or ideas, and linking social capital involves relationships to people in positions of power, for example between local residents and government officials (Adger 2003; Aldrich & Meyer 2014; Hess 2017).

Existing research almost exclusively focuses on local social capital, thus underestimating the contributions of translocal social networks and relationships spanning places and regions (Andersson et al. 2018; Boas 2017; Rockenbauch & Sakdapolrak 2017). Local social capital refers to the relationships, networks, and connections that exist within a specific community or location (Lee & Lee 2019). Translocal social capital, on the other hand, refers to the relationships and networks that connect individuals or groups across different locations or communities. These connections can provide access to resources, knowledge, and opportunities that might not be available within a single location (Bott et al. 2020; Chaudhury et al. 2017). Overall, research on translocal social capital is gaining traction in recent years (inter alia Bott et al. 2020; Rockenbauch et al. 2019). However, the field is still evolving and requires more empirical studies. This is crucial for understanding the nuances of both local and translocal social capital, as well as their interrelationships, which are key to enhancing coastal adaptation strategies.

Therefore, this study investigates the common features, differences, and potential interactions of local and translocal social capital on household and community adaptation to coastal hazards. The focus is on understanding how social networks, both within and beyond the local place-based community, influence responses to coastal hazards. Specifically, our study addresses the following research question: *How does external support during and after flood events differ between local and translocal social contacts, and to what extent do they complement each other?*

Understanding both types of social capital can provide insights into how communities function, how they respond to hazards, and how they can best be supported by governmental agencies or NGOs. For policymakers, community leaders, and organizations, balancing and leveraging both local and translocal social capital can be essential for promoting resilience and adaptation strategies.

2 Study area description and methodology

In this study, we explore the differing impacts of local and translocal social capital on coastal adaptation for flood-prone households in Padang and Denpasar, Indonesia. Both cities are prone to coastal hazards such as coastal, fluvial, and rain flooding due to a combination of flat terrain and high rainfall intensity (Kusmiyarti et al. 2018) as well as a high tsunami risk for Padang due to its location at the coast of West Sumatra facing the open Indian Ocean (Khomarudin et al. 2010). Secondly, these cities display distinct migratory and sociocultural characteristics which potentially influence the development of local and translocal social capital and inherent dynamics of support networks. Padang's Minangkabau

culture, with its matrilineal society and tradition of outmigration (Iman & Mani 2013, Rahman 2016), contrasts sharply with Denpasar's predominantly Balinese Hindu culture (Putra & Creese 2016, Wade et al. 2018) and high immigration rates from all over Indonesia driven by the local tourism industry on Bali (Prajnawrdhi et al. 2015).

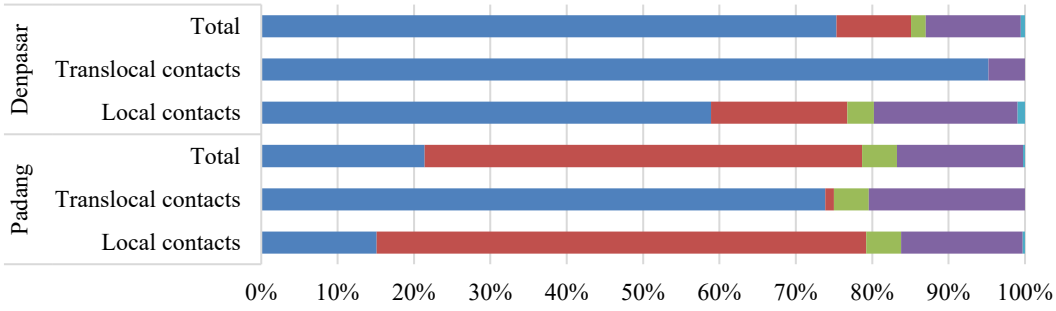
In June 2022, we conducted a pre-survey to collect socioeconomic and flood-related data for study site selection in Padang and Denpasar. All selected study sites are coastal residential areas directly connected to the sea and have been affected by flooding in the last 5 to 10 years. Subsequently, in October 2022, a quantitative household survey (N = 620) was carried out, covering, among others, demographic and socio-economic characteristics, flood exposure, impacts, and responses, and community activities. Data collection was supported by research assistants from Padang State University and Udayana University in Denpasar.

In addition to the household survey, we collected ego-centric network data focusing on social contact persons providing support to flood-affected households. Ego-centric network data refers to the collection and analysis of social connections and relationships surrounding a specific individual (the "ego") within a network, focusing on how that individual is directly connected to others without necessarily considering the wider network structure (see Borgatti et al. 2018). In this study, a social or personal contact refers to an individual who provides material or immaterial support to respond to flooding. Alongside demographic information about these social contacts, we asked respondents about the type of relationship (family member, neighbor/ community member, work colleague, or friend) and relationship strength (very close, close, or not close) with these contacts and the types of support they receive from these contacts during flood events. The data collected comprises information about 1169 support contacts. These contacts were further categorized into local and translocal contacts. Social contacts are considered translocal when the place of residence lies outside of the city of the surveyed household. The resulting data were analyzed using descriptive and bivariate statistical analysis to identify differences in the types of social support provided by local and translocal contacts.

