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MAY 2020

Business as usual for SEADPRI during the COVID-19 pandemic
Urusan seperti biasa untuk SEADPRI semasa pandemik COVID-19

Kes pertama penyakit Coronavirus (COVID-19) dilaporkan di Malaysia ialah pada 14 Januari 2020; mula dikesan pada warga asing yang mempunyai sejarah perjalanan. Kerajaan Malaysia bertindak dengan mengambil langkah-langkah pencegahan untuk mengawal wabak ini di peringkat nasional. Sejurus itu, kes domestik pertama telah dilaporkan pada 5 Februari 2020; dan sejak itu, kes COVID-19 telah meningkat dan membawa kepada keadaan yang lebih serius di peringkat tempatan. Dalam usaha untuk mengawal wabak ini dengan lebih berkesan, dan dengan cara yang tepat pada masanya, Kerajaan Malaysia telah mengenakan Perintah Kawalan Pergerakan (PKP) yang dilaksanakan di bawah Akta Pencegahan dan Pengawalan Penyakit Berjangkit 1988, dan Akta Polis 1967. Fasa pertama PKP adalah dari 18-31 Mac 2020; fasa kedua untuk tempoh 1-14 April; PKP dilanjutkan ke fasa ketiga yang merangkumi tempoh 15-28 April. Fasa keempat pula diumumkan oleh Perdana Menteri pada 23 April yang lalu, yang berlangsung dari 29 April hingga 12 Mei 2020, sebagai fasa pemulihan. Mesyuarat dwitahunan utama komuniti saintifik DRR Asia Pasifik, Asia Pacific Science & Technology Conference on DRR (APSTCDRR), yang dijadualkan pada 16-17 Mac tahun ini di Malaysia, terpaksa dibatalkan berikutan pandemik COVID-19. Terdapat juga pembatalan beberapa acara besar lain yang dijadualkan diadakan oleh SEADPRI-UKM pada tahun 2020. Namun, kakitangan kami telah rajin dan tabah dalam meneruskan rutin pejabat seperti biasa, dari rumah.

Pada masa-masa yang mencabar ini, SEADPRI-UKM telah mengambil inisiatif untuk mengadakan pertemuan melalui pelbagai platform dalam talian seperti Zoom, Skype, Microsoft Team dan lain-lain. Mesyuarat pengurusan dan penyelidikan berkaitan projek penyelidikan tetap dijalankan, begitu juga dengan kursus CITRA untuk pelajar ijazah sarjana UKM. Ahli akademik dan kakitangan kami yang berdaya tahan telah menghadiri mesyuarat utama dan membentangkan kertas kerja di seluruh dunia melalui platform dalam talian sejak PKP bermula.

Dengan meneroka dan menggunakan kaedah dalam talian untuk pengajaran dan penyelidikan, SEADPRI-UKM ingin terus menyumbang kepada pengetahuan corpus dalam DRR di peringkat nasional dan global. Sebagai catatan terakhir, ketika kita berada pada suku kedua tahun ini, mari kita berharap untuk persekitaran yang lebih baik sebelum tahun 2020 melabuh tirainya.

The first case of the Coronavirus disease (COVID-19) was reported in Malaysia on 14 January 2020; it was detected in a foreigner with travel history. The Government of Malaysia acted by initiating preventive measures to control this pandemic at the national level. Subsequently, the first domestic case was reported on 5 February 2020; since then, COVID-19 cases have escalated and led to a more serious situation at the local level. In order to control this pandemic more-

Prof. Joy Jacqueline Pereira was involved as a panelist in a webinar on "Climate Change Conversations", organized by the Ministry of Environment and Water, Department of Environment and GreenTech Malaysia.

effectively, and in a timely manner, the Government of Malaysia imposed the Movement Control Order (MCO) which was implemented under the Prevention and Control of Infectious Diseases Act 1988, and the Police Act 1967. The first phase of MCO was from 18-31 March 2020; the second phase for the period of 1-14 April; the MCO was extended into the third phase that covered the period of 15-28 April. The fourth phase was announced by the Prime Minister on 23 April, to run from 29 April until 12 May 2020, as a recovery phase. The major biennial meeting of the Asia Pacific DRR scientific community, the 2020 Asia Pacific Science and Technology Conference on DRR (APSTCDRR), which was scheduled to be held 16-17 March this year in Malaysia, had to be cancelled due to the COVID-19 pandemic. Similarly, there have been cancellations of many other big events scheduled to be hosted by SEADPRI-UKM in 2020. However, our staff have been diligent and resilient in continuing their work as usual, from home.

During these challenging times, SEADPRI-UKM has taken the initiative to conduct meetings via various online platforms such as Zoom, Skype, Microsoft Team and others. Hence, the management meeting and research project-related meetings carried on, as did the CITRA course for undergraduates. Our resilient academics and staff have joined major meetings and presented papers around the globe via an online platform since the MCO began. By exploring and utilizing online methods for teaching and research, SEADPRI-UKM wishes to continue contributing to the corpus knowledge of DRR nationally and globally. And on a final note, as we are in the second quarter of the year, let's hope for a better, improved environment before 2020 comes to an end.

ASSOC. PROF. DR. GOH CHOO TA
Ketua SEADPRI-UKM | *Head of SEADPRI-UKM*

Kakitangan SEADPRI-UKM / *SEADPRI-UKM Staff*

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Penyelaras Program Bencana Iklim / *Coordinator of Climatic Hazards Programme*
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Dr. Lim Choun Sian

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Dr. Lim Choun Sian

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Buletin SEADPRI

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About SEADPRI–UKM

Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) has been in operation since June 2008. Based at the Institute for Environment and Development (LESTARI), the Centre addresses crucial challenges on disaster risk reduction in Malaysia and the region. The research focus is on climatic hazards, geological hazards and technological hazards, with emphasis on capacity building, mainly through post-graduate programmes and specialized training. Transdisciplinary research conducted by the Centre is action-oriented, bridges the science-governance interface and provides pathways for disaster prevention .

In 2016, SEADPRI-UKM was acknowledged by the Integrated Research on Disaster Risk Programme (IRDR), jointly sponsored by International Science Council (ISC) and the United Nations Office for Disaster Risk Reduction (UNDRR), as an IRDR International Centre of Excellence (ICoE) for Disaster Risk and Climate Extremes (ICoE-SEADPRI-UKM). Globally, SEADPRI-UKM now sits with a group of 16 institutions with such recognition, representing various regions. The focus of ICoE-SEADPRI-UKM is to strengthen local inputs for addressing regional disaster risks in conjunction with national and international partners. A major flagship is the Asian Network on Climate Science and Technology (ANCST), coordinated by SEADPRI-UKM and funded by the Cambridge Malaysian Education and Development Trust, to link disaster risk reduction and climate change for building resilience in the region.

Contact

Managing Editor
Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM)
Universiti Kebangsaan Malaysia
43600, UKM Bangi
Selangor, MALAYSIA
Tel.: +603-8921 4852/4858 | Fax: +603-8927 5629
Email: seadpri@ukm.edu.my

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Research Highlights

Flood Hazard Assessment in Astore River Basin, Pakistan

Muhammad Sohaib Baig

Kyoto University, Japan

[Email: aquarius_baig@yahoo.com]

Abstract: Astore River Basin is prone to large flood events endangering lives and property in the area. This paper discusses the natural physical conditions of the basin that predisposes it to floods, especially during the monsoons. Imminent intensification of extreme climate events as a result of climate change may put the area under increasing risk from floods. Given this future climate phenomena, improvements towards the assessment and management of floods in the area becomes more important. Immediate and critical needs, and recommendations towards improving the assessment and management of flood hazards are made at the end of this paper.

Keywords: Flood hazard assessment, flood forecasting, Hindu-Kush region.

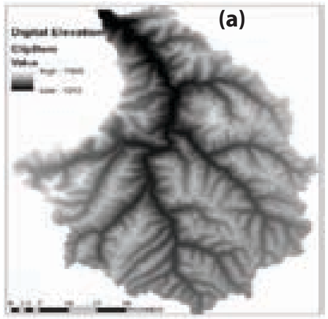
INTRODUCTION

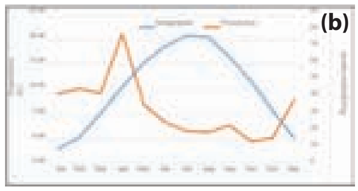
Devastating floods in the Astore River Basin in the last decade (2003, 2005, 2010 and 2011) resulted in a high number of human casualties as well as an enormous loss of property, causing immeasurable suffering to the people. Monsoonal rains, steep topography, and degraded catchments contribute to high flood peaks in the basin. A large drainage area and inadequate surface-storage capacity result in high stream flows. Encroachment and poorly planned development along the streams and in the floodplains also cause serious flood damage. The Basin lacks an appropriate flood policy, comprehensive laws, and adequate flood-control infrastructure. To date, no approved national water and flood policy exists, and too many institutions are involved when disasters occur. Considering the large basin area and scale of flooding, rescue and relief operations have been inadequate. During the 2010 floods, there were also problems in operational decision-making at the field level.

