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## Analyzing the National Disaster Response Framework and Inter-Organizational Network of the 2015 Nepal/Gorkha Earthquake

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### Abstract

This paper analyzes the activation of the National Disaster Response Framework (NDRF) following the 2015 Nepal/Gorkha earthquake. Among the important policy areas regulated by the NDRF is the mechanism for inter-organizational coordination and cooperation, including that with international organizations. Regarding this, inter-organizational network modeling is performed with the use of social network analysis to identify structural gaps and on-the-ground inter-organizational cooperation previously undetected by the Nepali framework and/or stand-by arrangement of humanitarian organizations. Furthermore, a brief analysis of humanitarian operations' performance and findings from the ground are also presented in the paper. The research found that the coordination mechanisms and mandatory emergency response operational activities outlined in the NDRF were partially implemented during the six months after the earthquake. As the network model suggests, the NDRF failed to capture the potential of local non-governmental organizations and communities as potential responders, although in reality they also collaborate with international organizations to provide emergency relief and may serve as potential key actors in post-disaster recovery.

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### 1. Introduction

In the intertwining efforts of multiple disaster management and humanitarian organizations, the search continues for the optimum cooperation process and coordination structure [1] [2] [3] [4]. This search is important due to the following challenges in the disaster and humanitarian fields: 1) an increase in disaster occurrence and scale [5] [6] [7] in the face of diminishing global resources for disaster risk reduction, emergency response, humanitarian operations, and post-disaster recovery [6] [7]; and 2) a significant reduction in official development assistance from major donors for disaster relief and its continuation for the 2012–2015 period [6]. Nevertheless, as many scholars and practitioners report, the number and variety of actors or organizations involved in the fields of disaster risk management and humanitarian operations are increasing. In addition, the inter-relationships between these players also include an unexplored space for improvement in the disaster management and humanitarian spheres where non-core actors, such as the private sector, military, and diaspora groups, need to be invited into the institutional processes [5] [3] [7]. That being said, empirical research on emergency responses to disasters is necessary to capture the reality of multi-organization interventions and determine effective emergency responses.

The timing of the 2015 Nepal/Gorkha earthquake could not have been more strategic as it occurred approximately one month after the 3rd World Conference in Disaster Risk Reduction in 2015 and the first World Humanitarian Summit in 2016. It can provide a critical case study for both initial evaluations of the agreed Sendai Framework for Disaster Risk Reduction and a timely subject for real-time evaluation in line with the humanitarian transformation agenda, including fresh observation of the

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performance of the humanitarian cluster and its inter-relationship with local disaster relief and humanitarian actors. Prior to 2015, scholars and practitioners alike worried about the next “big earthquake” that could strike Nepal, though the country had not experienced a major earthquake for 75 years [8]. Therefore, the 2015 Nepal earthquake may have been what Birkland describes as a “focusing event,” which can facilitate greater awareness and learning within policy systems at the international and national levels [9].

Nepal’s institutional setup for disaster management dates back to 1982, when the country already had the Natural Calamity Relief Act in place. In terms of disaster response, the latest policy paper pre-2015 was the National Disaster Response Framework (NDRF), enacted in 2013. The disclaimer of the framework mentions that it was prepared to ensure the effective coordination and implementation of disaster preparedness and response activities by clarifying the roles and responsibilities of government and non-government agencies involved in disaster response in Nepal [10]. The NDRF has domestic legal power and at the same time incorporates development in the international humanitarian consensus, e.g., it includes the UN-led and Inter-Agency Standing Committee (IASC) humanitarian cluster approach. Therefore, we decided to use the 2015 Nepal earthquake as a “focusing event” and specifically look into the “learning points” identified in the implementation of the NDRF. Specific focus is placed on the inter-relationships between government and non-government organizations, national and international organizations, and traditional and non-traditional organizations in the disaster relief and humanitarian fields.

As such, there are two objectives in this paper: first, to provide an overview of the implementation of the NDRF following the 2015 Nepal/Gorkha earthquake; and second, to map out and model the network of organizations involved in the emergency response, as predictor to the extent of which the NDRF implemented. Accordingly, this paper is intended to answer the following research questions: 1) How was the NDRF implemented following the 2015 Nepal/Gorkha earthquake? 2) What are the characteristics of the inter-organizational network shaped by multi-organizational intervention during the emergency response? Furthermore, although still at preliminary stage, a brief analysis of the system-wide humanitarian operation performance will be presented.