3 Results and discussion

3.1 Descriptive data analysis: Characteristics of local and translocal social ties in Padang and Denpasar

Our findings on personal social contacts who provide support in dealing with floods show significant differences between the two cities (see Figure 1). Overall, we find that households in both study areas have local and translocal personal contacts. In Padang, households draw support predominantly from local contacts, accounting for 89 % of their total support contacts. Support contacts in Padang are mainly neighbors and community members, making up 57 % of their total connections, and are largely close and very close personal relationships (54 % and 45 % respectively). In contrast, the households in Denpasar display a much higher share of translocal contacts, constituting 45 % of their total support contacts. The majority of all contacts are family members, reflecting 75 % of total relationships, and they are mostly very close personal connections (79 %). This substantial presence of translocal contacts in Denpasar can be attributed to the fact that a significant proportion of the respondents in Denpasar (64%) are internal migrants, mostly from East Java and other parts of Bali. Despite the spatial disparity in the origin of the contacts, both local and translocal relationships across the two regions mainly consist of strong connections with individuals in similar social groups (families) or communities. Therefore, support in these networks can be characterized as primarily bonding social capital.



	Padang			Denpasar		
	Local contacts	Translocal contacts	Total	Local contacts	Translocal contacts	Total
Family	15,1%	73,9%	21,3%	58,9%	95,2%	75,3%
Neighbors / Community members	64,1%	1,1%	57,1%	17,8%	0,0%	9,8%
Work colleagues	4,6%	4,6%	4,6%	3,5%	0,0%	1,9%
Friends	16,0%	20,5%	16,5%	18,8%	4,8%	12,5%
other	0,3%	0,0%	0,3%	1,0%	0,0%	0,5%

FIGURE 1. Distribution of relationship types among local and translocal contacts in Padang and Denpasar

3.2 Types of support provided by local and translocal contacts

We employ a bivariate analysis of support provided by local and translocal contacts (Table 1). Notably, none of the surveyed support forms are exclusive to local or translocal contacts. However, we find significant differences in the propensity to provide different types of support. Local contacts are more likely to share flood-related knowledge, skills, and advice as well as practical support (e.g., physical labor or caregiving) during flooding events. Translocal contacts, on the other hand, are significantly more likely to provide emotional and moral support as well as financial and material support. These results are largely robust across both cities and different relationship types and demonstrate the added benefits of having both local and translocal social capital and their complementary nature.

The finding that translocal contacts are more likely to provide emotional support than local contacts can be explained by several factors. Selective relationships in translocal connections with usually higher investments to maintain them often entail stronger bonds with close friends or family (Elliot et al. 2010; Su 2022), and shared experiences such as migration or cultural identities can deepen these connections (Esnard & Sapat 2016). The absence of physical presence may lead to emotional compensation and reduced social friction (Cronin 2015). The broader and often less intimate nature of local relationships, such as those with neighbors or casual acquaintances, might lead to less emotional support compared to translocal contacts. Finally, people from the immediate neighborhood are usually also affected by the flooding and related hazards, so they may be less able to provide moral support themselves.

TABLE I. Bivariate analysis of the relationship between local and translocal contacts and support types

Support type: Contact…	Significance[a]	N	Scale[a]	Test	Categories, N	Share of translocal contacts
provides emotional and moral support	***	1169	D	Chi² = 30.34	Yes = 832 No = 337	219 (26.3%) 39 (11.6%)
provides financial and material support	***	1169	D	Chi² = 12.83	Yes= 250 No = 919	76 (30.4%) 182 (19.8%)
provides flood-related knowledge support	***	1169	D	Chi² = 19.29	Yes = 230 No = 939	26 (11.3%) 232 (24.7%)
Provides practical support on-site (e.g., manual labor, caregiving)	***	1169	D	Chi² = 35.47	Yes = 347 No = 822	38 (10.9%) 220 (26.8%)
discusses flood adaptation strategies with household	***	1169	D	Chi² = 25.98	Yes = 385 No = 784	51 (13.3%) 207 (26.4%)
has influential contacts useful for flood responses	n.s.	1169	D	Chi² = 0.00	Yes =150 No = 1019	33 (22.0%) 225 (22.1%)
has improved long-term response to floods	***	1169	D	Chi² = 3.18	Yes = 523 No =646	128 (24.5%) 130 (20.1%)

[a.] *** p<0.01, **p<0.05, *p<0.1, (n.s.) not significant | D = Dichotomous

4 Conclusions

Contrary to our initial expectations, we found no evidence of greater importance of linking and bridging ties in translocal contacts compared to local contacts (e.g., in the transfer of flood-related or technological knowledge). We can, however, demonstrate the distinct and complementary roles of local and translocal bonding social capital and expand our comprehension of how communities can adapt effectively to natural hazards. Local bonding social capital is characterized by practical aid and knowledge-sharing, making it critical for immediate response and recovery. It is rooted in local networks, and demonstrates positive feedback created by connected local communities for individual and collective adaptation. Translocal bonding social capital, on the other hand, is a source of emotional and financial support, critical for dealing with the psychological and economic impacts of flooding. Despite the challenges of maintenance and activation, translocal bonding social capital offers a broader network and range of support, making it a beneficial additional resource for coastal adaptation. In sum, our study demonstrates that households affected by natural hazards will benefit from a combination of local and translocal social capital for increased adaptive capacity.

The study underscores the complexity of local adaptation, which is not solely about physical preparedness or economic resources but also about leveraging diverse social networks at different scales. It emphasizes the necessity to recognize and integrate translocal social capital into resilience strategies, shifting from a predominantly local focus to a more inclusive, interconnected perspective.

Ultimately, these insights have implications for policy and planning, suggesting that building climate adaptation in coastal communities requires a broader perspective, acknowledging the role of family, household, and community ties that transcend spatial boundaries.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

K Gisevius: Conceptualization, Methodology, Investigation, Formal Analysis, Data Curation, Writing – Original Draft, Review & Editing, Visualization

L-M Niesters: Conceptualization, Methodology, Writing – Review & Editing

A Larasati: Methodology, Investigation, Data Curation, Writing – Review & Editing, Visualization

B Braun: Conceptualization, Writing – Review & Editing, Supervision, Project administration, Funding acquisition

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