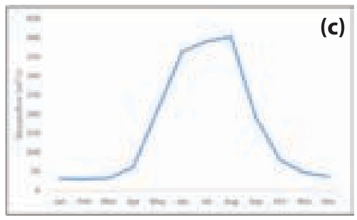
Frequency of natural disasters is on the rise due to extreme weather conditions and global climate change. The Intergovernmental Panel on Climate Change (IPCC) predicts that the average global surface temperatures will increase by 1.4°C-5.8°C between 1990 and 2100 (IPCC 2007). Climate change anywhere in the world will be accompanied by changes in the nature and frequency of extreme weather events. The increase in rainfall intensity and changes in rainfall patterns may further increase the frequency and/or intensity of floods in the Himalayan-Hindu Kush region, which the Astore Basin is a part of. This study will use a flood forecasting model with satellite imagery. The inaccessibility of disaster affected areas further adds to the complexity of relief and response work. In such a scenario, satellite imagery is a valuable tool to generate and establish a quick footprint of a disaster. It provides crucial input for the planning of relief supplies by assessing damage to transport networks, finding escape routes and potential shelter sites for displaced people.

APPROACH

The Astore River Basin is located in the Himalayan mountain ranges in Pakistan (Figure 1). Its area is 4000km² and elevation range is 1242-7595m. The land use suggests mixed forests, grass or shrub lands and glaciers. The elevation of the basin ranges between 2000-4000m about 85% of the area appears to consist of steep slopes. This paper highlights the climate and hydrological conditions as well as challenges in the Astore River Basin, which is part of the Hindu-Kush region drawing on a previous study. The climate of the region is generally cold with the temperatures remaining below freezing from December to February at the elevation of 2000m (Farhan et al. 2014). Temperature decreases with elevation and at 4000m, it remains below 0°C from October-May. The precipitation falls in the form of snow and rain with snow in large proportions. Snow falls from December to March whereas from April to October the precipitation is less in comparison (Figure 2). The flow regime is snowmelt dominated. From October to April, the flow is relatively stable at 32m³/s. The snow starts to melt in April and continues to contribute in streamflow till September. The monthly average streamflows are shown in Figure 3.







*(a) **Figure 1:** Digital elevation model of the basin; **(b) Figure 2:** Average monthly temperature in the basin at 2000 m; **(c) Figure 3:** Average monthly streamflow.*

DISCUSSION AND CONCLUSION

There are several challenges facing the the Astore River Basin. There is an immediate need to assess technological, institutional and policy options with respect to flood events. There is also a need to develop a flood policy, adopt an intergrated water resources management (IWRM) framework and basin-wide floodplan following integrated river-basin approaches. In additon, organizational roles and institutional reform as well as the development and enforcement of a land-use policy have to be considered. The engagement of all stakeholders in these processes is critical to ensure effective outcomes. The increase of revenue for the maintenance and management of flood protection infrastructure is also a challenge that has to be addressed. Recommendations for improvement include the following:-

- Carrying out a vulnerability and flood-risk hazard study focusing on critical areas;
- Improving databases and information-sharing mechanisms, expand the coverage of the flood forecasting and early-warning system to major streams and hill torrents;
- Developing retention basins and wetlands, as well as flood-diversion and flood-bypassing arrangements;
- Repairing the critical hotspots of catchments, as part of an overall effort to support livelihoods of communities and environmental protection;
- Developing disaster management plans, including dam-break and dam-burst scenarios.

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Research Highlights

Youth Participation in Disaster Science Communication

Liyana Yamin[1] & Iffah Farhana Abu Talib[2]

[1]Malaysian Youth Delegation

[2]ASEAN Youth Volunteer Program (AYVP)

[Email: lylana18@gmail.com]

Abstract: Disaster science communication is essential for community preparedness, response and recovery in minimizing severe adverse impacts. As such, empowering the community through its youth members can be seen as a key strategy for disaster resilience. Ineffective communication could increase losses and damages to the community. The objective of this paper is to investigate disaster science communication among youth through volunteerism platforms. A two-month data collection based on two case studies, 2017 ASEAN Youth Volunteer Program (AYVP) and Malaysian Youth Delegation (MYD), was conducted through literature reviews, observations, interviews, focus group discussions, workshops and simulation exercises. The qualitative data was analyzed based on observation throughout these platforms. This study concludes that volunteerism platforms that are established from science communication programs are essential in establishing disaster resilience among Malaysian youths.

Keywords: Disaster risk reduction, disaster science communication, resilience, youth, Malaysia.

INTRODUCTION

Malaysia is predicted to experience sea level rise, water shortage, extreme variations of rainfall, extreme heat with dry weather in some areas, and severe floods in others. Terrible floods in Malaysia have been recorded over the past 30 years; the situation worsens annually (EM-DAT, 2015). These impacts will affect local and national economies, threaten the livelihoods of people, destroy infrastructures which will cause people to seek refuge in other safe places. As disasters related to climate change become prevalently significant with adverse impacts on communities all over the world, it is a reasonable strategy to implement Disaster Risk Reduction (DRR). Empowering a community to become resilient with tools to engage in crisis preparedness, response, and recovery is essential. DRR involves stakeholders from different backgrounds; thus, participation from youths especially, will strengthen local disaster prevention and supplement national capacity (Fernandez and Shaw 2015). Youths are likely to be one of the vulnerable groups to face disasters; hence, this group needs to be recognized as a part of the implementation of disaster risk reduction policies (Gaillard and Pangilinan 2010).

Fernandez and Shaw (2016) highlighted that communicating risk to reduce disaster could raise awareness, build protective behaviour and promote management measures. Making DRR relevant to youths means providing more youth-centric opportunities for them to be included in the process (Cox et al. 2019). Youth perspectives are always fresh and up to date; they are a generation well connected with new technologies. Malaysian youths can play a role to renew and refresh the current status of our society in leadership, innovation and skills. Additionally, they are expected to advance the current technology, education, politics, and peace of the country. Sowing a sense of responsibility among the youth will spark much change in the preparedness of disasters.

APPROACH

The analysis was based on two case studies: 2017 ASEAN Youth Volunteer Program, Bandung, Indonesia (AYVP) and Malaysian Youth Delegation (MYD). They were conducted from December 2019 to January 2020. These two volunteering platforms use different methods to communicate disaster science. The AYVP is a community leadership platform that creates opportunities for ASEAN youths to develop innovative solutions to social, cultural, economic and environmental challenges in the ASEAN community while forging a sense of regional identity and cross-cultural understanding (UCTC-UKM et al. 2017). The duration of the program was four weeks. The first week was the preparatory training, followed by second and third week on field assignments. Finally, in the fourth week, project management skills were given to the participants for take-home lessons learned and implemented within their respective communities. In the case study of AYVP 2017, the science communication was implemented through different mediums, such as verbal and written. For example, there were verbal communications between the participants of the program and the organizer, by means of daily briefings.

In addition, science communication was implemented in writing through a social media platform; this was executed through the dissemination of relevant information through the WhatsApp group. Social media has been a good platform for the participants involved to broadcast and publicize the activities done, especially within the communities. Furthermore, the AYVP 2017 program organizer offered a prize to the participant for the best social-media communicator and wide-audience reach. As such, they learned more about the identified vulnerable communities (disaster-prone area), and knowledge-sharing through disaster simulation exercises (earthquake drill) with the local community. During the program, three types of knowledge transfer (12 Modules, 12 workshops and 17 informative lectures) were given to the participants and the local community. These sessions were about disaster risk reduction, ASEAN Region and Local Disaster Risk Management, Psychological First Aid (PFA), Social Media Marketing, Project Management and Strategic Planning, Safer School and Disaster Education in Indonesia, and finally, the Social Media Ambassador (SMA).

(Photo by AYVP)

***Figure 1:** Post-interview session with the local community in Bandung, Indonesia for Community-based Disaster Risk Reduction.*

The second case study was on the Malaysian Youth Delegation (MYD). Established in 2015, MYD is the only youth-led organization in Malaysia which focuses on climate change policies and negotiations; it provides a platform for curious and interested youth to explore the world of climate agreements at the United Nations platform. MYD strives to educate the public on climate change policies by organizing training and talks. MYD maintains a relationship with the federal government and regularly engages with them. The role of MYD in disaster science communication is deemed important. MYD activities encompass capacity building which involves internal (study sessions among members) and external sessions (training series with the public); engaging with like-minded youth organizations on climate change issues; regular discussions with the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC);

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organizing Local Conference of Youth (LCOY), a space to gather youth voices from all over Malaysia who are passionate about addressing climate change and promoting sustainable lifestyles; sending delegates to regional and international conferences like the Conference of Parties (COP) (Malaysian Youth Delegation, 2019). Apart from that, MYD also reached out to the Federal Territories Mufti, Datuk Dr. Zulkifli Muhammad Al-Bakri who has authority over the religious affairs of Islamic communities in Malaysia. Besides this, there was an engagement with Mulberry School for Girls, London to elevate their interest to be part of change. Some of the leading questions by MYD members during this engagement were: How do you see yourself in the climate/environmental advocacy space? Who is the most important stakeholder for you, and what would you say to them? What are you willing to give away (sacrifice) in achieving your goals? (Malaysian Youth Delegation, 2019).