## 2. Research Approach and Methodology

This paper is a mix of both qualitative and quantitative analyses. First, the paper qualitatively analyzes the content of the NDRF and via process-tracing looks at its implementation, verified by evidences from multiple sources. This qualitative analysis follows the procedure of data coding, exploring, describing, explaining, and drawing and verifying conclusions [11]; this is combined with guided process-tracing for analyzing catastrophes as “focusing events,” which may induce a “learning process” and open up a “policy change window of opportunity” [9]. As a side note, our original intention was limited to the learning process of disaster policy implementation in an actual disaster setting, and not the determination of subsequent policy change.

Quantitatively, the paper employs the first iteration of Social Network Analysis (SNA) to model the inter-organizational network present during the 2015 Nepal earthquake emergency response. SNA is the study of the structural relationships among interacting network members (individuals, organizations, etc.) and how those relationships produce varying effects [12]. SNA is known for its versatility in answering research queries in the fields of disaster management and humanitarian affairs, e.g., in Hurricane Katrina [13], the West Java earthquake 2009 [14], the West Sumatra Earthquake 2009 [15] and the Great East Japan Earthquake and tsunami of 2011 [16].

In this paper, SNA was performed using UCINET Version 6 [17], which helped to present the near-actual network of multiple organizations present during the emergency response to the 2015 Nepal earthquake, not by its conceptualization of the NDRF, but via a relational database. Furthermore, SNA provides measurements of complete network structures, whereby the values of degree centrality, betweenness centrality, closeness centrality, and network density can be presented. Degree centrality is a measurement of an organization’s level of involvement or activity in the network; it calculates the number of immediate contacts an organization has in a network [18] [19]. Betweenness centrality is a measurement of the extent to which an actor is located in the direct path of communication exchange between two other actors in the network [18]; it calculates how many times an actor sits on the geodesic (shortest path) linking two other actors, i.e., it can indicate the potential control an actor has over the flow of information or show the organizational leaders in a network [19]. Closeness centrality can be seen as a measure of an actor’s independence, which can also uncover how a network can quickly and efficiently relay messages through the group. It considers the entire network of ties when calculating the centrality of an individual actor [19]. Lastly, network density refers to the extent to which all individual actors in a network are linked together. It counts how many actual ties exist in a network and expresses this number as a proportion of the potential ties that could exist in the network [19].

Accordingly, the data collection method for this research included a mixture of desk-study, fieldwork, and unstructured interviews with key informants in Nepal. The desk-study included collecting disaster response reports, policies, and activity records related to the emergency response to the 2015 Nepal earthquake, with the dataset mainly coming from the situation reports released by UN-Office for Coordinating Humanitarian Affairs (UNOCHA), humanitarian financial tracking system (FTS) by UNOCHA as of April 3 2016, and Social Welfare Council (SWC). From the UNOCHA situation reports and FTS, to be accounted for SNA dataset, an emergency response activity must clearly mention the name of donor (both funding or in-kind support), project owner and implementing partner; thus the Authors verified the existence of identified organizations through the internet and to Nepali government registration. Unmet humanitarian pledge, support from foreign government to their own governmental agency and activities that claim unidentifiable ‘various recipients’ were not included in the SNA dataset.

According to the Nepali law, all 39,763 local NGOs and 234 international NGOs must periodically acquire license and report to the SWC of their activities, and following the 2015 earthquake the SWC instructed all registered Nepali and international NGOs to report their humanitarian activities.

To complement and enrich the data, two fieldworks were done in September 2015 and March 2016, where the authors is part of a multi-disciplinary research team dispatched by the Hyogo Prefecture in Japan, including from Kobe University. The team visited several earthquake-affected areas including Kathmandu metropolitan area (special district), Gorkha District, Bhaktapur District, and Nuwakot District. The key objectives of the fieldwork were: 1) confirmation of disaster situation reporting systems/practices in Nepal from the central and local governments' points of view, and 2) collection of stories about coordination and cooperation between multiple organizations during the emergency response to the earthquake. During the fieldwork, the research team also conducted key interviews to total 39 agencies/organizations, including: academic (1 organization), beneficiaries at refugee camp and affected schools (5), ministries of central government (5), diaspora group (1), international non-government organization (NGO) (6), international organization (1), local/Nepali NGO (6), local government unit (5), media (2), political party (1), private company (3), and agencies of the United Nations (UN) (3).

