

**How government discourse makes people vulnerable? The case of the
Province of Davao del Norte, Philippines**

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Introduction

The world is becoming more dangerous to live. According to the Centre for Research on the Epidemiology of Disasters (CRED), “average mortality for all types of natural disasters increased to 69,800 per year in the decade 2006-2015, up from 64,900 between 1996 and 2005” (CRED, 2016). But for whom is this world more dangerous? CRED (2016) reports that in terms of loss of lives per disaster, low-income countries experienced the highest rate of mortality, where on average, 327 people died per disaster in the past 20 years. This is approximately five times more than generally recorded in high-income countries (p. 12). This is supported by UNISDR’s Global Assessment Report 2009 that affirms impoverished countries’ relative mortality risk which is 200 times higher than OECD countries (UNISDR, 2009). This was experienced by Haiti which suffered 1,000 casualties in the aftermath of Hurricane Matthew in October 2016; while the number is relatively lower in other countries in the Bahamas and Americas that experienced the same hurricane (Delva, 2016). Meanwhile, the Philippines is not immune from disasters having been considered 4th most disaster-prone country by UNISDR Mortality Risk Index in 2009. Typhoon Bopha in 2012 claimed close to 1,000 Filipino lives, mostly from Southern Mindanao. The extent of flooding is so wide that it inundated all the 223 communities in the Province of Davao del Norte; displaced 12,186 families; destroyed 764 houses; partially damaged 5,702 homes; and damaged close to Php800 million worth of public infrastructures, and Php2.8 billion in agriculture mostly in the banana export industry (Provincial DRRM, 2013)

Since poverty is identified as a factor for a differentiated impact of a calamity, this could mean that disasters are not really “natural”; but are socially constructed as a result of power imbalance within the society (Heijmans, 2004). In this study, the researcher attempts to: 1) construct a social vulnerability model in Davao del Norte Province, as well as, 2) determine the model’s psychometric properties; and 3) expose the discursive structure of the local DRR functionaries regarding flood risk. The researcher assumes that the people in affected areas have their peculiar concepts of flood vulnerability; and that these constructs do not entirely match with the constructs the local domain of disaster governance hold. This ideation gap may explain why the immense advocacy campaigns of the local governments are met with public apathy; and may expose the link between the flooding experienced by the people and the development pattern prevalent in the Province of Davao del Norte.

The evolving concept of disaster risk

The Third United Nations World Conference on Disaster Risk Reduction adopted the Sendai Framework for Disaster Risk Reduction 2015-2030. It underscores the need and urgency to produce a plan to succeed the Hyogo Framework of Action 2005-2015 because “disasters continue to undermine efforts to achieve sustainable development”(UNISDR, 2015, p. 11). In the next 15 years, it aims to substantially reduce disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. It intends to achieve this by preventing new and reduce existing disaster risk by strengthening community resilience (ibid, p. 9); and shifts emphasis from disaster management to disaster risk management. Hilhorst (2004, p. 52-53), traces the shifting thoughts preceding global declarations to combat disasters. In the hazard-centered paradigm of the 1950s, disasters were attributed to the natural geophysical processes. The primary actors involved were technocrats from the natural sciences such as seismologists and geologists who aim to understand, measure, and predict the occurrence of these natural processes. While the social scientists supported this view by proposing a behavioral paradigm to explain people’s behaviors and responses to early warning system. In the 1980s, the hazard-centered paradigm was challenged by the social science discipline. Collectively, it argued that disasters are not solely the result of geophysical interactions, but are also partly explainable by structural processes, that is, social processes that make people vulnerable. These social factors may include population and poverty, among others. Hence the formula, Risk = Hazard + Vulnerability (Blakie, et al, 1994 cited in Hilhorst 2004, p. 53). In the 1990s, the issue shifted to the idea of “mutuality” between hazard and vulnerability, or the interaction effects of these two factors: humans are viewed not just vulnerable to hazards, but are also the causes of these hazards because of its activities.

After decades of refinement, the global community has arrived at a consensus defining disaster risks as “the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society, or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity” (UNDRR, 2017). For Cardona (2004, p. 38) “risk is the probability of surpassing a determined level of economic, social or environmental consequence at a certain site and during a certain period of time”. However, Bankoff (2004, p. 30) warns that a reductionist approach to understanding vulnerability by way of a formulaic expression is blind to the connection between hazard, vulnerability and society’s culture. For Oliver-Smith (2004), risk is the distribution of disaster effects as materially and socially constructed based on political, economic practices, and institutions of a certain society (p. 11).

Cardona (2004, pp. 37-51) explains disaster from the pressure and release model, holding the assumption that vulnerability springs from social pressures and relations at the global level where “root causes” are embedded in the globalizing social, political, and economic structures. These root causes produce “dynamic pressures” at the national level in the form of population growth, urban development and population pressures, environmental degradation, and lack of development morals. Altogether, they give rise to “unsafe conditions” at the local level in the form of social fragility, potential harm or poverty. These pressures have to be “released” by mitigating the factors that causes the pressure to rise, and eventually prevent the actualization of disaster risks. Finally, risk is also construed to be a socially constructed concept either individually or collectively. This school of thought emphasizes the active role of people in constructing the meaning of risk. This means that the concept of risk depends on one’s appreciation, reading or imagination. Here, individual perception, attitude and motivations are crucial drivers that either strengthen or weaken vulnerability to hazards. Therefore, risks as a constructed concept varies subjectively from context to context. This constructivist model differs with the previous models explained where risk as an objective concept is construed to be external to people (ibid).

Vulnerability as a contested discourse

From a constructivist point of view, it takes power differentials within every society to determine whose risks perceptions matter most and least. Bankoff (2004, pp. 25-36) argues that the term vulnerability is a Western discourse along with “tropicality” and “development”. These normative dualist frames are employed by globally dominant powers to justify their international interference in the guise of western medicine to cure tropical diseases, development aid to poor nations, and currently, disaster relief for regions rendered discursively unsafe. In pursuit of this framing, science is employed to illustrate geophysical pattern where disasters usually occur; hence, the term vulnerability to hazards, tacitly denoting some places to be dangerous for human habitation; somewhere where the “they” as opposed to the “us”, are dangerously living. For Bankoff (2004), this framing largely neglects the wider historical roots of vulnerability, originating from the past actions of humans, the global economic imbalance.