Figure 2: *With one of the largest crowds that attended MYD training series #7 on Climate Action and Policy Lobbying.*

The MYD also exchanged input with the Asian Youth Climate Network on Nationally Determined Contribution (efforts to reduce greenhouse gases), collaborated with UKM Lestari for the National Youth Climate Change survey, and is in its planning stage for the *Saluran Hijau* (a new informative channel to talk about climate change issues and impacts in layman terms supported by scientific evidence). MYD members have also been heard on different platforms, for example, at the Yayasan Sukaralewan Siswa and Girl Guide Malaysia events to share about climate 101 (Malaysian Youth Delegation, 2019); participated in a radio talk by CityFM, a Chinese speaking radio station; also via an interview published by Heinrich Boell Foundation (Southeast Asia) (Heinrich Böll Foundation 2019).

RESULTS AND DISCUSSION

Both case studies emphasized youth participation in disaster science communication through different volunteerism platforms. For the first case study, the AYVP 2017 program illustrated a strong network among program participants by means of establishing a group through a cross-platform instant messaging application (WhatsApp) for updating about Disaster Risk Reduction in their countries. The lessons learned from the program, such as useful knowledge on disaster risk reduction and survival skills during disaster events, are valuable to formulate their own projects for their home country and communities. As such, the innovative ideas from the program are transformed into ideas which are low cost, high impact, and rapid execution with maximum outreach. The participants were inspired in the sense of giving, sharing and contributing to communities across ASEAN. In addition, the participants were able to demonstrate their leadership qualities for community engagement and development. Furthermore, this program has contributed to the enhancement of the global agenda (Sendai Framework and Sustainable Development Goals) in combating disaster events in the ASEAN region. One of the platforms on science communication engagement, with regards to disaster events, is the Community-based Disaster Risk Reduction (CBDRR) framework. CBDRR covered the interviews, focus group discussions, workshops and simulation exercises with the local communities and stakeholders (local authorities). Consequently, the information gathered from the activities held were shared and disseminated through posting on social media platforms. The Malaysian Youth Delegation has - empowered more youths to be involved in climate change action, engaging with regional partners and international-based audiences, and finally building up momentum to form a bigger call to action as expressed by LCOY. The sharing of personal experiences through talks with the girls from Mulberry school, radio talk show at City FM and the interview by Heinrich Boell Foundation (Bangkok) are deemed important to maximize engagement with younger and more diverse people. Understanding the scientific evidence and navigating it to educate the public, has always been how MYD moves. The exchange of experiences, knowledge and good practices will strengthen the national youth climate movement as a platform to develop climate solutions and actions. Adapting to the community languages and working with like-minded peers is viable to establish resilience in disaster science communication. As youths continue to play an increasingly important role in shaping understanding towards disaster risk reduction, it is a healthy sign to see these volunteerism platforms maturing to communicate the issues accordingly. These two case studies could definitely play a bigger role in communicating disaster science provided that its full potential is realized. However, these volunteering platforms do come with a downside, with regards to capacity and financial constraints, that can hinder them from being more active; it is still a monumental challenge to communicate the climate crisis.

CONCLUSION

Participation of Malaysian youth as a tool for disaster science communication is inevitable. As mentioned by Marchezini and Trajber (2017): Gathering and sharing experiences and knowledge about the youth involvement in DRR are important bridges to encourage people to learn about disasters, vulnerability and hazards, as well as to provide tools for policymakers and stakeholders. From the above-mentioned case studies, volunteerism platforms are identified as the key strategy for youth and community to be empowered, proactive and knowledgeable, especially in disaster risk reduction. Hence, disaster science communication among youth through volunteerism platforms is evidently essential to be established. Moreover, the interdisciplinary interactions by both case studies prove that disaster science communication contributes to the enhancement of knowledge among the youth, who eventually will give back to their community by engaging the lessons learned from the programs/events. More advocacy and inclusivity of Malaysian youth, among others, is needed to convince communities to take action and participate in discussions which empower them to be better prepared and resilient towards combating potential disastrous events.

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Research Highlights

Effective Communication through Disaster Ethnography

Ryo Tsuchida[1,2]

[1]*Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University, Kyoto, Japan*

[2]*U-INSPIRE Japan*

[Email: tsuchida.ryo.88x@st.kyoto-u.ac.jp]

Abstract: This paper describes actions, mitigation and rehabilitation process, and problems of the residents of Ratnapura city by a method of disaster ethnography, to promote disaster risk communication. The focus is on a flood-prone area in the southwest of Sri Lanka, where a severe flood disaster took place in May 2017. The disaster was triggered by heavy rains and high winds brought about by the southwest monsoon on 25 and 26 May 2017. During a couple of visits to Ratnapura city, the author conducted fieldwork and interviewed affected people and the local government to understand the impact of the flood disaster, and how they coped with it. After these interviews, the author edited and analyzed some trends and patterns by utilizing a framework based on disaster ethnography: (a) What you must do for the next (future) disaster, (b) What kinds of problems you can address for the next disaster, (c) What you must not do for the next disaster, (d) What is the most difficult thing for you to decide on during the actual disaster situation, and (e) Recovery and rehabilitation process. Results obtained from the interview survey showed that the residents, who acted based on their own experience and knowledge, could not respond to critical floods, and the flood disaster brought them adverse influences. In addition, external organizations, including governments, UN agencies and non-profit organizations for disaster relief could not provide adequate support to meet the needs of residents. The results in this paper would be useful for flood disaster risk reduction and understanding the recovery process in Sri Lanka.

Keywords: Flood disaster, disaster risk communication, disaster ethnography, multi-stakeholders analysis, Sri Lanka.

INTRODUCTION

In the last 30 years, there has been a worldwide trend of an increasing number of natural disasters caused by climate change and geophysical effects. The impacts are dramatic. However, the relationship between disasters and rehabilitation still remains a key topic to be investigated, as well as a way for effective disaster risk communication. In order to inspect the context of two factors, some researchers attempt to formulate a framework of anthropology between disasters and rehabilitation from the viewpoint of anthropology, using ethnography. By reading disaster ethnography and by collaborating with multi-stakeholders such as the government, academia, and the citizens, scientists could provide new insights into what is rehabilitation, and how we can create a resilient society against disasters. Also, it is important for us to recognize a gap between UN activities, government policies, and grassroots views (including citizens and other groups) and to take measures to prevent and mitigate the next disaster based on their understanding relevant problems and actions, in order to bridge the gap after serious disasters and during rehabilitation. That is also why, scientists and practitioners should articulate the gap between local residents and governments during disasters.

Sri Lanka, the site of the study, is at high risk of floods, cyclones and sediment disasters. This is due to the vulnerability of the country to water damage due to its geographical characteristics and the social infrastructure (United Nations Office for Disaster Risk Reduction & Asian Disaster Preparedness Center 2019). For this reason, the country was ranked second in the world by the Global Climate Risk Index in 2017, raising the issue that the country has not yet adapted to the risks of climate change and the growing external forces of disaster (Eckstein et al. 2018). In Sri Lanka, research on water damage has been done in the context of flood risk identification and its link to poverty. The understanding of water damage in this area is that Sri Lanka is geographically vulnerable to water damage, yet the damage is increasing, and increasing due to inadequate government-led disaster preparedness. It was also suggested that the peculiarities of the topography, demographic changes associated with economic growth, and urban planning have increased water damage and widened economic disparities among the poor (United Nations Habitat Sri Lanka 2014; Robert and Deborah 1984; De Silva and Kawasaki 2020).

In this country, mutual aid through kinship was the mainstay of rehabilitation and reconstruction. However, since the 2004 Indian Ocean Tsunami, the main focus has been on reconstruction with support from external organizations, including domestic and international NGOs and international organizations. However, the box support and infrastructure provided by external organizations with external technology does not work well because it does not match the needs of the residents who value the local culture and lifestyle during the disaster and recovery period (United Nations Office for Disaster Risk Reduction & Asian Disaster Preparedness Center 2019). In areas that are permanently affected by repeated flooding, the residents' own experiences and conventional knowledge were utilized, which was significant for rapid post-disaster recovery. However, the administration has not been able to ensure a micro perspective on conventional knowledge for disaster recovery and has not been able to develop a complementary relationship with policy (Ahangama et al. 2019).