### 3. A Brief on the National Disaster Response Framework (NDRF)

Flashing back to 20 months before the 2015 earthquake, the Ministry of Home Affairs (MOHA) completed and enacted the aforementioned NDRF. It states that in the Nepali context, a national disaster response means “*actions taken immediately before, during and after the disasters, or directly to save lives and property; maintain law and order; care for sick, injured and vulnerable people; provide essential services (lifeline utilities, food, shelter, public information and media); and protect public property*” [10]. The framework has eight sections with main components that regulate the national system for disaster response, arrangements for international assistance, the coordination structure of national and international assistance, special operation arrangements for national disaster response, the national framework for disaster response, and necessary future courses of actions for emergency preparedness.

Parallel to the enactment of the NDRF, IASC in 2013 also setup the Nepal Inter-Agency Contingency Plan. The plan objective is to ensure a coordinated response by the IASC which complements national efforts for human survival and wellbeing. The contingency plan listed two disaster scenarios that might occurs in Nepal where international assistance will be required. As complement to governmental disaster response framework, it also listed the overall coordination arrangements, humanitarian clusters designation lead agencies as well as common strategies for international humanitarian partners. The document was a brief one and become the basis for each humanitarian cluster in Nepal to develop its own contingency plan collaboratively with government focal point.

Although the framework does not clearly define the type and scale of disaster that may activate it, it is clearly stated that the NDRF can come into effect immediately after approval by the cabinet, as recommended by the Central Natural Disaster Relief Committee (CNDRC), which is composed of line ministries, NGOs, and international organizations. This was in contrast to the clear existence of scenario of a major earthquake affecting Kathmandu Valley, outlined in the IASC 2013 Inter-Agency Contingency Plan. Subsequently, the cabinet may appeal for international assistance, which on paper will be done only through the UN and Red Cross. In such a case, Nepal will clearly commit to international humanitarian guidelines, including the cluster approach.

Under the NDRF, it was intended that the CNDRC would assume the highest coordination responsibility and the highest apparatus would be the National Emergency Operation Center (NEOC) of MOHA. NEOC/MOHA would thus manage communication and coordination with the Onsite Operation Coordination Centre (OSOCC) for coordination with UN agencies, Red Cross affiliated organizations and other civilian organizations of humanitarian clusters, as well as with the and Multi National Military Coordination Centre for coordination with military and para-military organizations. Furthermore, in the humanitarian cluster arrangement, both the lead agency from the government side and the co-lead agency from the UN or international NGOs are pre-determined, at least in national level. This arrangement was also endorsed in the inter-agency contingency plan.

Lastly, the NDRF defines 61 emergency response operational activities that must be implemented as a consequence of its activation, and assigns responsibility to certain lead agencies for implementation using the following timeline: 0-1 hour, 0-7 hours, 0-24 hours, 24-48 hours, 48-72 hours, 72 hours-7 days, 7 days-2 weeks, and 2 weeks-1 month after a disaster. Indirectly, the NDRF assumes the return to normalcy after one month. The 2015 earthquake marked the second activation of the NDRF, with the landslide and flood of August 2, 2014, being the first. However, it was the first activation for an earthquake and the first to engage all humanitarian clusters.

### 4. The 2015 Earthquake: Analyzing NDRF Activation and Direct Impact to Humanitarian Operation

The 2015 Nepal/Gorkha earthquake occurred on April 25, 2015, and had a magnitude of 7.8. It was followed by smaller aftershocks over one month, before a final, major aftershock occurred on May 12, 2015, with a magnitude of 7.3. Altogether, in the span of one month, the earthquakes caused 8,569 deaths, over 100,000 injuries, and as of September 2015, 384 missing persons. In terms of the extent of damage, out of Nepal's 75 districts, 14 were severely affected, especially in the central and

western regions; the districts are home to about 5.4 million people. The disaster also destroyed over 500,000 houses and damaged a further 269,000, from which, as of September 2015, some 95,100 people remain displaced and sheltered in sites across 12 of the 14 districts affected by the earthquake [20]. From day one after the main earthquake, the cabinet of Nepal declared a state of national disaster and appealed for international support.