The acceptance of one disaster risk frame over the other is made possible by recasting the ontology of disaster and disaster risks. This is a function of discourse and rhetoric which use tools such as metaphors, frames, narratives, among others. Foucault (1960 cited in Hewitt, 2009) challenges the supposed rationality of policy processes as asserted by positivist approach. For Foucault (1960), inputs used in policy making is created within the confines of the discursive formations, so that the truth conforms to the rules and the norms of the discourse. This, Foucault calls, “the will to truth”

(ibid p. 7). And in arriving at that truth, quantitative means of persuasion proved insufficient. The argumentative nature of rhetoric abrogates the long-held monopoly of positivism in policy analysis. By positivism is meant the embracing of scientific rationality. When applied to policy analysis, it means that the latter is a means to a quest in uncovering objective knowledge through the techniques of economics (Howlett, et al, 2009, p. 21). But the argumentative turn in public policy acknowledges that metaphors matter. Metaphors and frames are rhetorical tools that are useful in policy advocacy (Fischer & Forrester, 1993; Buscher, 2014; Lakoff, 2010). For Schon and Rein (1994) frames are the “underlying structures of belief, perception, and position in disputes” (p. 23). These frames are tacitly used by policy actors to support their biases, motivations, and interests. This means, framing is inescapable in the policy processes.

The epistemic struggle in DRR framing is a toss between and among three policy actors representing different social domains (Hilhorst, 2004). These social domains include: (i) the domain of science and disaster management dominated by scientists and managers, (ii) the domain of disaster governance dominated by politicians and bureaucrats, and (iii) the domain of local responses comprised of local vulnerable people. These domains are associated to particular discourse and meanings of phenomena, hence, their different ideation of nature-society relations, vulnerability, risks, and disaster response. For example, the domain of international science and management adopts a hazard-centered paradigm of DRR. Its aim is to understand, predict and control nature as hazards. This domain maintains epistemic hegemony and is accused of being “embedded in the general discourse of capitalist modernity” (Escobar 1999, cited in Hilhorst 2004, p. 58). The domain of disaster governance is where scientific knowledge enters public policy through State actors such as politicians and bureaucrats. In this domain, political actors select ideas that mirror their own interests, beliefs and values. Finally, the domain of local responses which is comprised of the panoply of local people’s coping capacities and mechanisms in times of disasters. This body of local knowledge runs through social networks, and are valuable assets in anticipating disasters in order to survive. External agents call this local people’s capacities; and compares this rather marginally with dominant Western discourse associated with elite technology and top-down disaster management style. Wisner (2004) argues that “we need to understand why and how local knowledge is rendered inappropriate or inaccessible, and the ways in which people can be empowered to reclaim local knowledge and appreciate its usefulness” (p. 189). Hilhorst (2004) theorizes the existence of disconnect between and among these three social domains. Spiekermann, et al. (2015, p. 100), point out the source of fragmentation between the science and public policy spheres: on one hand, scientists do not have legal mandates in the public sector; on the other hand, the practitioners are facing limited means to acquire high quality data. Moreover, lack of shared risk

culture and poor exchange of ideas between scientists and local knowledge producers led to the knowledge gap between the two social domains.

The development-vulnerability nexus

The concept of vulnerability to disaster risk triggers the politicization of the term development. Collins (2009) agrees that vulnerability is not static but varies in response to the constantly evolving social processes, environmental change, conflict, politics, among others. As such, disaster is an off-shoot of development: either it is “the consequence of insufficient development that hampers human capacity to avoid crisis or could be an aspect of development that causes the crisis itself” (p. 8). In addressing the development inadequacy, the familiar disaster management cycle divided the possible developmental actions that should be done, informed by the lessons of previous disaster events to avert future disaster events; hence, the familiar prevention/mitigation, preparedness, response, and rehabilitation continuum. However, Collins (2009) argues that it has to be an appropriate type of development for a society to avoid future disaster events, or at least mitigate its impact leading to a sustainable recovery (ibid. p. 27-28). Unfortunately, social, political and economic power relations are reflected in the development patterns, and are made part of our daily experience of conditions of vulnerability. For instance, income inequality enables the rich to exploit natural resources in wanton disregard for pollution and environmental degradation; moreover, the poor and powerless are also forced to utilize resources at their reach, and are forced to adapt to adversities for survival (Oliver-Smith, 2004, p. 16). Development therefore can be a source of vulnerability. It can be hostage to vested interests who, because of power imbalance in social relations, can influence public policy and investment. Dams for hydro-power, large-scale mining, land conversion for plantations are examples cited by Heijmans (2004). From the pressure-and-release framework, these high-modern technology projects in pursuit of globalization are the root causes of vulnerability that may negatively impact the dynamic pressures at the national level, and renders local communities unsafe (Wisner & Birkmann 2006, p. 25). Acknowledging development to be double-edged sword, Collins (2009, p. 30) contends that it has something more to do with uneven development, and development that is maladapted to the context. By uneven development Collins (2009) points out the people’s lack of basic standards of living that ensures access to safe water, nutrition, shelter, fuel, sanitation, education and rights.

In the current DRR theorizing, resilience is emphasized as the new development paradigm. Resilience is the “capacity to endure shocks and stresses and bounce back by individuals or communities from the difficulties that life might bring without their overall situation deteriorating” (Pasteur, 2011, p. 13). People and communities are expected

to adapt to the new normal called climate change and disaster risks. They have to learn how to manage risks by understanding and reducing the occurrence of hazards and stresses, if not at least cope with the immediate challenge, and recover the soonest time possible. The original risk formula of Blaikie, et al. (1994) is improved by Wisner, et al. (2004) to become $\text{Risk} = \text{Hazard} \times \text{Vulnerability/Capacity}$ (Collins 2009, p. 20), factoring the mutuality or interaction effects of hazard and vulnerability, as well as capacity. In this formulation, capacity serves as an inflator or deflator of resilience which in turn affects risk level. However, in a recent reformulation, Gaillard et al. (2018) believe that capacities and vulnerabilities do not necessarily constitute a polarity; but rather a companion concept. For them, capacities comprise a bundle of “diverse knowledge, skills and resources people can claim, access and resort to in dealing with hazards and disasters”, that even the most marginalized individuals or communities must naturally possess. Activating individual or collective capacities is crucial for preventing disasters from happening; or in strengthening preparedness before a disaster, as well as in responding to actual disasters. Reducing disaster risks, therefore, requires the utmost participation of people in mapping the diversity of this knowledge system and resources, as well as enhancing their skills in utilizing local resources. Ultimately, this genuine participation should help dictate the development pattern the community or society must take. This makes vulnerability and capacities as parallel concepts pointing at one and the same target --- to enhance the pattern of development. However, due to social inequality both in wealth and power, some individuals or communities are made more vulnerable than others. While enhancing capacities serves as a springboard for empowerment, in a highly skewed society such as the rural Philippines, that political springboard is either simply not present or too narrow to accommodate the widest genuine participation. This burdens the poor and the powerless without allowing them to raise the question “why we have to learn to cope more while the powerful others, less?” As an illustration, high risk areas in Davao del Norte province learn the value of a ringing bell or *batingaw* to gather people for some important community events. As a Christian country, bells in the Philippines are usually used by local parishes to signal the start of a church service from a daily Holy Mass to celebrations of baptism, weddings, or to mourn the death of another Christian. This knowledge is tapped by Oplan A.N.D.A.M. (Plan Ready), a program of the provincial government in 2013-2016 as part of its flood, tsunami and landslide evacuation drills. The rapid ringing of a bell made of an empty acetylene tank cut in half, created a new knowledge and a new local norm that signals voluntary evacuation to a pre-designated assembly area. This development of a new capacity is welcomed by local residents. However, it does not cure the “root causes” of flooding or landslides in the province, a subject investigated in the second part of this paper.