It is necessary to unearth facts that have been neglected in disaster prevention research to date, by listening to the words of people who were actually present at the disaster site and elucidating a series of problem-solving processes, such as what problems they encountered, what they struggled with, and how they solved them. It also failed to address the question of what survival strategies the population had adopted to mitigate the damage caused by the country's frequent floods. Therefore, the results of the applicant's research into qualitative research based on field surveys should highlight survival strategies for resisting regularly occurring floods that have been overlooked so far, as well as reveal various perspectives on the recovery process and issues on the ground from the time of evacuation.

Based on the above concept, this paper aims to describe actions, mitigation and rehabilitation processes, and problems of the residents of Ratnapura city by a method of disaster ethnography to enhance disaster risk communication. The focus is on a flood-prone area in the southwest of Sri Lanka, where a severe flood disaster took place in May 2017. The disaster was triggered by heavy rains and high winds brought about by the southwest monsoon on the 25th and 26th of May 2017, affecting 879,778 people with 219 deaths and 74 missing in five major affected provinces in Sri Lanka. The disaster caused destruction and damaged nearly 80,000 houses (Ministry of National Policy and Economic Affairs and Ministry of Disaster Management 2017) (See Table 1).

Table 1. *Basic Information about the flood disaster in May 2017, Sri Lanka.*

Province	Affected Families	Affected People	Death Toll	Injured People	Missing People	Partially Damaged Housings	Full Damaged Housings
Ratnapura	60,080	235,197	86	99	15	12,345	803
Galle	40,814	158,693	16	4	0	18,888	445
Hambanthota	2,432	10,457	5	0	0	992	143
Kalurtara	51,505	192,464	70	20	43	14,390	602
Matara	49,541	183,008	32	16	15	27,686	1,015

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APPROACH

The research site, Ratnapura city, Ratnapura District, Sabaragamuwa Province, is located in the mountainous area in the southwest of Sri Lanka (UN Habitat Sri Lanka Ratnapura 2015). In recent years (in 2003, 2016 and 2017), it suffered flood disasters due to typhoons and torrential rains. After a couple of visits to Ratnapura city, the author conducted fieldwork and interviewed affected people, the local government and disaster prevention-related officers to understand the impact of the flood disaster and how they coped with the flood and its rehabilitation. After these interviews, the author edited and analyzed some trends and patterns by utilizing a framework based on disaster ethnography (Hayashi et al. 2009): (a) What you must do for the next (future) disaster, (b) What kinds of problems you can address for the next disaster, (c) What you must not do at the next disaster, (d) What is the most difficult thing for you to decide on during the actual disaster, and (e) Recovery and rehabilitation process. An ethnographic survey is an unstructured survey, in which participants are free to speak and, to speak voluntarily. What is shown here as a non-constitutive investigation is disaster ethnography. It does not bring any hypothesis in advance, but allows the victim who derives from the fact of what influences what in the series of investigation process, and what is related to what, to freely talk about what the victim has experienced from the actual empirical data in the field, and to find out some kind of law from it.

Fig. 1. Serious Flood Damage in Ratnapura City.

RESULTS AND DISCUSSION

During interview surveys with officials of international organizations, national and local governments, the author asked about their response to the flood disaster in May 2017, in accordance with the semi-structured interview method: (1) basic information on heavy rain disasters, (2) past and present heavy rain disasters, (3) counter-measures against heavy rain disasters, (4) infrastructure development. Seven respondents cooperated and answered these questions. As a result of this survey, the following three findings were obtained:

1) Disagreement between the central government and local governments.

The head of the government agency, the Ministry of Disaster Management, described the post-disaster response and planning as "Complete assessment and recommendations". However, there were complaints from local government about this response and measures, such as "unsuitable program for the region" and "recovery and reconstruction should be promoted based on an understanding of the local situation, rather than a top-down approach."

2) Questions about local knowledge.

Government and local government officials questioned the wisdom of disaster risk management, with comments like, "Low risk awareness, preparation and communication within the community", "Evacuation is conducted based on the water level, but before the water level rises, sufficient preparations for evacuation are not made, and the damage may have increased" and "based on conventional knowledge and communication but they have not yet been systematized".

3) Unnecessary or little support.

When a former UN officer visited the country, he said, "They don't need more blankets. Also, they don't need clothes and foods". This is because, although blankets and minimum necessary clothing and food were already provided to some extent in Japan, and could be covered sufficiently between the disaster-stricken areas, there were cases in which assistance was unnecessarily received from inside and outside Japan through all media. Local government officials, on the other hand, stated that "We need more boats and more motors for rescue." and this led to a bias in the provision of necessary and sufficient supplies and the transmission of information. The author also interviewed local people and information from nine respondents were collected. An example of disaster ethnography is presented in the following paragraph.

Example of a Case

Ajitha is a 38-year-old man. His father was a vocational school teacher who around 1978, designed a traditional Sri Lankan house of earth and bamboo, built by city carpenters; the house was destroyed in past floods. The current cement block house was built around 1998 when Ajitha took ownership of the house. Ajitha is a city official and works as a tuk tuk (three wheels taxi) driver. He now lives there with his wife and two daughters, aged 10 and 2.

- What must you do for the next (future) disaster?

It is better to bring things such as pillows and clothes for children so that they can sleep safely in the evacuation center. There is nothing for children in the evacuation center.

- What kinds of problems can you address for the next disaster?

I took the most important things to the second floor, but I couldn't protect them all. The land here is low and near the river, so I rushed to the second floor with what I wanted to protect, but I couldn't make it. The clothes I was wearing were all that I had left, but the rest were washed away.

- What are the things you must not do for the next disaster?

We know how the water level rises by the way it rains, but if the judgment of how the water level rises is delayed, we cannot open the door due to the water pressure and cannot go out. We could leave early, but I don't think we should be late to escape. But when you leave your house and evacuate, you must not open the door and go out. This is because thieves sometimes attack an unlocked house at night.

- What is the most difficult thing for you to decide on during the actual disaster situation?

I think about whether to evacuate or not after seeing how it rains, and the flow of the river, but it is difficult to decide when to leave the house.

- Recovery and rehabilitation process.

The flood started on the morning of May 26. We packed our luggage in the morning, but it was dangerous for our family to stay here all the time; the water was pouring in, so we put our wives and children on a boat first and evacuated them to the temple. After I evacuated them, I went back home and to pack my baggage. In the evening, there was no electricity and I couldn't see anything, so I went to the temple by boat. I evacuated to the temple for three days. After that, I thought it would be difficult to take care of my youngest daughter (at that time, five months after delivery) at a temple, which is a shelter, so I, my wife and children evacuated to a village called Gulumaura, which is 5km away from where my wife's parents live. I was in the village for two months. During that time, I sometimes visited my house to remove mud and clean floors and walls. I painted the walls of my house in October 2017. We paid for it with our own money. I didn't get any money. We painted it ourselves. In early June, a week after the flood, GN came to check the damage of the house. But the money came in August 2018. The amount I received was much less than the amount I lost. We don't even know what they're doing.

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CONCLUSION

This paper clarified actions, mitigation and rehabilitation process, and problems of the residents of Ratnapura city through a method of disaster ethnography, to promote disaster risk communication. What emerged from the results was that, while local residents were using their diverse relationships based on kinship, neighborhood, and religion to promote evacuation and recovery, the government and external organizations were disregarding local customs and hindering the recovery process using conventional knowledge. Specifically, residents relied on relatives, land, and religious affiliation to temporarily shelter them and provide their daily necessities on the upper floors of their homes, or to take refuge in tall buildings and religious institutions. In the surveyed areas, mutual aid, mainly from relatives and religious communities, had been functioning during normal times and had been functioning well during disasters. Going forward, there is a need to develop and instill disaster management plans from a consistent central government to local governments and local communities.

To sum up, disaster ethnography could provide an insight into various people's viewpoints and lives, and result in effective contribution to create a resilient society. The research results in this paper would be useful for flood disaster risk reduction and understanding the recovery process in Sri Lanka. It will help not only to identify flood risks before the flood occurs in the study area, but also to mitigate the socio-economic damage caused by flooding in the study area. Scientific knowledge may also be necessary during the phase of evacuation and revitalization, but rather it is more important to find a way so that citizens can expand and deepen their experiences, and balance local and scientific knowledge to improve their livelihoods.

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COMMUNICATION ON COMBATING THE COVID-19 PANDEMIC

A webinar on Youth and Young Professionals in Asia and the Pacific - Engagement on COVID-19 was successfully organized on 15 May 2020 via the online Zoom platform. The webinar was convened by UNESCO Office Jakarta and U-INSPIRE Alliance, with support from the African Youth Advisory Board on DRR (AYAB-DRR). The webinar involved 376 participants from 46 countries around the globe.