As confirmed by multiple evidences, following the earthquake, by 14:00 local time (two hours' post-earthquake), a meeting of the CNDRC was conducted where several major policy decisions were made, including: acceleration of search and rescue and relief operations in a timely and effective manner, standby policy on free medical treatment, and activation of all government and non-government agencies. Afterwards, by 16:00 local time, the following key cabinet decisions were made: 1) a state of emergency was declared in the 14 affected districts; 2) an international appeal was made for effective search, rescue, and relief; 3) the prime-minister relief fund was mobilized; and 4) the decisions by the CNDRC were endorsed. Subsequently, a central command post was established and headed by the home secretary. In addition, "special power" was given to the chief district officers (CDOs), as per the Basic Goods and Services Control Act, 2017BS and the Natural Disaster (Rescue) Act, 2039 BS, to handle basic utility services and make search, rescue, and relief operations more effective.

Based on documented reports and confirmed through interviews during fieldwork, out of 62 mandatory emergency response operational activities, 30 were performed in accordance to the timeline set by the NDRF, 17 were implemented-but outside of the NDRF timeline or with some negative notes on its implementation (based on interviewees statement and field observation) and 15 were not implemented at all. Emergency response activities that were implemented timely include the DDRC meeting, CNDRC meeting, appeal for international support, activation of search and rescue operation, coordination setup for receiving international support at the Tribhuvan International Airport, as well as the processes that requires communication with the UN/HC and IASC humanitarian clusters. These activities have pre-established standard operating procedure at NEOC, which also understood across the ministries. The fact that telecommunication was fully functional made those measures can be taken smoothly.

On the other hand, there were also some emergency response activities that implemented with heavy criticism or not accordance to the timeline set by the NDRF. One of the most visible was absence of government own situation report mechanism implemented, despite the Nepali government had a situation reporting procedure outlined in one of the NEOC standard operating procedure [21]. All government top-level officials interviewed states such reporting was not available and admitted that the government very much rely on situation reports and 3W/4W matrix provided by the humanitarian clusters. In the MOHA own report, one-month after the earthquake, it simply listed coordination meetings of the OSOCC and MNMCC without acknowledging the existence of government own situation report mechanism [22]. In addition, NEOC Sahana disaster management system was also out of date and did not provide public reporting on the extent of disaster and rescue efforts. On the other hand, it was the SWC which asked all Nepali and international NGOs to report their emergency response activities and set up a high-level committee for disaster management and coordination. However, due to the absence of authority and SWC was not mentioned in the NDRF, some of the organizations interviewed said that even though they were aware with the instruction from SWC. They were unsure as to the reason MOHA did not consolidate reporting process done by the SWC and merge it with the humanitarian clusters matrix. This issue also made weak formal media communication.

Some other emergency response activities that implemented with some limitations were late rapid assessment on the critical facilities, such as school and hospital, as well as temporary shelter setup in the pre-determined safe and open evacuation sites; e.g., in the internally-displaced-people (IDPs) camp in Nuwakot District visited by authors. The camp sheltered IDPs from Salme, Bhalche, and other villages in Nuwakot, as well as Haku village from Rasua District. Altogether there are people from 14-15 VDCs, comprises of 300 temporary shelters, 304 families, and 1,375 people. Authors managed to interview one of the members of the Committee which manage the camp, distribute, and coordinate support from donors or NGOs that came to the camp distribute it to the beneficiaries, as well as some beneficiaries. The camp itself started approximately one week after the earthquake in April 2015 whereas at the beginning people gathered tarpaulin from any sources they can get and later each family received tent; although as of September 2015 some of the families still living in the tarpaulin and yet to receive temporary shelter. The IDPs received non-food items (NFIs) support from Share & Care Nepal, temporary toilet and sanitation facilities from KOICA and the Red Cross. In addition, multiple NGOs came to the camp site and distributed food and other NFIs items, without standardized mechanism in place for monitoring the quality of food and NFIs. According to the Committee member, basically those NGOs which came to the camp site already possessed permit from the District government, contacted the camp Committee, and thus together distributed the in-kind help.\*