Research area and the analytic frameworks

A survey was conducted in five (5) villages in the Province of Davao del Norte, in southern Philippines. These villages were chosen to be part of the sampling frame for being high-risk areas situated in the uplands, riverbanks, and coastlines. The province is among the flood-prone areas in the country. This is due to a number of rivers traversing the province. Also, flooding is attributed to the intense logging activity in the past, resulting to forest denudation. These open areas are now converted to built-up areas, as well as agricultural farms. Figure 3 depicts the distribution of land-uses in the Province of Davao del Norte between the year 2000 and 2007. Recent data show that almost 200 hectares were devoted to agriculture, while Production and Primary Forests combined are less than 100 hectares. The rest are classified as built-up areas, grassland, and other uses. The current economic narrative depicts the Province of Davao del Norte as having the highest poverty incidence in Region XI at 26.7 percent, and lists banana industry as the leading agricultural produce (NEDA XI, 2018).

This research work is descriptive in design. Primary data is used. A total of 540 respondents participated in the survey. After data cleaning and normalization procedure, sample size was reduced to 380. The author proceeded in two major steps guided by the sequential exploratory type of mixed method espoused by Creswell (2009). First, the author executed Factor Analysis (FA) to determine the dimensions of vulnerability from the perspective of local respondents. FA refers “to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical variables (Kim & Mueller 1982, p. 9). In factor analytic approach, we are interested in examining the covariation among a set of observed variables in order to gather information on their underlying latent constructs, that is, the common factors (Byrne, 2010, p. 5). Factor analysis come in two variants: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) (Yong & Pearce, 2013, p. 79). The researcher used EFA in a situation when “we may not have an idea as to how many underlying dimensions there are for a given data” (Kim & Mueller 1982, p. 9); or when “links between the observed and latent variables are unknown or uncertain” (Byrne 2010, p. 5). Hence, this particular use of factor analysis is exploratory in nature, to ascertain how and to what extent the hypothetical factors can account for observed covariations. In confirming the psychometric properties of the null model produced by EFA, the researcher executed Confirmatory Factor Analysis (CFA). CFA can be used when we know a little either theoretically or empirically about the existence of underlying latent variable structure (Byrne 2010, p. 6). In this case, we hypothesized the existence of two or more dimensions (the EFA results), and tested it through a number of parameters. This approach is confirmatory mode of factor analysis (Kim & Mueller 1982, p. 9).

The second major step is the interrogation of the final model of vulnerability in the context of Davao del Norte to uncover the discursive structure of the policy actors within the domain of governance in Hilhorst's (2004) framework on social domains. Primarily, this is done through FGD where 15 local technical functionaries in the DRR and agriculture sectors took part. In making sense of the messy narratives, the researcher employed the Structured Policy Argument Analysis using the framework of Dunn (1981, cited in Gasper & George, 1997, p. 371). We followed the method of Aragón-Durand (2009), in executing this step. In this approach, an argument is the basic unit of analysis. Dryzek (1993) advocates for this movement in policy studies, believing that judgment and decisions should not be exclusively derived through computations but equally through a “deliberative process that affords room for beliefs, principles, and actions under conditions of multiple frames for the interpretation and evaluation of the world” (p. 214). As a deliberative process, arguments comprise the building blocks of persuasion to achieve certain policy output.

In the final analysis, the discursive structure is compared to the vulnerability model arrived at using Confirmatory Factor Analysis. This approach enabled the author to see the gaps in the ideation processes between the public that experience flooding, and that of the local domain of disaster governance in Davao del Norte.

Results and discussions

Dimensions of vulnerability in the Province of Davao del Norte. The results contained in this sub-section support Objective No. 1. The dimensions presented here are the latent factors extracted using Exploratory Factor Analysis. Table 1 presents the KMO and Bartlett's Test. The computed value of .808 indicates an adequate sample. The computed Chi-square of Bartlett's Test of Sphericity is 2151.693. and is significant ($p < .001$).

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.808
Bartlett's Test of Sphericity	Approx. Chi-Square	2151.693
	Df	153
	Sig.	.000

Author's computations

EFA identified five (5) linear components as indicated by the Eigenvalues in terms of percentage of variance explained. Table 2 presents the results. These factors explained 61.762 of the variances in the model. The extraction is done using Principal Component Analysis and rotated using Varimax technique at no less than .400 factor loadings. The Rotated Factor Matrix reveals five (5) dimensions of vulnerability in Davao del Norte. Thematically analyzed, these

factors include: 1) Government inaction, 2) Age-based frailty, 3) Weak social capital, 4) Disability-based social exclusion, and 5) Material susceptibility.

Government Inaction. The thematic analysis indicates government's action as a source of resilience, or the lack of it as a source of people's vulnerability. Hence, the Sendai Framework for Disaster Risk Reduction 2015–2030 calls upon every State to support the four (4) Priority of Actions. Moreover, Boussalis (2011, p. 83) found strong evidence suggesting the crucial role of government policies and actions in the form of mitigation, preparedness, and response interventions. This conclusion is achieved using an objectively-derived and flexible indicators of government effectiveness. However, in the USA, Hurricane Katrina tested the limits of government's technocratic approach to DRR. Nates and Moyer (2005, p.1144) reported the general perception that local and national leaders underestimated the strength of the hurricane and failed to act in time. Evidence of lack of preparedness became clear after the hurricane: there was confusion among rescue and recovery teams; insufficient availability of physical and human resources, collapsed health care system, urban anarchy, and crimes. This means, mere government presence is not enough. The quality of actions and institutions that govern collective action, matters too.