The main objective was to discuss how youth and young professionals could use their science, engineering, technology and innovation background to contribute in the fight against COVID-19. It was also a platform to share experiences and lessons learnt from the U-INSPIRE Alliance and the National Chapters, especially from the Asia Pacific, in addressing the pandemic and reducing societal risk to the viral infection. The opening remarks was delivered by Prof. Shahbaz Khan, Director and Representative of UNESCO Regional Science Bureau for Asia and the Pacific, UNESCO Office Jakarta. The keynote speech was delivered by Mdm. Shamila Nair Bedouelle, Assistant Director-General of Natural Sciences of UNESCO Paris.

The two and a half-hour webinar was enriched with twelve case studies and activities from youth and young professionals of U-INSPIRE country chapters, covering aspects of data science application, technological innovation (products and tools), advocacy and disaster risk communication. Youth and young professionals should aim to be catalysts in innovating low-cost technologies to bridge the gap between knowledge and behavioural change through various community channels including the social media. The webinar ended with a draft of statement where UNESCO, U-INSPIRE Alliance, and AYAB-DRR would lead the compilation of practical experience, good practice, lessons learnt, and case studies of youth and young professional's initiatives on COVID-19. This would serve as educational material for future pandemics.

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Anticipating the Big One in The Philippines

Azul, Kristian M.

University of the Philippines Diliman

[Email: ce.kristianazul@gmail.com; kristian_up@yahoo.com]

Abstract: Metro Manila is the second most populous and the most densely populated region of the Philippines. As the ninth most populous metropolitan area in Asia and the fifth most populous urban area in the world, Metro Manila is exposed to multiple natural hazards such as earthquakes, floods, and typhoons. It is surrounded by active faults including the Marikina Valley Fault System. This paper is intended to study the JICA model 08, that is an earthquake generated by the West Valley Fault. A catastrophic devastated area is expected if the earthquake happens in the fault line where Metro Manila is located. Therefore, a proper design process includes building retrofitting and road design should be able to help in making sure that structures will not fall in a destructive manner. Current land use and urban plan/situation studies, including frequent awareness programs and drills can be used as well to better prepare for potential problems derived from the earthquake hazards for Metro Manila.

Keywords: Metro Manila, earthquake, West Valley Fault, high population.

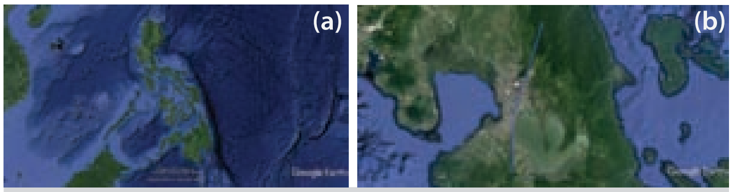
INTRODUCTION

There is major threat that a big earthquake is expected to occur in the West Valley Fault (WVF) that passes through parts of Metro Manila, the national capital region of the Philippines. According to JICA (2004), two to four large surface-rupturing events have happened since 600 AD, based on trenching excavation surveys in the West Valley Fault and East Valley Fault. The recurrence interval is less than 500 years; if no earthquakes had occurred in the WVF since the 16th century, then it is very likely that the WVF is close to generating an earthquake again (JICA 2004). Among the models studied in JICA (2004) is model 08, that is an earthquake generated by the WVF. Based on the maps provided in the JICA final report, the WVF has three segments and model 08 with a magnitude of 7.2. With this in mind, a lot of effort is put into trying to address the problems it could pose, should it happen.

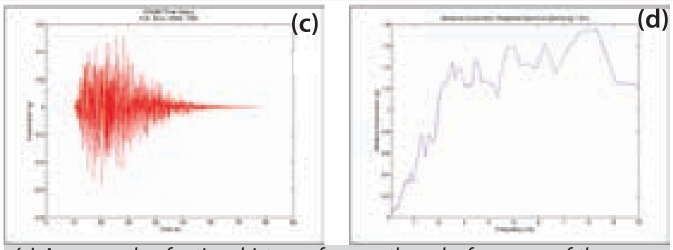
APPROACH

The areas immediately affected are the cities surrounding the fault. One of the main concerns is the effect on a highly populated Metro Manila which, being the national capital region of the country, has a lot of structures where many people live and work (JICA 2015). With their proximity to the fault, it is guaranteed that they will be the most affected by the vibrations from the earthquake; it puts all the structures at risk (Miura et al. 2008). As seen in Fig.2, the fault passes right through Metro Manila and will affect it severely. Expected effects on the areas are destruction of structures; outbreak of fires, injuries and deaths related to it; breakdown of communication lines and roads affecting inflow and outflow of help; and transport of items like relief goods, fire trucks to put out fires, ambulances to transport victims. The threat of an earthquake itself is not preventable. As we have no way to control the stresses built up on the faults, we have no control as to when it will rupture, resulting in an earthquake. The destruction of structures like buildings, roads, flyovers and the like can be minimized. A proper design process or retrofitting design should be able to help in making sure that structures will not fall in a destructive manner. Roads must be designed properly such that there is a big chance that it will still be available for use during a calamity, as evacuability of a city is a very important factor. The threats of fire hazard is minimizable too, if we make sure everyone knows how to properly store flammable materials. Also, the breakdown of communication lines; if the telephone and communication companies build their systems in a more earthquake-resistant manner such that, at the very least, a critical line of communication is still available.

However, there is much to be desired in a lot of studies like this since data needed for certain earthquake simulation methods are not easily available and are usually patterned after data available in other countries similar to the conditions present; as well as not being able to fully validate such studies since there are no records from previous earthquakes from the West Valley fault. A comprehensive study had been done by Japan International Cooperation Agency (JICA), Metropolitan Manila Development Authority (MMDA) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) back in 2004 where they studied several earthquake scenarios, and the effects of some of it and what can be done to prepare for these scenarios. They have identified possible casualties and amount of damages in the -



*(a) **Fig.1.** Above is the map of the Philippines with the blue trace being the West Valley Fault. **(b) Fig 2.** The figure above shows the trace of the three segments of the West Valley Fault and markers for Metro Manila and the University of the Philippines Diliman (UP Diliman).*



*(c) An example of a time history of an earthquake from one of the many studies done using synthetic earthquake simulation based on parameters of the West Valley Fault. **(d)** An example of an acceleration response spectrum that is used by civil engineers to design structures against earthquake effects.*

cities as well as plans for said scenarios. Research and studies in relation to the threats accompanying the earthquake are also being done such as earthquake studies to simulate the possible earthquake, possible methods to design structures against it, and an overall better understanding of earthquake phenomenon and effects. Current land use and urban plan/situation studies can be used as well to better prepare for potential problems. Aside from all these plans, it's important to do information drives and evacuation drills. The minimization of damage and casualties can only be achieved if the technology we use is appropriate, plans are well designed, and more importantly, the population knows what to do and cooperates. There have been several large earthquakes in the past years affecting highly populated places. We can study the responses and experiences of each of the governments and the places affected, so that we can apply it to the plans we are making and get ahead of the potential problems. An improvement in the plans made by others before is always better and will help us get the best possible results when the time comes.

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A One–stop Platform for Disaster Preparedness in Nepal

Ankita Shah[1], Pradip Khatiwada[1], Reena Bajracharya[1], Niroj Panta[2] & Sanchita Neupane[3]

[1]Youth Innovation Lab, Nepal
[2]University College London, United Kingdom
[3]Durham University, United Kingdom
[Email: ankita@youthinnovationlab.org]

Abstract: In the past many attempts were made from different governmental and non-governmental organizations to develop disaster related portals to share information about different aspects of disaster risk reduction and management. In addition, disaster related datasets have been collected and stored in different portals. Lack of integration and availability of these datasets on a single platform has made it difficult to find data and information, build a comprehensive picture of disaster scenarios in different parts of Nepal and have a coordinated approach to prepare for and respond to disasters. It is an open question if Nepal, with its new federal structure, can sustain 753 local and seven provincial Disaster Information Management System (DIMS). Additionally, disaster management being the primary responsibility of local governments, there is a need and opportunity for the development of integrated DIMS to ensure that different governments at different spheres and non-government actors have access to and can compare the same data and information to prevent, mitigate and respond to disaster risks and incidents. Identifying this need and opportunity, an initiative has been taken by the Ministry of Home Affairs (MoHA), Network of Emergency Operations Centers (NEOC) to develop an integrated and comprehensive DIMS locally named as Building Information Platform Against Disaster or BIPAD. This platform has the potential to enhance early warning and preparedness, strengthen disaster communication, response, and decision making.

Keywords: DIMS, BIPAD, open data, technology, integrated platforms.

INTRODUCTION

With a diverse and complex geography, Nepal is exposed to a multitude of hazards every year resulting in multiple disasters. In the years 2017 and 2018, a total of 6,381 disaster incidents took place resulting in 968 deaths, 3,639 injured and estimated property loss of NPR 6.84 billion (MoHA, 2019a). Natural hazards such as floods, landslides, epidemics, cold waves, and forest fires occur recurrently, posing a threat to 90% of the population who are at high risk due to two or more than two types of disasters (MoHA, 2018). There are several challenges that Nepal faces in implementing effective disaster risk management, one of which is the lack of an integrated Disaster Information Management System (DIMS) (MoHA, 2019b). In the past, numerous disaster-related portals were developed by government and non-government organizations to manage and share information. However, most of them were developed for the organization's own purpose of storing and managing their data instead of making it available, or open, to everyone. This led to scattered, scanty and non-synchronized data and even resulted in data duplication, constraining a consolidated and coordinated effort to enhance the disaster resilience of the country.

