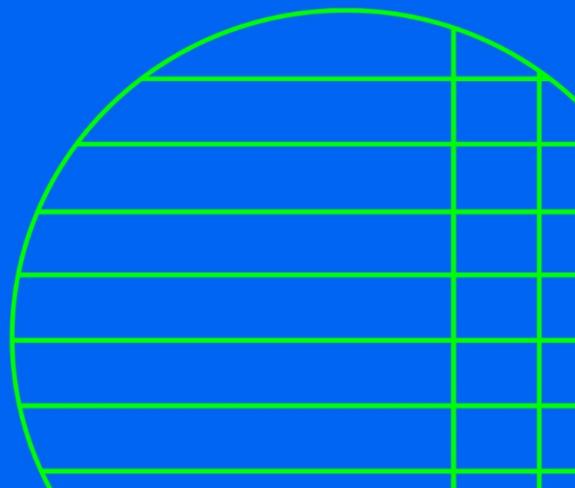


# MAPPING AND ANALYSIS OF VULNERABLE GROUPS FOR CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION (CCA-DRR) IN SUPPORT OF THE DIGITAL READINESS STRATEGY IN THE PHILIPPINES



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A study led by the United Nations Development Programme in the Philippines and Bangkok Regional Hub in collaboration with the Government of Japan as part of the DX4Resilience regional project.

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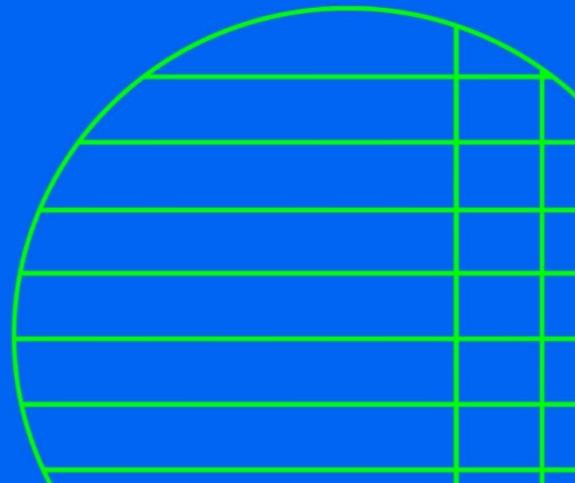
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## Acknowledgements

The study is led by the United Nations Development Programme in the Philippines and Bangkok Regional Hub in collaboration with the Government of Japan as part of the DX4Resilience regional project. The DX4Resilience supports the governments of Indonesia, Nepal, Philippines, and Sri Lanka in their digital transformation to reduce disaster risks and help people understand what happened, why it happened, and how to respond, prepare and recover. It focuses on helping vulnerable communities to become more resilient by using technology to better respond, prepare and recover from disasters in Asia-Pacific.

The following partner organizations provided useful insights: ADHD Society of the Philippines, AKAP-Pinoy, Ateneo Innovation Center - Ateneo de Manila University, CARE Philippines, Cancer Registry of the Philippines (CARE-PH), Center for Disaster Preparedness, Coastal Core, Department of Psychology - Ateneo de Manila University, Disaster Risk Reduction Network - Philippines, Environmental Science for Social Change - Ateneo de Manila University, Life Haven CIL, New Voice Association of the Philippines, Office of Civil Defense, Oscar M. Lopez Center, People's Disaster Risk Reduction Network, Philippine Disaster Resilience Foundation, PWD AKKAP-PASIG, UN WOMEN, UNDRR, and the UP Resilience Institute.

The study was prepared by the Climate Action Programme team at UNDP Philippines and the Disaster Risk Reduction and Recovery for Building Resilience Team at UNDP BRH led by Sanny Ramos Jegillos, Rajesh Sharma, Christine Apikul, Floradema Eleazar, Rodolfo Calzado Jr., and Christopher Tapnio (National Consultant) with support from Sooin Bang, Dany Olivera, Satoko Okamoto, and Dr. Tarek Rashed.

## Executive Summary

People get left behind when they lack the choices and opportunities required to participate and benefit from development progress (UNDP, 2018). Even in the digital world, a technological divide exists, acting as a barrier which prevent access and availability of digital governance initiatives by vulnerable groups.