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared			Rotation Sums of		
	Total	% of	Cumu-	Total	% of	Cumu-	Total	% of	Cumu-
	Variance		lative	Variance		lative	Variance		lative
			%			%			%
1	4.816	26.754	26.754	4.816	26.754	26.754	2.639	14.661	14.661
2	2.117	11.759	38.514	2.117	11.759	38.514	2.527	14.038	28.699
3	1.815	10.085	48.599	1.815	10.085	48.599	2.422	13.453	42.152
4	1.272	7.068	55.667	1.272	7.068	55.667	1.924	10.687	52.839
5	1.097	6.095	61.762	1.097	6.095	61.762	1.606	8.923	61.762
6	.879	4.883	66.646						
7	.810	4.501	71.147						
8	.704	3.912	75.059						

9	.649	3.607	78.666
10	.564	3.136	81.802
11	.532	2.956	84.757
12	.498	2.769	87.526
13	.473	2.625	90.152
14	.437	2.427	92.578
15	.390	2.167	94.745
16	.342	1.900	96.645
17	.330	1.835	98.480
18	.274	1.520	100.000

Extraction Method: Principal Component Analysis.

Age-based Frailty. The Sendai Framework for Disaster Risk Reduction 2015–2030 calls for mainstreaming the needs of special sectors such as the children (UNISDR 2015, Article I.7), and calls for the inclusion of the older persons in designing DRR policies owing to their “years of knowledge, skills and wisdom, which are invaluable assets to reduce disaster risk” (ibid., Article 36.a(iv)). Crooks (2009, p. 230) concluded that advanced old age in Jamaica is a risk factor for social vulnerability. Old age cohorts are found to be not only poverty-stricken but are also found to have a high level of morbidity and disability. This high vulnerability among senior citizens, particularly the “oldest-old” has something to do with their depleted resources in terms of physical, psychological and social losses. However, levels of vulnerability vary among senior citizens: those with high social status in their productive years are less vulnerable as social status are preserved during old age. The same conclusion was held by Sun, et al. (2017, p. 131) in their study of the elderly in Hong Kong. They observed that despite the advanced disaster preparedness of the island-state, it is not responsive to the needs of the elderlies, especially those with low socioeconomic status, those who are alone and isolated, and having limited access to basic care services. At the other end of the age spectrum, children are also found to be vulnerable. Peek (2008 cited in Mudavanhu, et al., 2015, p. 269) reported that children have the tendency to suffer psychological vulnerability in the form of depression from loss of family members, material loss, low level of social support and displacement. Physically frail, they are also prone to injury, illnesses, diseases, and malnutrition in times of disaster. Finally, their education is more likely to be disrupted during crisis situations through missed school, poor academic performance, delayed progress, and failure to complete education. Unfortunately, children, especially those suffering

from some forms of disability, are socially excluded that limited their access to necessary resources required in facing disaster (Hans et al., 2008, cited in Ronoh, et al., 2015, p. 45). This exclusion is sustained by the prevailing policy discourse that focuses on individuals' vulnerability and resilience rather than on addressing the social structure that heightens children's vulnerability. Children are made vulnerable by government policies that see only economic gains and losses as the main drive (ibid. p. 46).

Weak Social Capital. The thematic analysis gives rise to the importance of social capital as a source of resilience, or the lack of it as one vulnerability factor in Davao del Norte. Hence, the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015, Article 24.O) seeks “to enhance collaboration among people at the local level to disseminate disaster risk information through the involvement of community-based organizations and non-governmental organizations”. In Tacloban City, Province of Leyte, Philippines during Typhoon Haiyan, people did not respond to calls for evacuation despite the real-time warnings of storm surge. Apparently, people's low risk perception has not engendered positive behavioral response (NDRRMC, 2015, p. 76). On the contrary, in a tiny island of Tulang Diyot off Cebu Province, ordinary people positively responded to the house-to-house calls for evacuation during the same typhoon (McElroy, 2013). An assessment of their success highlights the Purok¹ system. The contrasting accounts generally lead top-down policy analysts to acknowledge that vulnerability and resilience are historical and socially embedded (Hilhorst, 2004). In Nepal, Bhandari (2014) concluded that “close ties or bonding social capital were important for immediate support on a daily basis to survive and develop resilience at an individual level; while bridging and linking social capital was instrumental in connecting people across social, economic and geographic boundaries to provide access to essential resources for families; as well as provide pathways to longer term survival and wider neighborhood and community revitalization” (p. 325).

Disability-based Social Exclusion. The Sendai Framework for Disaster Risk Reduction 2015–2030 explicitly acknowledges the critical role of persons with disabilities and their community in the “assessment of disaster risk and in designing and implementing plans tailored to specific requirements, taking into consideration, inter alia, the

¹ This informal community self-organization vertically lies between a family and the Village.

principles of universal design (UNISDR, 2015, Article 36a.iii). Stough and Kang (2015, p. 146) expounded the concept of PWD-oriented DRR policy to contain four (4) pivotal themes: first, the use of universal design, like ramp, in buildings as component of “build back better”. Second, the inclusion of PWDs in disaster preparedness, response, and mitigation activities to allow them to give meaningful insights into DRR planning. Third, information and communication technology accessible and assistive to people with disabilities must be in place. Finally, the acknowledgement of the critical role of people with disabilities as part of the broad-based advocacy group in emergency planning and recovery. Moreover, in their study on how differently-abled persons were impacted by the 2011 Christchurch earthquake, Phibbs et al. (2015, p. 40) cited the actual conditions that sharpened the vulnerability of disabled people, namely, disruption of infrastructure, inability to access support workers, responding agencies that were not set up to cater for the needs of disabled people, and temporary housing and public information that was not disability accessible. In particular, disabled people complained about a number of barriers to accessing emergency information before and after the disaster event.

Material Susceptibility. The quality of the dwelling place is also found to be a source of either vulnerability or resilience. In Vietnam, Tran (2015, p. 77) concluded that building a locally-sensitive housing design can mitigate pre-disaster fragilities, and suggested this to become part of the stages in the housing development process. Moreover, reducing people’s unsafe condition can also be done by strengthening local policies such as: supporting local economy development, applying building permits for safe construction, widen people’s access to local professional services of local engineers and architects, and widen consultations towards a safe and resilient construction. In China, Gao and Ji (2014) studied 2,403 rural counties using their seismic vulnerability model. They found that 17.4% of the sample belong to the vulnerable and highly vulnerable groups. Among the explanatory variables in their model include poor housing structure, dense population, and potentially high seismic intensity. In particular, they modelled the physical resilience of housing structures made of: reinforced concrete, brick with concrete pillars and poles or mixed, brick, wood, and other informal structures such as bamboo and grass as basic materials. They found that reinforced concrete is generally the strongest material, followed by mixed, brick, wood and others. In Pakistan, Schute and Kreutzmann (2012, p. 213) found that deficient access to basic infrastructure such as shelter and sources of safe drinking water heightened health problems. They also emphasized the need to use local materials and design and avoid repeating the failure of government housing models that did not find local acceptance.