As of September 2015, the IDPs basically still in doubt and looking for active discussion with the government or whether or not they can start rebuilding their communities at original village due to the risk of landslide in there. The situation put the IDPs in difficult situation as the public service in the camp site is lacking, e.g., access to emergency education for the children, and that they cannot get access to the Nepalese government financial support for housing reconstruction. In specific to education cluster, although it was true to claim that exactly one-month after the earthquake children returned to school, but the quality of temporary learning centers in general was poor and not supportive to a normal education activity.

From the system-wide perspective of humanitarian operation, according to one report, the fulfilment of humanitarian

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\* Interview with Key Person F, 25 September 2015.

operation targets in each cluster reached 130% for food security (out of 1.4 million people targeted, 1.8 million were reached), 50% for health (5.6 million targeted, 2.8 million reached), 40% for shelter (1.9 million targeted, 762,300 reached), 25% for WASH (5.2 million targeted, 1.3 million reached), 24% for camp coordination and management (400,000 targeted, 95,100 reached), 10% for nutrition (323,000 targeted, 32,000 reached), 36% for protection (2.8 million targeted, 1 million reached), and only 1% for the education cluster (1 million people targeted, only 13,700 reached) [20]. The above-mentioned performances were achieved with about 55% humanitarian flash appeal fulfilment out of the US\$422 million requested for humanitarian operations [23]. International observers noted that in the span of five months' post-earthquake, daily activities in most of the affected districts were beginning back to normal, with visible normal market activities and essential public services. To some extent, this was also confirmed by our research visit in September 2015, although with some limitation and under-estimation in educational activities and IDPs camps' essential livelihood support. Furthermore, as tourism is one of the key industries in Nepal, the research team also observed rather limited support in place for accelerating heritage site reconstruction, which in turn will delay the recovery of tourist numbers in Nepal.

The NDRF was indeed put the response very much in line with the international mechanism of humanitarian response, and greatly made response by international organizations visible. However, it was at the expense of limited involvement of Nepali organizations, in directly tapping massive cash and in-kind donation to Nepal. It should be noted that out of the \$422 million consolidated humanitarian appeal by 78 humanitarian organizations, only 0.8% of the funds directed to Nepali organizations or about \$3,503,842 of the funded humanitarian appeal went to Nepali organizations, and it was only concentrated in shelter, WASH and education clusters [24]. That being said, instead of focusing on harmonization with efforts from abroad, the core issue was the NDRF did not recognize the potential of Nepali NGOs. Directly advertise or push the local organizations to tapped in to the complicated humanitarian appeal process is also not the solution, instead it is within the task of the domestic government and organizations themselves to make itself visible and capable of accessing the humanitarian funding.

Another dimension for analyzing the system-wide humanitarian response operations performance is on the coherence to the operation, including the perception as to when the emergency response ended. On this, Authors reckon forced closure of emergency response period within one month after the earthquake by the government. It was true in terms of the success of completing post-disaster needs assessment and the success of organizing a donor conference for earthquake reconstruction in July 2015. However, all was done without the government have their own version of composed situation reports, or at least in accordance to objective analysis of MOHA's NDRF. In reality, and based on statements by multiple key-persons from UN agencies, Nepali NGOs and international NGOs, the "actual emergency response" mode was effective until the end of December 2015 and January 2016 in some of the clusters, e.g., education cluster.

At this stage, it can be said that without clear guidance on the exit-strategy or response closure parameters in the NDRF, there are direct implications in the overall emergency response performance: 1) by September 2015 IDPs did not understand their position and felt disconnected with the recovery process, 2) by March 2016, even inside Kathmandu, Authors still identify sub-par refugee camp, 3) in education cluster, while the target to return most of students to school after one month, their TLCs facilities were dissatisfied by September 2015 and transition to permanent schools were lagging behind as of March 2016, 4) generally unclear transition to Nepal reconstruction authority (NRA), i.e., while the NDRF gave clear reference of the ultimate focal point in the response, absence of operation closure parameters made MOHA in limbo when the time frame of the NDRF finishes.