The United Nations 2030 Agenda for Sustainable Development upholds the principle of “*Leave No One Behind*” in a concerted effort to reach the furthest behind, and in the context of this study, to make the benefits of digitalization inclusive of marginalized communities.

“*Accelerating Disaster Risk Reduction and Enhancing Crisis Response through Digital Solutions*”, also known as the DX4Resilience project, is an initiative implemented by the United Nations Development Programme (UNDP) - Bangkok Regional Hub (BRH). The project, funded by the Ministry of Foreign Affairs (MOFA) of Japan, is being implemented in four (4) countries namely: Indonesia, Nepal, Philippines, and Sri Lanka, and aims to strengthen disaster risk reduction and response by improving digitalization of data through innovative partnerships and solutions to support risk-informed development.<sup>1</sup>

As part of the DX4Resilience project’s output no. 2 (i.e., “*Targeted digital solutions for increased preparedness and response of vulnerable groups developed and applied*”), this mapping and analysis of vulnerable groups (MAVG) for CCA-DRR study aims to provide a better understanding of who the most vulnerable are, their respective locations, the multiple risks they face, their priority needs, and the barriers and opportunities for developing digital solutions to address gaps and maximize opportunities for the most vulnerable to the impacts of climate change.<sup>2</sup>

This study provides information that would be instrumental in developing appropriate and relevant digital solutions that address said problems and needs of vulnerable groups. It likewise contributes to the foundation of other UNDP Country Offices’ (CO) convergent projects such as the “*Strengthening Institutions and Empowering Localities Against Disasters and Climate Change in the Philippines*” (SHIELD) Program.

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<sup>1</sup> DX4Resilience: Country Implementation Plan – Philippines.

<sup>2</sup> DX4Resilience: Methodological Framework and Detailed Work Plan (2020).

Using participatory and mixed methods, e.g., focus group discussions, online survey, and literature review, guided by the Pressure and Release Model (Wisner et al., 2004) and the Digital Disaster Risk Reduction Maturity Model (DDRRMM)<sup>3</sup>, this study generated information on the challenges and barriers encountered by vulnerable groups to prepare for, respond to, and recover from disasters. This information is presented with attention on how said challenges can be addressed through digital solutions. Real-life experiences were extracted through focus groups discussions. Knowledge and perceptions of vulnerable groups with respect to CCA-DRR and their use of technology were collected through an online survey, and the review of literature validated the findings of the study.

This study includes the exploration of different demographics through the use of quantitative methods, e.g., a structured analysis of the barriers faced by vulnerable groups in terms of accessing and using digital technologies using the 5'A's framework adopted by Roberts & Hernandez (2019).

The study also prescribes to the Leave No One Behind (LNOB) agenda as anchor in the analysis of vulnerabilities of the groups mentioned in the study. The survey and the focus group discussion identified that these groups have the predisposition to be left behind even further in five (5) key areas, unless appropriate (digital) interventions are put in place. These areas are: discrimination (i.e., due to types of disabilities, gender, or class); geography (i.e., due to inequalities based on residence); governance (i.e., national and local policies that are discriminatory); socioeconomic (i.e., disadvantages in terms of income); and shocks and fragility (i.e., vulnerability and exposure to the impacts of climate change).

Several key points were confirmed by this study. First, persons with disabilities; women and the lesbian, gay, bisexual, transgender, queer, and intersex (LGBTQI) persons; and farmers and fisherfolk are highly vulnerable to the continued effects of both rapid onset events and slow onset events related to extreme weather events and climate variability. This is compounded by multiple vulnerabilities (i.e., those

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<sup>3</sup> A digital disaster risk reduction maturity model (DDRRMM) provides criteria for measuring the present capability of digital solutions in each country against five maturity levels across seven components: data, solutions, partnership, ICT infrastructure, users, policies, and alignment with/impact on DRR practices. It helps benchmark the state-of-the-art in digital technology applications to DRR in each country and provides a compass to driving forward the specific's country utilization of digital technologies in realizing various short- and long-term outcomes that ultimately manifest the desired change in the form of reduced disaster risks and improved community resilience.

with multiple disabilities) that cause double-triple marginalization. This was identified in the focus group discussions as an important factor to be considered in designing potential solutions. Second, the study confirmed the existence of different classes of technology access in the country. The different levels of availability, affordability, awareness, ability (or digital literacy), and agency created a “*stratification*” that was reflected in the survey results and focus group discussions. Together, its validity was triangulated with results of the literature review.