Confirming the dimensions of vulnerability in the Province of Davao del Norte

The results contained in this sub-section support Objective No. 2. From a number of iterated models, the final model registered acceptable parameters statistic (see Table 3) based on critical thresholds prescribed by Schreiber, et al. (2006, p. 330): a CMIN/DF

Table 3. Fit Indices for the final model of vulnerability in the Province of Davao del Norte

Goodness of Fit Indices	χ^2	CMIN/D F	GFI	RMSEA	CFI	AIC
Critical threshold	>.05	<2	$\geq .95$	<.05	$\geq .95$	Smaller, the better
Obtained values	.000	1.83	.961	.047	.965	172.679

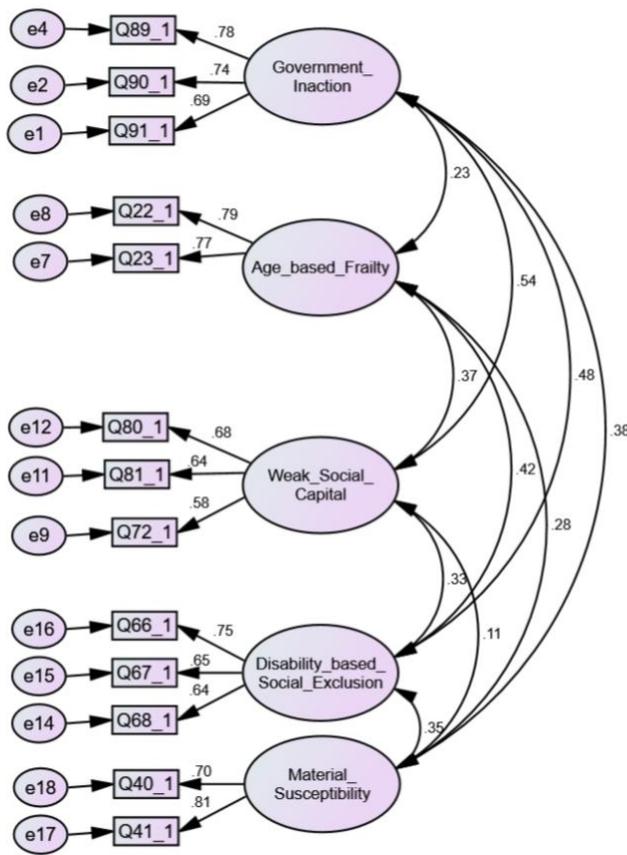


Figure 1. The final model of vulnerability in the Province of Davao del Norte

of 1.831 which is below 2.0 threshold, a GFI of .961 which is above the .95 threshold, a CFI of .965 which is above the .95 threshold, a RMSEA of .047 which is below the .05 threshold, and finally, a parsimony score (AIC) of 172.679 which is the lowest among the iterated models. Figure 2 depicts the final model using Amos software; while Table 4 shows the summary of fit indices from the five (5) iterated models. The fifth iteration serves as the final model. Nearly all fit indices were satisfied except for the Chi-statistic (χ^2) which is known to be sensitive to larger sample size. Moreover, Table 5 shows the corresponding Regression Weights of the factors in the model. It shows significant p-values of the regression coefficients. This is indicative of the robustness of the model.

Table 4. Summary of Fit Indices obtained

Goodness of Fit Indices	χ^2	CMIN/ DF	GFI	RMSEA	CFI	AIC
Critical threshold	>.05	≤ 2	$\geq .95$	<.05	$\geq .95$	Smaller, the better
The Null Model	.000	2.11	.926	.056	.928	364.113
Model Re-specification 1	.000	2.22	.930	.057	.932	330.878
Model Re-specification 2	.000	2.05	.937	.053	.942	311.876
Model Re-specification 3	.000	2.08	.940	.053	.943	279.657
Model Re-specification 4	.000	1.89	.955	.049	.959	203.173
The Final Model	.000	1.83	.961	.047	.965	172.679

Author's construction

Table 5. Regression Weights for the final measurement model of vulnerability in the Province of Davao del Norte

	Est.	S.E	C.R.	P	Label
Q91_1 <-- Government__Inaction	1.000				
Q90_1 <-- Government__Inaction	1.173	.102	11.485	***	Sig.
Q89_1 <-- Government__Inaction	1.165	.099	11.763	***	Sig.
Q23_1 <-- Age_based_Frailty	1.000				

			Est.	S.E	C.R.	P	Label
Q22_1	<--	Age_based_Frailty	1.114	.143	7.777	***	Sig.
Q72_1	<--	Weak_Social__Capital	1.000				
Q81_1	<--	Weak_Social__Capital	1.143	.143	7.997	***	Sig.
Q80_1	<--	Weak_Social__Capital	1.362	.168	8.115	***	Sig.
Q68_1	<--	Disability_based__ Social_Exclusion	1.000				
Q67_1	<--	Disability_based__ Social_Exclusion	.943	.102	9.207	***	Sig.
Q66_1	<--	Disability_based__ Social_Exclusion	1.179	.123	9.596	***	Sig.
Q41_1	<--	Material__Susceptibility	1.000				
Q40_1	<--	Material__Susceptibility	.872	.134	6.504	***	Sig.

Author's computation

The interrogated dimensions of vulnerability in the Province of Davao del Norte

This sub-section supports Objective No. 3 by exposing the discursive patterns detected from the policy arguments by State actors involved in DRR and agriculture in the Province of Davao del Norte.

Pattern 1: The Pressure-and-Release Model fits within the narrative of land-use changes in Davao del Norte.

Figure 3 illustrates the general narrative of land-use changes in the country, and in Davao del Norte in particular. According to the UN Food and Agriculture Organization (FAO, cited in Hammond, 1997) the country's forest area has declined from 12 million hectares in 1960 down to an estimated 5.7 million hectares. These remnants of the logging boom are located in steep and inaccessible areas. The country's timber harvests also