Acknowledging this need, sub-section 1(k) under section 11 of Chapter 4 of DRRM Act mandates 'to develop and operate National Disaster Management Information System' and collect, store, analyze and disseminate information and statistics of DRRM. The need for DIMS is also highlighted in the Sendai Framework Priority for Action 1: Understanding Risk, and DRR National Strategic Plan of Action (2018-2030) Priority Area 1: Understanding Disaster Risk, which explicitly states to develop an integrated and comprehensive DIMS. As per the mandates, the Ministry of Home Affairs (MoHA) through its Network of Emergency Operations Centers (NEOC) formed a dedicated steering committee and a technical working committee to develop DIMS. The steering committee includes all the ministries and departments (includes portfolio of under-secretary level and department heads) of Government of Nepal (GoN) that are currently working in DRRM and a technical expert committee that includes technical staff of 11 ministries and departments of the Government.

The technical development of DIMS, locally named as Building Information Platform Against Disaster (BIPAD), started on Feb 11, 2019 after signing the MOU with the Youth Innovation Lab (YI-Lab), a civic-tech social enterprise that uses technological tools to bridge science public divide as the technical partner. BIPAD which is now hosted in the government's domain (http://bipad.gov.np/) has been developed as a one-stop platform not only for disaster-related information management but also for disaster management.

APPROACH

In the new federal structure with local governments as the primary actors in disaster management, BIPAD adopts a bottom up approach for data generation and validation. It is a national portal embedded with independent platforms for 753 local governments, 7 provincial governments and federal government for data collection, input and sharing with adequate linkages for data enrichment and verification.

BIPAD was envisioned with the overall aim to enhance the coordinated efforts for disaster management through a one-stop information management platform. The objectives of BIPAD include the following:

- Create an integrated platform for disaster-related data and information management;
- Enhance disaster resilience by adopting data driven preparedness, mitigation and response strategies thereby helping in informed policy and decision making; and
- Enable bottom up approach of data sharing making optimum use of indigenous knowledge at local level.

BIPAD MODULES

With an aim to develop a user-friendly system, BIPAD consists of general features such as time, location and hazard filter, and download function for key statistics. Information on the data visualized on the maps can be obtained through a tooltip feature that allows users to see the information whenever they hover the mouse on the data visualized on the map. To cover the whole spectrum of DRRM and the diversity of disaster in Nepal, six separate modules have been developed.

Fig. 1. Dashboard Module showing latest alerts.

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Dashboard

The dashboard is the landing page of BIPAD and contains the latest alerts data along with its visualization in the map (Fig.1). The main aim of developing this module is to inform about the probable disaster and provide early warning to strengthen early warning, preparedness and response. This module is linked to the real-time module and pulls data from river and rainfall stations that crosses the danger level, and the latest earthquake data. Users can immediately see the alerts in this module, for example, if the water of a river basin crosses the threshold, or if an earthquake of 5.0 Richter scale occurs, these data are directly pulled and visualized in the dashboard. The authorized user can also create an event manually such as monsoon floods, or health epidemics that affect a larger population. Events are usually visualized with polygons covering a larger area. The users can also view infographics and tabular list of alerts and download them in CSV format.

Incident

Incident module contains vital information on BIPAD for timely response where the data reported by the Nepal Police as the first responder to disasters are visualized (Fig.2). These data on the incident module provides detailed information of human and economic loss that are collected as per standard template made available by MoHA/EOC. The template is designed to acquire the geotagged information on incidents to capture granular details. The most recent incident that took place within a 24hr-timeframe blinks so that the users/responders will be aware of urgent incidents. The incident module links the incident with the response page that maintains and visualizes the information on critical infrastructures that are crucial for response, such as health institutions, educational institutions, religious places, open spaces, and capacity and resources like supermarkets, public water points among others. The users can view all the information on critical infrastructures, and on capacity and resources near an incident location with their communication details. There are also filter options like number of beds, number of staff, ICU/NICU and such that the responders can filter these information as per need and communicate accordingly. The users can view incident infographics like the hazard occurrence statistics and severity, and can also view the tabular form containing detailed information of the incidents and download them.

Damage and Loss

The Damage and Loss module allows the users to see, compare, and analyze the damage and loss information of past disasters (since 2011), pulled from MoHA's DRR portal and DesInventar Nepal. The incidents that crosses a month in the incident module directly gets recorded in the damage and loss module. The damage and loss component records damages and losses related to people, family, agriculture, livestock and infrastructure. The timeline mode allows the users to visualize the information in a time series and the comparative mode allows the users to compare the damage and loss details of two provinces, districts or municipalities. Infographics such as time and human loss, time and estimated monetary loss, death by hazard and monetary loss by hazard can be viewed along with tabular forms for all details. This module will help decision makers and DRR practitioners to analyze disaster trends and make future DRRM plans and policies accordingly.

Real time

The real-time module visualizes the real-time data on rainfall and water level, earthquake, air pollution and forest fires (Fig.3). The data currently available in this module are pulled into the system from government and non-governmental organization portals through API. Currently, this module is linked with DHM for rainfall and river data, NSC for earthquake, ICIMOD for forest fire data and government data on air pollution. This module shows the status of the probable hazards so that mitigation efforts and response can be triggered on time.

Profile

Profile module is a platform for information on different projects that are being undertaken by the government as well as non-governmental organizations. The module allows the government and non-government organizations to track and monitor project progress against the government's targets and national strategic action plan specifically to keep track of their progress and to avoid duplication of their efforts. This module allows the users to view disaster profiles from federal to municipal level. This feature has been specifically developed for decision makers at all three spheres of government to make informed decisions. The contact mode of this module contains the contact information of officials of the Disaster Management Committee, focal person and members, so that their information can be accessed easily in times of disaster for better coordination and communication. This module also contains the feature to monitor the projects against the National Strategic Plan of Action (2018-2030) priority areas.

Risk info

Risk Info module is a platform developed as a repository for hazard, vulnerability, exposure and risk assessment information along with capacity and resources (Fig.4). This module provides the information on hazards, vulnerability and risk across 77 districts of Nepal. Data is integrated from various sources including national as well as international governmental and non-government organizations, research and academic institutions. Not only can users view the data from this module, but it also has a facility to analyze the location specific hazard and risk scenarios and use that information to prepare risk reduction, preparedness and response plans accordingly.

BIPAD Data Partnership

BIPAD adopts a bottom up approach for data collection, sharing, enrichment and verification.

Fig. 2. *Incident Module showing disaster incidents of past one month.*

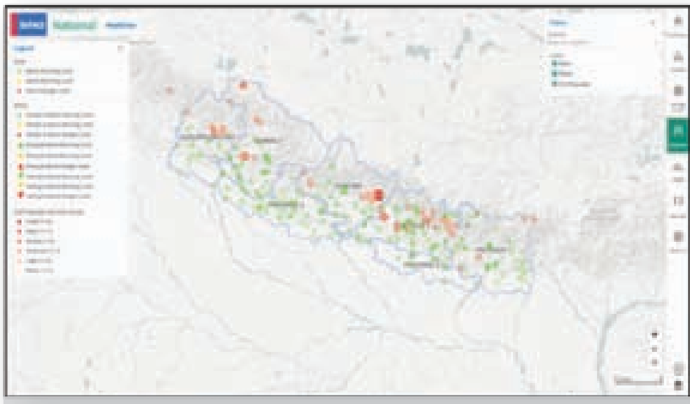

Fig. 3. *Real-time Module showing past earthquake incidents and real-time time data of rainfall and water level data.*

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Research Highlights

Users at each sphere of government as well as Nepal Police have their own independent platforms where they can login and enter/edit/comment/verify/approve the data as per their scope of work and permissions allocated. BIPAD system has separate forms for municipal, district, provincial and federal bodies. A permission matrix has been formed by NEOC that specifically states the permission for each sphere to input/edit/comment/verify/approve data. Technical user manuals have been developed for each user with specific guides to use the system. These were made to allow the permission matrix developed by NEOC that consists of detailed guidelines to use the system such as for input, edit, delete and verify data purposes. The local governments have a separate form to collect and store data such as inventory, critical infrastructures, capacity and resources as well as socioeconomic datasets within their administrative region. Similarly, the district, provincial and federal bodies have separate forms to collect and store their inventory data. As the local governments are the closest to the people, maximum authority to input the data has been given to local government. These data will be accessible to all spheres of government in the frontend.