## 5. Inter-organizational Network Model of Emergency Response to the 2015 Nepal Earthquake

In the aftermath of the earthquake, humanitarian clusters activated, with all 11 clusters being on the ground, reaching 341 agencies and 2,591 humanitarian activities as of May 2015. The arrangement of cluster leads and co-leads can be seen in Table 1 below. However, one interesting point is that in addition to the activation of humanitarian clusters, the government of Nepal also assigned specific ministries to procure relief items. To date it is not clear how these additional ministries worked with the humanitarian cluster lead/co-lead, especially on procurement and distribution.

On paper, at the national level NEOC belongs to MOHA and is supposed to play a central role in national-level disaster management, supported by CDOs, village development committees, and UNOCHA. The NEOC enables both the establishment of the various sectoral clusters and inter-cluster coordination; however, it still needs to be tailored to the Nepali context [25]. Furthermore, at all governmental levels, the coordination body for day-to-day disaster management is the Disaster Risk Reduction Committee (DRRC) (i.e., the national DRRC or district DRRC).

According to a MOHA official, the response during the 2015 Nepal earthquake through the cluster approach was led by the ministry, and NGOs and UN agencies worked as co-leads. Coordination meetings were conducted every week and MOHA shared all information with cluster members. Twice the officer himself conducted inter-cluster meetings, but they were very crowded. Then, MOHA asked the parties to have separate cluster meetings, advising them to make decisions at the meetings and report to the government.<sup>†</sup> In terms of the coordination mechanism, the international appeal was not entirely channelled through the UN system, but also bilaterally and regionally through South Asian Association for Regional Cooperation.

<sup>†</sup> Interview with Key Person A, September 23, 2015.

Table 1. Humanitarian Cluster's Activation in Emergency Response to the 2015 Nepal/Gorkha Earthquake

Humanitarian Cluster	Government Lead Agency	IASC Country Team Counterpart
1) Search and Rescue (SAR) and logistics	Ministry of Home Affairs (MOHA)	World Food Program (WFP)
2) Health	Ministry of Health and Population (MOHP)	World Health Organization (WHO)
3) Water, Sanitation and Hygiene (WASH)	Ministry of Urban Development (MOUD)	UNICEF
4) Nutrition	Ministry of Health and Population (MOHP)	UNICEF
5) Emergency Shelter	Ministry of Urban Development (MOUD)	International Federation of Red Cross (IFRC)
6) Camp Coordination and Management	Ministry of Urban Development (MOUD)	International Organization of Migration (IOM)
7) Food Security	Ministry of Agricultural Development (MOAD)	World Food Program (WFP)
8) Education	Ministry of Education (MOE)	UNICEF
9) Protection	Ministry of Women, Children and Social Welfare (MOWCSW)	United Nations Population Fund, IOM
10) Emergency Telecommunications	Ministry of Information and Communications (MOIC)	World Food Program (WFP)
11) Early Recovery	Ministry of Federal Affairs and Local Development (MOFALD)	United Nations Development Program (UNDP)

All interviewees said that coordination and decision making in the emergency response also went through the DRRC at all levels. Most of them said that humanitarian cluster members basically just integrated into the DRRC mechanism and participated in the coordination meetings organized by each DRRC; this went well according to the key actors interviewed. However, at the local level, updating and monitoring of emergency responses by local and national governments was not implemented. For example, the Nepal Red Cross Society in Nuwakot district admitted that coordination was done through the district DRRCs; they were also a part of this and acted as co-lead in several clusters, e.g., WASH, shelter, and protection. But they stated that reporting was mostly done through the humanitarian cluster 3W/4W matrix instead of governmental forms.

For the purpose of the analysis, the Authors input the actual emergency response activities from multiple actors dated from April 2015 until January 2016. SNA modelling used the dataset, consolidated from three credible sources, contains 468 sample of emergency response activities and 317 sample of organizations. The emergency response activities sample was a consolidated one combines activity from all humanitarian clusters, e.g., from search and rescue until post-disaster need assessments and early recovery. The sample organizations are 19 Nepal government agencies, 75 Nepali NGOs, 144 international NGOs, 21 agencies of the UN, 3 military unit, 45 foreign government agencies and 10 other type of actors (including private company).