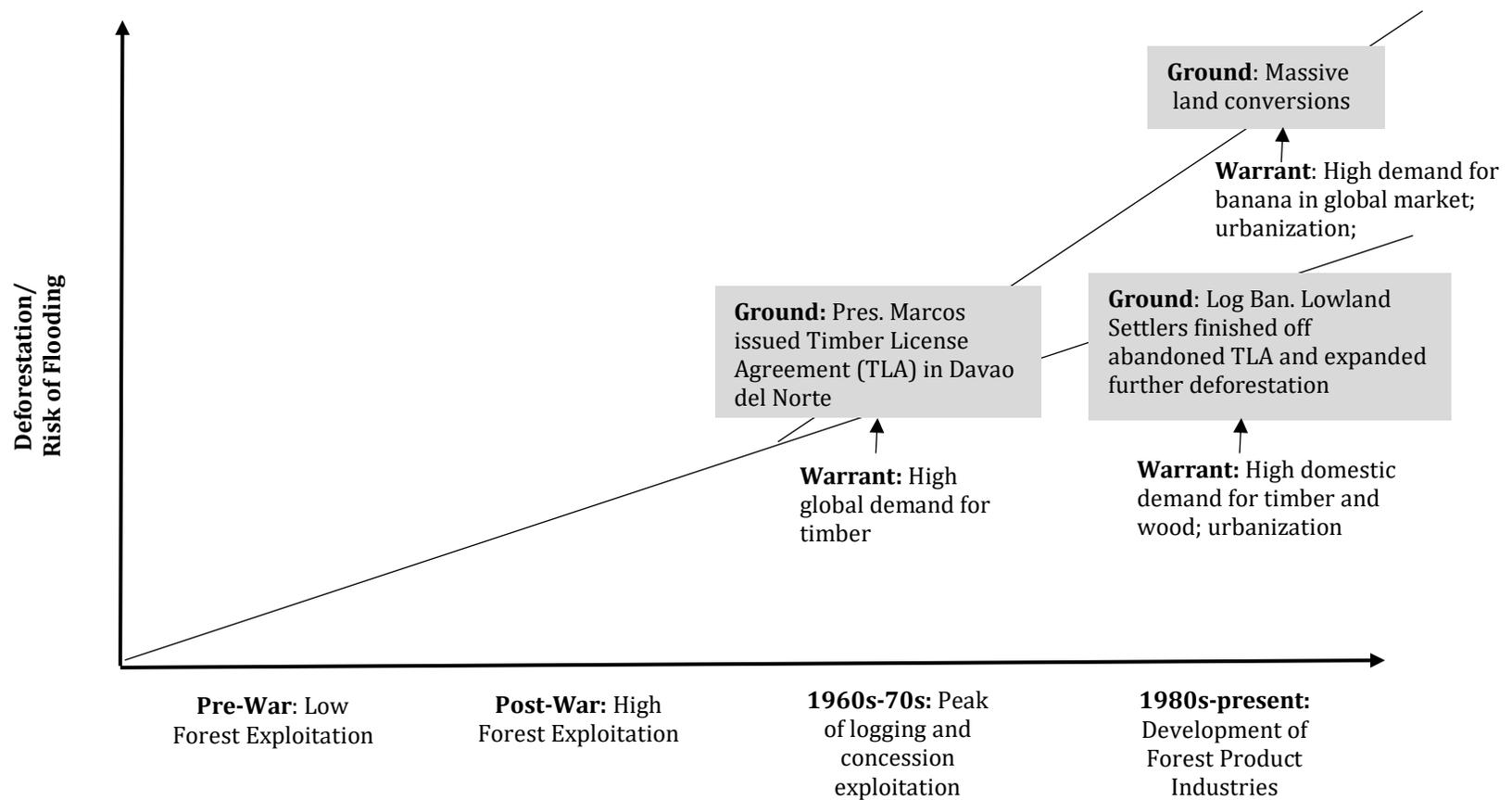


Figure 2. General narrative of forest land-use changes in the Philippines and Province of Davao del Norte (FAO 1997 timeline classification as cited in Hammond, 1997; FGD facilitated by the author)

declined from 6.4 million metric tons in the 1980s, down to just about 0.8 million metric tons in 1995. A policy was introduced in 1991 banning the export of timber, especially from virgin forests. However, amidst the ban, deforestation continued at about 150,000 hectares. Forest pressures come from shifting cultivation, land-use conversion, forest fires, illegal logging and 40 million metric tons of fuelwood harvested each year. The acute supply-demand gap in timber and wood since 1997 has made the Philippines a net importer of timber until today. FAO divided the country's forest land-use progress in four (4) phases, namely, Pre-War period, Post-War period, the 1960s-70s marked by peak logging exploitation, and the 1980s- onwards when development of forest product industries came into existence. In Davao del Norte, this phenomenon was observed:

“Deforestation in the province started in the 1960s. The government issued Timber License Agreement. It has a corresponding Sustainable Management Program. Our model was the best in Asia. The system is harvest rotation to ensure perpetual forest management. But, the DENR people taught the operators how to go around the policy, instead of ensuring the compliance of conditions attached to the TLA. When logging was banned, the lowland settlers came in and finished off what was left by logging concessionaires. They took advantage of the abandoned logging roads and expanded further to areas outside the defunct TLA. Their practice was indiscriminate. They were backed-up by local politicians in an effort to raise personal revenues, and a larger electoral base” (Lowland_DRRMO_9, Note # 8, Time Sequence 1:33:25).

The quote above confirms the report of Ross (2001) that the logging boom in Asia Pacific countries like the Philippines and Indonesia was heavily characterized by predatory behavior of politicians and their cronies. They controlled most of the operations involved in the traditional and modern timber industries. In the same vein, Borrás (2005) pointed out that the massive land clearing, even during those “timber rush” days have been within the frame of land deals or the industrialization and commodification of land. When examined using the Pressure-and-Release framework, the responses of FGD participants pointed to logging and banana industries as triggering dynamic pressures subsumed in the narrative of success. The global demand for these commodities triggers massive land conversions in the Province of Davao del Norte, from forested areas to open areas, to banana plantations. Nowadays, even rice farms are converted to banana farms, thereby reducing domestic rice production efficiency. Given large incentives structure, the key players of these industries have since enjoyed the favor of the local and national governments as they provide

employment and dollar revenues. For the provincial government, the banana industry in particular, provides revenues through Real Property Tax. As part of the larger discourse coalition, the key players of the industry have also long held critical political positions at all tiers in the government. This policy bias towards banana industry at the present, has encouraged small landowners to also convert their farms to banana plantations. Moreover, the opening of Chinese market for export bananas has engendered production penetration in the upland areas. Upland bananas are known to have longer gestation period due to gravitational constraints on water. Nonetheless, this has not spared the steep and rolling areas in Davao del Norte from land conversion to banana farms:

“Small banana growers are now planting bananas in rolling areas, even if it is prone to landslide” (Upland_MAGRO_4, Note # 2, Line 64).

This dynamic pressure at the residual forests as well as at the landslide prone areas in Davao del Norte has put a large swathe of population in an “unsafe condition”, at risk of landslide, flashfloods, and inundation by the time the monsoon season comes. For Wisner and Birkmann (2006), it is this bundle of “unsafe conditions” that makes people vulnerable to disaster. This vulnerability is not simply tied to their personal risk perception, or demographic characteristics; but to the larger development pattern as mediated by power imbalance in their society. Here, vulnerability is a political issue since it touches on the poor’s inability to influence the status quo and propose an alternative development trajectory. It is this “unsafe condition” that the vulnerable populace must escape from. Hence, any talks of resilience must not neglect the uncomfortable question of power, power imbalance, and marginalization.