There is a data enrichment and verification mechanism creating linkage between all three spheres as per their scope of work. Nepal Police as the first responders to disaster incidents has the sole authority to collect the incident data through the 'Incident Reporting Form'. These incident data can be accessed by municipal, provincial and federal governments. They have the authority to comment on the form if the data is incorrect or incomplete, which will then be notified to Nepal Police. Once the data is changed, the users who commented will be notified. The federal ministries have the authority to edit the loss data of incidents under their scope of work. For example, the Ministry of Agricultural, Land Management and Cooperatives has the authority to edit the agriculture loss data. NEOC has the sole authority to make final verification of the incidents which is represented with a green tick mark on the side of incident details in the incident module. To validate the whole data collection, enrichment and verification process, specific user details will be recorded with their login name, including the date and time those data were uploaded. Historical tracking system will be available that will track each activity of the users. Also, follow-up notifications will be sent to the concerned users when there is a comment to correct or enrich the data and when the data are changed. Notification will be sent via email or SMS as preferred by the user.

Fig. 4. *Risk Info Module visualizing flood hazard of Nepal.*

In addition, BIPAD also consists of data on hazards, vulnerabilities, exposure and risk from different governmental and non-governmental organizations, international research institutions and academic institutions. Currently BIPAD contains datasets from the following institutions:

1. Flood Hazard Maps of 25 river basins of Nepal - Department of Water Resources and Irrigation, Ministry of Energy, Water Resources and Irrigation;
2. GSHM earthquake hazard map: Global Earthquake Model (GEM), Global Seismic Hazard map, 2018;
3. Earthquake Risk and Landslide Hazard maps of 14 earthquake-affected districts from 2015 Gorkha earthquake;
4. Flood Hazard Maps: UK Space Agency's METEOR Project with British Geological Survey.

BIPAD Localization

The Prime Minister of the country as the chair of National Disaster Risk Reduction and Management Council has mandated to localize and institutionalize BIPAD at municipal, provincial and federal spheres to collect and share data for a consolidated effort to mitigate, prepare and respond to disasters. In this context, localization training is being conducted in each province inviting officials from all municipal, districts and provincial spheres. Led by MoHA, and facilitated by YI-Lab, the training includes the introduction of frontend and backend of BIPAD. The part of a website that user interacts with directly is termed as frontend. It includes everything that users experience directly: text colors and styles, images, graphs and tables, buttons, colors, and navigation menu etc. Backend is just accessible to the users for data input which are then visualized in the frontend. The participants are given a walk-through of each module of the system and training sessions conducted to use the backend of the system to input and edit the data as per their scope of work. The team also collects and records feedback on the training conducted and, on the usability, and utility aspects of BIPAD. To date, localization programs have been conducted in Bagmati Province, Sudurpaschim Province, Karnali Province and Province 5. The main purpose of the localizations is to ensure that every sphere of governments can use the system and contribute, so that they can use the data to make informed planning and decisions and prepare and respond to disasters effectively and efficiently.

CHALLENGES AND WAY FORWARD

BIPAD is an integrated and comprehensive system that aims to cater to many users at all spheres of government including the general public, nationally and internationally. The major challenges includes the technical development process which has been rigorous and challenging, lack of available data at local level and also limited knowledge and technical capacity of human resources at local levels. Institutionalizing the use of such technology might come as a challenge for the officials.

BIPAD has been developed with the vision of creating a robust, flexible, stable and user-friendly platform to enhance and strengthen disaster information management as well as disaster management of the country. It is solely a user-centric platform and is still in the process of development. As the development of the system is an iterative process incorporating useful feedback from users as well as experts working in the field of DRR, continuous research and innovation has been a great part of the process. The next phase of the development mainly focuses on enhancing the cohesiveness, intuitiveness, and overall stability of both frontend and backend of the system with enhanced UI and UX. A Standard Operating Procedure (SOP) for access, data entry, enrichment and verification will be established. Localization, institutionalization and technical capacity transfer at federal, provincial and local spheres to ensure the sustainability of BIPAD will be an integral part of the overall development process.

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Climatic Hazards Programme

SEADPRI–UKM Promotes Social Entrepreneurship to Build Community Resilience

Joy Jacqueline Pereira & Nurul Syazwani Yahaya

SEADPRI-Universiti Kebangsaan Malaysia

The project on "Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience" is funded by the International Development Research Centre (IDRC) Canada. It was launched by the Selangor Chief Minister, YAB Dato' Seri Amirudin bin Shari, who was represented by the Head of the Selangor State Disaster Management Unit, Mr. Ahmad Fairuz Mohd Yusof. Also present at the launch on 21 Jan 2020 at the Concorde Hotel Shah Alam, were Her Excellency Julia Bentley, the High Commissioner of Canada in Malaysia, Project Advisor YM Tengku Mohd Azzman Shariffadeen, project members and stakeholders from key agencies in the State of Selangor constituting over 130 attendees.

Led by SEADPRI-UKM, the key partners of the project include the Royal University of Phnom Penh (RUPP), the Geological Society of Malaysia (GSM), the Malaysian DRR Service Organization (MDRRSO) and the Selangor State Disaster Management Unit. The main objective of the project is fostering long-term community resilience in Malaysia and Cambodia by empowering young female social entrepreneurs to develop disaster resilience plans. Social entrepreneurs are highly innovative, creative, risk- taking individuals with higher levels of social conscience and low levels of self-interest, who seek to maximize social value from non-profit pursuits to solve social problems. The project aims to bring together and train such individuals from the youth groups to build community resilience by developing disaster resilience plans that integrate climate change adaptation to support decision- making at the local level.

The workshop on Promotion of Social Entrepreneurship for Disaster Risk Reduction (DRR) was also held in conjunction with the launch of the project. The workshop highlighted the experience of social entrepreneurship and citizen science in DRR as well as youth participation in DRR from the region. A panel session on the experience of disaster management in Kuala Selangor, Shah Alam and Ampang Jaya, Selangor provided a sound background on the opportunities ahead for social entrepreneurship in DRR.

The Project Members of SEADPRI-UKM and Dr. Chinnh Nyda *(third right)* of the Royal University of Phnom Penh, Cambodia met with Dr. Melanie Robertson *(second right)* of the IDRC in November 2019 to discuss implementation of the project.

Project Advisor and Vice President of the Academy of Sciences Malaysia, YM Tengku Mohd Azzman Shariffadeen *(far right)* presented a token of appreciation to Her Excellency Julia Bentley at the launch event with Mr. Ahmad Fairuz Mohd Yusof.

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Geological Hazards Programme

A National Risk Register for Building Disaster Resilience

Lim Choun Sian

SEADPRI-Universiti Kebangsaan Malaysia

Disaster resilience alludes to the ability to bounce back from the effect of disasters. It transcends into anticipating, planning and reducing disaster risk to effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socio-economic assets and ecosystems. In the context of a country, national risk assessment is carried out to understand the possible risks in order to enhance the ability to prepare and plan for, absorb, recover from and more successfully adapt to adverse events.

Terms such as national risk assessment, national risk register, national risk profile or national disaster risk assessment may be used when drawing up such a document. The names may differ in different parts of the world and as per its specific purpose. Ultimately, it serves to provide an opportunity for the identification, discussion and consideration of risks over a certain period of time. In the United Kingdom, for example, both national risk register and national risk assessment exist in the disaster management systems. The United Kingdom National Risk Register summarizes most significant emergencies, from likelihood and potential impact of a range of different risks including natural hazards, that may affect the country and its people for the next five years.

It also outlines a set of recommendations for ensuring that policies, measures and investments use risk information to be properly targeted towards reducing risk effectively. In Malaysia, under the aegis of the National Disaster Management Agency (NADMA), a National Risk Register document is under development. The National Risk Register is part of a national-level project carried out to realize three objectives. It is an augural effort to chart the mechanism of disaster risk management in the country, and establish a comprehensive repository to store disaster loss data. It takes a cross-sectoral and multi-risk approach to understand and profile natural hazards that are significant, in line with the global commitment to the Sendai Framework for DRR, Sustainable Development Goals (SDG) and Paris Agreement.

The National Risk Register communicates risks to all stakeholders and actors, and provides a systematic overview of strategic actions needed to be taken in managing the risks. The document will provide recommendations for the ongoing prevention and preparedness measures for DRR. This initiative is led by SEADPRI-UKM, with support from government agencies and researchers in Universiti Utara Malaysia and Universiti Malaysia Sabah.

Community engagement on DRR is one of the important elements in communicating risk at the local level.