Figure 1 shows the inter-organizational network model for the 2015 Nepal/Gorkha earthquake emergency response, drawn in "valued" and "directed" mode, i.e., the frequency/intensity of the relationship was calculated, and the direction of relations can be identified, whether one-way or two-way. Within the network, there are 618 ties, and each type of organization is colored differently. From the SNA measurement, it was found that the network density was at 0.008, degree centralization at 0.185, fragmentation at 0.780, and compactness at 0.080. This means the network has several sub-groups and is not fully connected as a whole.

As Figure 1 suggests, sub-groups in the network were centralized to the co-lead agency of each humanitarian cluster, which was also confirmed by the value of degree centrality and betweenness centrality of those agencies: UNICEF (degree centrality: 62.00, betweenness centrality: 11949.000), IFRC (degree centrality: 35.00, betweenness centrality: 3639.499), WHO (degree centrality: 23.00, betweenness centrality: 4113.330), UNFPA (degree centrality: 23.00, betweenness centrality: 3487.828), UNDP (degree centrality: 19.00, betweenness centrality: 2495.385), WFP (degree centrality: 16.00, betweenness centrality: 2606.847), and IOM (degree centrality: 15.00, betweenness centrality: 2326.015). In the case of UNICEF, their high values for degree centrality and betweenness centrality were due to their role as co-lead in the education, WASH, and nutrition clusters. On the other hand, the actual lead agency from the government side in all humanitarian clusters was recorded as having a low degree of centrality and betweenness centrality since they mainly maintained relationships and cooperation with their co-lead, in addition to direct intervention on the ground by providing emergency relief themselves. Nevertheless, among the line ministries, MOHA (degree centrality: 16.00, betweenness centrality: 1143.312), MOHP (degree centrality: 17.00, betweenness centrality: 649.449), MOUD (degree centrality: 5.00, betweenness centrality: 367.402) and MOAD (degree centrality: 6.00, betweenness centrality: 190.005) were the national government agencies with the highest degree of centrality and betweenness centrality.

Furthermore, the network shown in Figure 2 also reveals 75 Nepali NGOs and 144 international NGOs that were not considered in the NDRF. In particular, the NDRF did not target any coordination with local/Nepali NGOs. Most of the Nepali NGOs operated in the education, nutrition, health, and emergency shelter clusters. Many international NGOs also collaborated with Nepali NGOs to deliver emergency relief, and following the 2015 earthquake, a coalition of Nepali NGOs developed an

independent coordination website to promote collaboration from abroad. Nevertheless, their presence and cooperation with private company or diaspora groups were not as strong as in other recent disasters.

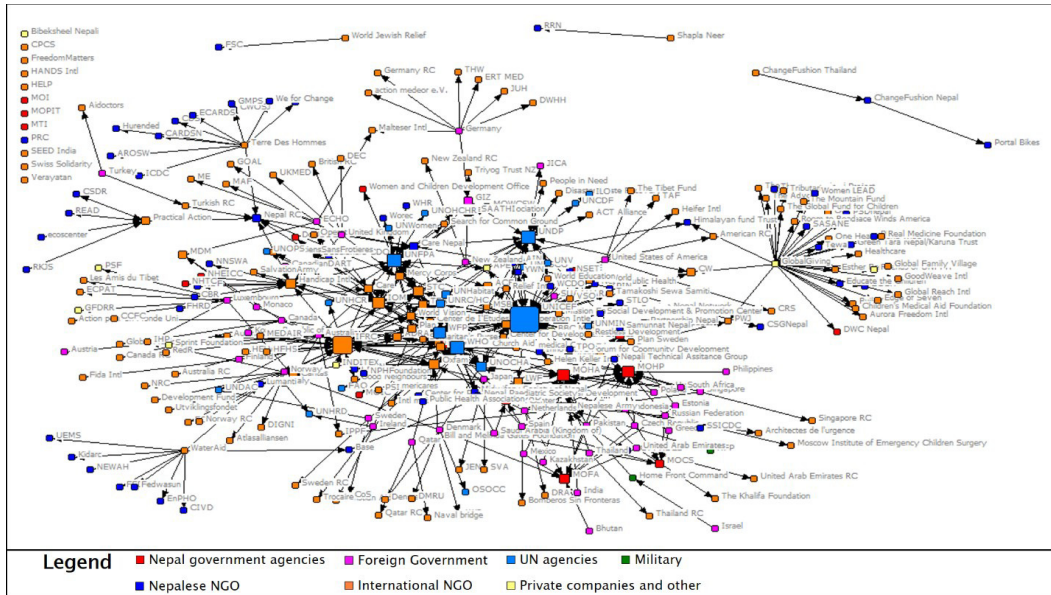


Fig. 1. Inter-organizational Network during the Emergency Response to the 2015 Nepal Earthquake.