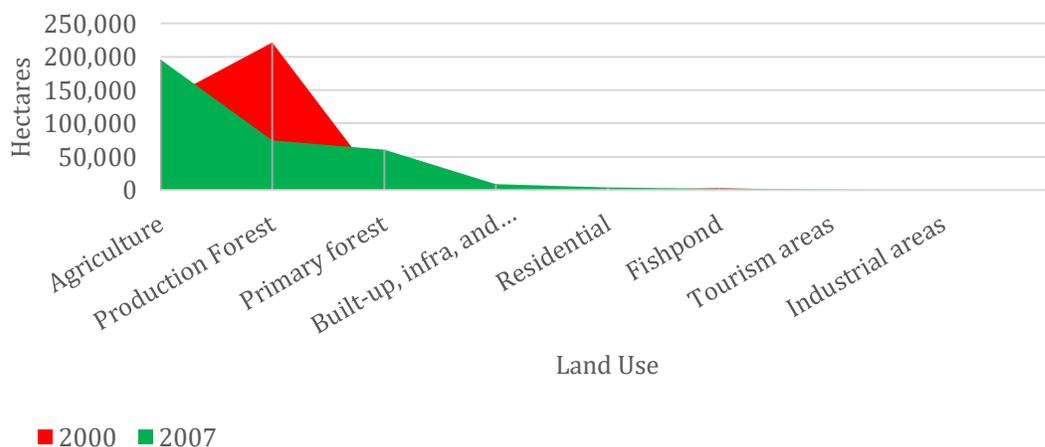


Figure 3. The changing land-uses in Davao del Norte, 2000-2007 (Provincial Planning and Development Office, 2015, p. 355)



Figure 4. Highland banana crops, Municipality of Asuncion, Davao del Norte, Philippines

Pattern 2: The discursive structure dominant in the local domain of disaster governance and the overall deforestation context in Davao del Norte are mutually reinforcing. In the preceding section, the author illustrated how “unsafe conditions” as vulnerability came to be in Davao del Norte. In this section, the author argued that the special bias in favor of logging in the past and banana crop in the present is reinforced by the framings dominant in the discourse of the local domain of disaster governance. In the structured policy argument analysis, the analyst traced how the rhetoric of disaster relates to the wider context of being a “banana capital”. In the words of Rojo (2003 cited in Aragón-Durand 2009, p. 194), “there exists a relationship between text and the context – the discursive practices of the discourse that allows us to judge, convince, inform, and understand social actions, institutional and policy contexts, as well as subjects’ identities and their interests”. Using Dunn’s lens on policy argument, local DRR staff adheres to the positivist framing of risk. Having been trained by National Government Agencies concerned with DRRM, they expressed support to the idea of risk as probability that can be managed, given levels of exposure (E), presence of Hazard (H), and magnified by levels of Vulnerability (V). They are also unanimous in attributing flood disasters to the deforestation of the mountains in the province:

[Claim] *“In our trainings, disaster risk is equal to exposure times hazard times vulnerability over capacity”* (Coastal_DRRMO_4, Note # 1, Time Sequence 14:10).

[Ground] *“The effect of deforestation is flooding. Because there are no more trees to absorb rain water. In the olden days, it usually took three days of continuous rains before our Municipality gets flooded; but now, it will take only a whole day rain”* (Lowland_DRRMO_9, Note # 10, Time Sequence 1:42:30)

From these two main elements the author traced several Warrants that support the Ground. Each Warrant also corresponds to the emergent themes arrived at using thematic analysis, where spoken and unspoken words and meanings were analyzed as part of the rhetorical devices employed by the FGD participants. These subtle rhetorical devices are reflective of their ethos, pathos, and logos within the larger rhetorical situation which is “banana capital”. In addition, the FGD also reveals that the capacity of the participants for self- reflection has allowed them to think of corresponding alternative explanations or Rebuttals to their claims. Rebuttals, as defined by Gasper and George (1997) could be either doubts or counter-arguments to modulate the assumed linear X-Y causal relationship. The first warrant asserts the manageability of increased run-off water through flood control projects and construction standards. Supported by significant statements, this warrant sits well with the hazard-centric paradigm in DRR that points to nature as the culprit of any disaster. However, as a Rebuttal, this warrant is contrasted by the view that flooding is not just about the inadequacy or lack of appropriate protection infrastructure in the province; but is largely caused by deforestation and massive land-use conversions to banana plantations. The second warrant expresses optimism in managing disaster risk through technical trainings, robust response protocols, and well thought contingency plans. This conforms to the behavioral paradigm in DRR which, coupled with the hazard-centric view, justifies the “natural-ness” of disasters; and that human coping behavior must surpass the hazard to be able to tolerate risks. Unfortunately, because of the top-down nature of State-sponsored DRR education, ordinary people passively resist the former’s epistemology, sensing the alienation of their indigenous knowledge system. The third warrant speaks of the traditional State-centric, “big stick” holder bias. In the subtle epistemological struggle, local DRR staff claim supremacy: from defining risk, to responding to risks, and underestimating ordinary people’s capacity to do the same. Unfortunately, FGD reveals that for local disaster staff, responding to disasters is primarily a managerial problem than a differentiated view of specific sector needs. Hence, while aware of the extreme vulnerability of children, the elderly, PWDs, mentally ill, and pregnant women, local DRR staff homogenously see them as herds of people that should follow evacuation orders; to be put en masse in crowded school gymnasium where basic comfort, sanitation, and privacy is not a priority. This situation highlights another DRR theme in the Philippines where top-down State policy action leads to absolute claim to DRR knowledge and sharpening power imbalance in actual practice. On the whole, the three warrants that support the positivist construction of risk amounts to a hero-villain normative duality frame; where local DRR staff consider themselves as hero, while ordinary people, the villain.

Synthesis

This sub-section interprets the findings in its entirety, proceeding through the sequentialist explanatory approach to mixed method of Creswell (2009, p. 209). Table 6 presents the over-all findings of this work: a comparison of views on vulnerability between the ordinary public and that of State actors involved in DRR. Column 1 lists down the sources of vulnerability from the ordinary people’s perspectives. This includes absence of government action in their community, age-based frailty, disability-based social exclusion, weak social capital, and material susceptibility. Column 2 lists down the dominant themes in the discourses of the local domain of DRR governance.