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Technological Hazards Programme

On-site Rapid and Early Detection of COVID-19

Tan Ling Ling

SEADPRI-Universiti Kebangsaan Malaysia

In December 2019, Wuhan city, the capital of Hubei Province in China, became the centre of an outbreak of pneumonia of an unknown cause. By 7 January 2020, Chinese scientists had isolated a novel coronavirus, severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2; previously known as 2019-nCoV), from the patients with virus-infected pneumonia. In February 2020, this was designated as coronavirus disease 2019 (COVID-19) by the World Health Organization (WHO). Although the outbreak is likely to have started from a zoonotic transmission event associated with a large seafood market that also traded in live wild animals, it soon became clear that efficient person-to-person transmission was also occurring. The clinical spectrum of SARS-CoV-2 infection appears to be wide, encompassing asymptomatic infection, mild upper respiratory tract illness, severe viral pneumonia with respiratory failure and even death. The level and duration of infectious virus replication are important factors in assessing the risk of transmission and guiding decisions regarding isolation of patients. Because nucleic acid detection of coronavirus is more sensitive than virus isolation, most studies have used qualitative or quantitative viral DNA/RNA tests as a potential marker for infectious coronavirus.

PCR: The Gold Standard of COVID-19 Diagnosis

For SARS-CoV, viral RNA was detected in respiratory specimens from patients of 4 weeks after the onset of disease. Similarly, the duration of Middle East respiratory syndrome (MERS-CoV) RNA detection in lower respiratory specimens persisted for at least 3 weeks, whereas the duration of SARS-CoV-2 RNA detection has not been well characterized. In addition, the estimated duration of viral shedding is limited by the frequency of respiratory specimen collection, lack of quantitative viral RNA detection, and relatively low positive rate of SARS-CoV-2 RNA detection in throat swabs.

The virus can be transmitted by ingestion of contaminated food or water, person-to-person contact, and contact with contaminated surfaces or objects. There are currently no vaccines or antiviral drugs for the treatment of COVID-19 - infection. Therefore, a rapid and sensitive detection system is essential for preventing and reducing COVID-19 outbreaks in both developed and developing countries. There are several mainstream methods for detecting SARS-CoV-2 in humans including antibody based-serological screening, next-generation sequencing, real-time reverse transcriptase polymerase chain reaction (real-time RT-PCR) and virus isolation in cell cultures. Although RT-PCR is widely employed owing to its high sensitivity relative to other methods, it requires expensive, sophisticated equipment and trained personnel as well as time-consuming preparation steps, making it unsuitable for point-of-care (POC) testing.

State-of-the-art: Integrating Nanotechnology and POC Testing

There is an increasing demand for POC tests in many fields, including clinical analysis, food safety and environmental assessment, and many efforts have been made to develop biosensors that are affordable, sensitive, specific, user-friendly, rapid and robust, equipment-free and deliverable to end-users (ASSURED) that meet WHO criteria. Paper-based analytical devices (PAD) have received considerable attention for POC applications owing to the advantages of being low cost, lightweight, plus ease of handling and fluid transport by capillary wicking. However, it has limitations in terms of sensitivity and manipulation of fluid flow. To overcome these drawbacks, recent research on PADs has focused on improving detection signal and modifying paper geometry. For example, various detection labels (e.g. nanoparticles, carbon nanotube, quantum dots, fluorescent dyes, etc.) and amplification methods (enzymatic reaction and metallic precipitation) have been integrated to improve detection signal and sensitivity for optical or electrochemical detection of analyte of interest. Recently, the research team from SEADPRI-UKM has engaged with the Department of Earth Sciences and Environment, Faculty of Science and Technology, UKM and Virology Laboratory, Institute for Medical Research, to work collaboratively on the development of a point-of-care and device-on-site testing nanogenosensor for COVID-19 specific RNA. This work is anticipated to contribute to early detection of COVID-19.

Commercially available rapid test kit to undergo clinical tests to gauge its accuracy and sensitivity to detect COVID-19 in patients.

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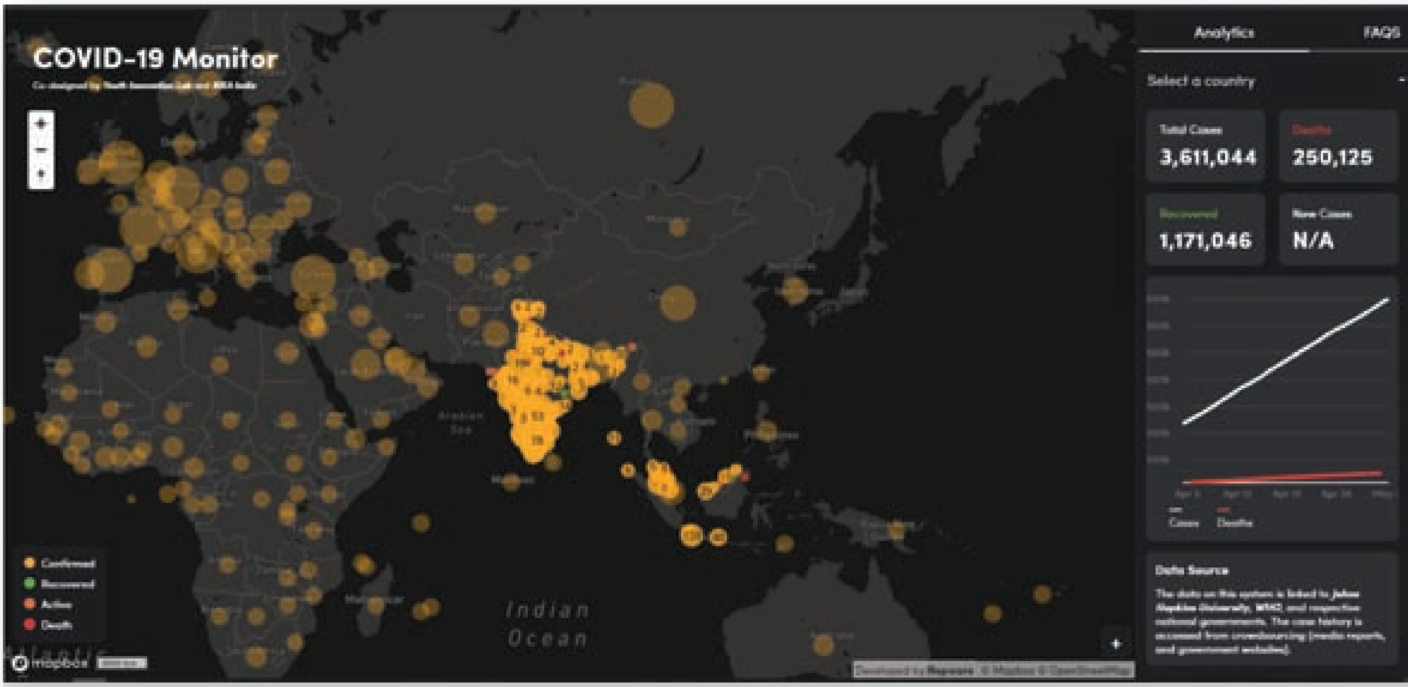
U-INSPIRE Malaysia's Contribution to COVID-19

Mohd Khairul Zain Ismail

SEADPRI-Universiti Kebangsaan Malaysia



The COVID-19 Monitor is co-designed by Youth Innovation Lab and RIKA India; it can be accessed via webpage https://covid19-monitor.net/.

U-INSPIRE Malaysia @UKM, under the aegis of ANCST Special Topic Group (STG) on Young Professionals in DRR and Climate Change, has contributed to the U-INSPIRE Alliance initiative on COVID-19 Monitor (https://covid19-monitor.net/). This is an online portal to trace COVID-19 patients by tracing their movements across countries, and within cities based on an open-source platform available in the public domain. This tracer is important as it identifies the hotspots and will support informed decision-making by the government and community. This platform differs from others that are available at the moment, as it traces the linkages between the cases and their movements within countries and abroad, where there is data available. The portal is co-designed by Youth Innovation Lab (a member of U-INSPIRE Nepal) and RIKA India (a member of U-INSPIRE India CRRP). The initiative is supported at the country level by U-INSPIRE Alliance country chapters, based on the crowdsourcing approach.

For U-INSPIRE Malaysia, this initiative is led by Dr. Vivien How of the UPM Faculty of Medicine and Health Sciences (a member of U-INSPIRE Malaysia) and Ms. Iffah Farhana of Universiti Teknologi MARA (a co-leader of U-INSPIRE Malaysia). The information is updated daily onto the webpage for the Malaysian cases, based on the official information released by the Ministry of Health Malaysia, which can then be retrieved online via their website.

U-INSPIRE Malaysia and other country chapters are also working with the U-INSPIRE Alliance in contributing to a write-up on "Countering Inevitable Infodemic" on Medium (https://medium.com/@covid19.-monitor), a blog-style information effort, with case studies from different countries. This initiative is led by Dr. Azliyana Azahari of UKM Pakarunding Sdn. Bhd and Ms. Farhana Shukhor of Universiti Utara Malaysia (members of U-INSPIRE Malaysia).

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southeast asia disaster prevention research initiative

Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM)
Universiti Kebangsaan Malaysia (UKM), 43600 UKM Bangi, MALAYSIA
Tel : +603 8921 4852/4853 Fax : +603 8927 5629 Email : seadpri@ukm.edu.my Website : www.ukm.my/seadpri

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