The network also shows the presence of some potential humanitarian donor managed privately but still connected to the overall humanitarian organizations network and being accounted in the UNOCHA financial tracking services, such as the Global Giving. The Global Giving was able to raised up to around US\$ 5 million funding from 42,239 donations, and channelled it to 36 organizations, from both Nepali and international NGOs [26]. On the other hand, the network also captures some sub-network that totally disconnected from the overall humanitarian organizations network and those with stand-alone projects. On the first one, the case of sub-network of ChangeFusion Nepal shows the presence of support from abroad, channelled via cooperation between two Nepali NGOs in reaching IDPs in Bhatendandhaa, which did not reach out by the major humanitarian organizations. From the interview, officer of the organization said that their initiative was simply supported by the presence in the community even before the earthquake, existence of international network and through limited coordination with the CDOs, without sense of obligation to report to the humanitarian coordination forum set by the UN and national government.<sup>‡</sup> Similar story was also observed by the Authors in the case of emergency response, and later post-disaster recovery, by a political party in Nepal. Lastly, eight international NGOs emergency response activities registered to the SWC were disconnected to the overall humanitarian organizations network also identified.

**6. Conclusions**

From this research, it can be seen that to some extent the Nepali government partially managed the disaster response in a concerted manner following the 2015 earthquake, thanks to the enactment of the NDRF in 2013. This is an important lesson for other least-developed and developing countries: a clear and concise framework for emergency response operational activities and coordination mechanisms can provide important first point of reference and guidance at a time of disaster. The framework’s strong point is its integration of international humanitarian norms and guidelines, making for swift connections to organizations coming in from abroad at a time of emergency and reduce time for coordination adjustment.

Critical evaluation on the NDRF is the absence of disaster risk scenario and pre-disaster impact assessment; i.e., even though the IASC has applies a level 3 disaster to be parallel with the NDRF setup. The NDRF also did not outline exit or closure strategy., i.e. under what condition the emergency response can be ended in one-month time frame. At the same time, it does not provide contingency measures should the emergency response goes longer, which was beyond the scope of the current NDRF. On this, such role should be given back to the CNDRC, under the current Nepali law on disaster management.

<sup>‡</sup> Interview with Key Person BB, March 8, 2016.

In addition, the framework failed to identify and integrate the existing potential of national and local NGOs, which in reality exist, and even can be considered as prerequisite for channeling resources from abroad during emergency responses, as shown by our network model. For future revision of such a framework, recognition and integration of local and national NGOs should ensure the strengthening of the existing capacity to respond a disaster and participate in post-disaster recovery. This paper has provided empirical evidence on the actual network that materialized, which shows actual potential ties, as well as revealing the immaterialized ties planned in the disaster response policy. Accordingly, one of the potential follow up is to strengthen and leverage the position of local NGOs to be considered by the government. On this the role of NGOs hub or a federation of NGOs must be greatly empowered, as in present times many national NGOs did not felt their role to do so, as pointed out by at least five key respondents in the research. Furthermore, the minor involvement of faith-based organization, diaspora groups and private sectors is key area to strengthen disaster response in the future.

To this end, this paper sends important message for other developing and least-developed countries that it is beneficial to setup a disaster response framework for channeling international humanitarian resources. However, a more participatory and endogenous approach is needed, to ensure all existing potential domestic organizations are familiar and able to coordinate with the practices of the international humanitarian system, e.g., the humanitarian clusters. Establishment of a disaster response framework must also include multiple disaster risk scenarios and be equipped with a clear exit strategy and parameters for emergency response period closure towards transition to post-disaster recovery phase.

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