Table 6. Dimensions and themes in the vulnerability ideation processes in the context of Davao del Norte

Vulnerability from respondents’ perspective	Dominant discourse operative within the local domain of disaster governance
<ul style="list-style-type: none"> • Government Inaction 	<ul style="list-style-type: none"> • DRR can be explained through Behavioral Paradigm • The State is the Epistemic Hegemon
<ul style="list-style-type: none"> • Age-based Frailty • Disability-based Social Exclusion • Weak Social Capital 	<ul style="list-style-type: none"> • Hero-Villain Normative Duality Frame (where the State actors are the hero, the people in harm’s way are the villain)
<ul style="list-style-type: none"> • Material Susceptibility 	<ul style="list-style-type: none"> • DRR can be explained through Hazard Paradigm

Comparing the two general ideations of vulnerability, the author is convinced of the coherence between heightened vulnerability in the absence of government, and the absolute claim of the State actors as bearers of technical help. This is indicative of an awareness and acknowledgment from both sides that government is an indispensable policy actor in lessening people's vulnerability. Also, the researcher inferred coherence between the public's perception of material susceptibility as a source of vulnerability, and that of the State actors' claim on the primacy of hazard as the paradigm within which to interpret risk. This coherence acknowledges the agentic autonomy of nature in shaping and re-shaping itself; and that society has to adapt to it by way of choosing the right materials and design for human dwelling place.

However, the researcher also found certain gaps. On one hand, the public views age-based frailty, disability-based social exclusion, weak social capital, as human-centric sources of their vulnerability; on the other hand, State actors view the public as homogeneously impacted by disasters, that specific social needs of the children, the elderlies, or persons-with-disabilities are marginally responded to depending on budget availability. Generally, State actors see the public's disaster experience from a managerial perspective: a problem of social resistance and inadequacy of resources needed to address it.

On the whole, the State actors' ideation gives rise to the normative duality frame of Hero-Villain; where DRR State actors tacitly assumes the "Hero" role, while the public is assigned the "Villain" role. As Hero, they assume technical superiority in identifying and predicting hazards. Their privileged discursive positions enable them to impose what they think is right over public consciousness. In this framing, the alternative discourse of the public at the community level is dismissed as a form of risk ignorance; and their attempts to defy government technical instructions in favor of local knowledge, is dismissed as a form of public resistance. This framing is potentially harmful for ordinary people. The "unsafe conditions" (i.e. threat of flooding and landslide) in combination with weak social capital, enhance the vulnerability of children, the elderlies, and the persons-with-disability. Either State actors are blind to these nuanced social vulnerabilities, or they are fixated to elitist risk perspectives and approaches. Either way is a form of maintaining the Hero-Villain framing through a continuous marginalization of grassroots knowledge, voices, needs, and rights of the public to break-free from their "unsafe conditions".

To complicate the matter, the discourse of the “Hero” interacts with the uneven development pattern observed in Davao del Norte. In particular, the inequitable land-uses in favor of export commodity crops, like timber and banana, is reinforcing deforestation. Instead of responding to these sources of vulnerability at the meso-level, the discourse of State actors in charge of the DRR and agriculture sector tend to support this uneven development by toning down its negative impacts on communities. This is justified by export revenue, increased household incomes, and global competitiveness. This denial is evidenced by their dominant epistemology on DRR as more of a hazard and behavioral problem, than a question of “unsafe conditions”. Hence, the “Villain” who does not have a sense of reality and is technically ignorant, must be “educated” according to the elitist, positivist, technocratic paradigm. In a Foucauldian sense, the positivist discourse of DRR has linked up with the neo-liberal discourse of globalization to create meanings that led to the imbalanced power relations within society; and consequently, shape the acquiescent behaviors of people both within and outside the State structures. The grand narrative of “timber exporting province in the 60s,” and “the banana capital” of today are motivated by the pursuit of narrow development goal of poverty alleviation measured in improved incomes. From the results of the FGD, as well as from the direct observations of the researcher, this discourse is widely shared by a coalition largely entrenched in the State policy venues. The location whence this discourse is produced, reproduced, and transported makes it a “truth” that convinced other people to accept. This creates enormous power to those “who speak the truth” as this discourse become intimately embedded in social networks. It is this “truth” that the local domain of disaster governance assumes to speak with authority and affords them the Hero-sense. Within this “truth” certain expressions of social standards are allowed as it determines “what people know, what they hold for true, and how they behave accordingly” (van de Ven, 2012, p. 5).

These findings necessitate the strengthening of the DRR national policy at two fronts: 1) ensure that the Social Sciences be equally represented in the proposed National DRR Department. The draft policy creating such a national department, House Bill 8165, is largely an agglomeration of natural sciences bureaus currently existing at the different departments such as the Mines and Geo Sciences Bureau (MGB) from the Department of Natural Environment and Natural Resources (DENR), the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) under the Department of Science and Technology (DOST); also included are existing highly regimented bureaus such as the Bureau of Fire Protection (BFP) from the Department of the Interior and Local Government (DILG), Office of Civil Defence (OCD) currently attached at the Department of National Defence (DND), among others. A lopsided mix of professional practitioners manning the new Department might only reinforce the technocratic, top-down approach to DRR, perpetuating the Hero-Villain normative duality frame. 2) The adoption of a National Land-use Act that limits the use of steep upland areas, riverbanks, and select coastal areas primarily for protection forestry. Its long absence in the Philippine legal system (although there are Department Orders and Bureau Memos to that effect) has allowed unplanned development to encroach and penetrate these crucial areas, leading to tragedy of commons and other public bad, the recent examples were the landslide in the City of Naga, Cebu Province, and the "cesspool" state of Boracay before its rehabilitation in 2017. Given high social inequality and power imbalance prevailing in the Philippines, this encroachment and penetration of critical public spaces are made possible by local politicians or well-connected moneyed businessmen. These wanton disregard for the safety of people in the name of business and profit in response to global demands (for example, timber and bananas) is the root cause of people's vulnerability to disaster.

Conclusion

Based on the above findings, the researcher holds the following conclusions: first, not all factors of vulnerability suggested by the literature is true in Davao del Norte. Of the long list of variables, EFA results show only five (5) indicators as relevant to the context of the research locale. This means, vulnerability varies from one context to another, and that outside observers must be careful in measuring disaster risk using reductionist measurement tools. Second, depending on its quality, development can be a source of vulnerability. Mediated by power imbalance within a society, development can be hostage to vested interests that may create dynamic pressures and unsafe conditions for the powerless and marginalized. And if State actors are silent on assigning blame to these vested interests, it is because they are caught up in a rhetorical situation where some things are “unsayable”. Finally, the risk to flooding confronting the people in Davao del Norte is hardly escapable. State actors view themselves as the Hero, while the ordinary public are viewed as the Villains. This normative duality frame is a paradox: the Hero must continuously marginalize grassroots knowledge, their voices, and their needs, to prevent them from genuinely breaking-free from their “unsafe conditions”. Otherwise, the Hero-sense will vanish as soon as the Villains get empowered.

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