Based on its findings, multiple entry points and opportunities for digital solutions to address the priority CCA-DRR needs of vulnerable groups were presented in this study. This information contributes to future efforts to design digital solutions, and findings will be incorporated into the DX4R project’s Digital Readiness Strategy that serves as a supplemental document to the Philippine government’s updated National Disaster Risk Reduction and Management (NDRRM) Plan for 2020-2030, among other entry points that may be identified in the future. This arrangement was approved by the Philippines’ NDRRM Council (NDRRMC) Disaster Prevention and Management pillar, through the passing of its Resolution No. 1, s. 2021 entitled “*Resolution Establishing Cooperation with UNDP on Data Governance for Resilience*”.

Several globally proven digital technologies were also examined in this study and recommended for its potential use as a digital solution in addressing the priority needs of vulnerable groups in CCA-DRR. The nationwide reach of television offers opportunity for adopting TV White Space technology, which has the ability to provide connectivity to far-flung rural areas not reached by the local telecommunication companies. The Near-Cloud System also holds promise in allowing the continuous flow of communication and transfer of vital information in places where 3G/4G access is cut off during and after disasters. The SCOPE, a platform for beneficiary and transfer management used by the World Food Programme (WFP), is noteworthy as it is a proven cloud-based digital solution that identifies households and individuals for cash-based assistance and support. Various messaging apps (i.e. Viber, WhatsApp, Messenger) that can be accessed with “free data” can be used in Early Warning Systems to reach a greater number of people.

The study calls for key stakeholders to recognize that any digital solution, in order to be genuinely inclusive, should first acknowledge that a digital divide exists in the country and, as such, must first into account the interplay of various socioeconomic

and political factors that affect technological access of vulnerable groups that occupy the lowest ladders of the largely stratified digital world.

Designing digital solutions must address the root causes of vulnerabilities; must break down the barriers presented by affordability; provide activities that would foster digital awareness; conduct trainings and capability building to build up abilities and digital literacy; and implement grassroots level initiatives to encourage community participation to voice out their insights and opinions freely.

Funds must be allocated to the appropriate programs and projects in support of digital solutions including the fast tracking modernization of ICT Infrastructure, implementing programs to effectively cascade the updated NDRRM Plan 2020-2030 to the local government and other stakeholders; conducting capacity building initiatives that addresses digital literacy; and establishing, enhancing, and enriching partnerships and linkages between and among the different stakeholders in the CCA-DRR and vulnerable groups space. This would ensure that digital solutions are inclusive, openly available and accessible to all, personalized, holistic, and user-friendly so that no one would be left behind.

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## LIST OF ACRONYMS AND ABBREVIATIONS

|         |  |
|---------|--|
| ARMM    | Autonomous Region of Muslim Mindanao   |
| CAR     | Cordillera Administrative Region   |
| CCA     | Climate Change Adaptation  |
| CRI     | Climate Risk Index   |
| CTI     | Coral Triangle Initiative  |
| CVCA    | Climate Vulnerability and Capacity Analysis                                  |
| DDRRMM  | Digital DRR Maturity Model   |
| DOH     | Department of Health   |
| DRR     | Disaster Risk Reduction  |
| DRRM    | Disaster Risk Reduction and Management                                       |
| DSWD    | Department of Social Welfare and Development                                 |
| EbA     | Ecosystem-based Adaptation   |
| Eco-DRR | Ecosystem-based Disaster Risk Reduction                                      |
| ENSO    | El Niño Southern Oscillation   |
| EWS     | Early Warning System   |
| FGD     | Focus Group Discussion   |
| GIS     | Geographical Information System  |
| HIV     | Human Immunodeficiency Virus   |
| IATF    | Inter-Agency Task Force  |
| ICT     | Information and Communications Technologies                                  |
| IFRC    | International Federation of Red Cross and Red Crescent Societies             |
| IP      | Indigenous People  |
| IPCC    | Intergovernmental Panel on Climate Change                                    |
| KRA     | Key Result Area  |
| LGBTQI  | Lesbian, gay, bisexual, transgender, queer, intersex                         |
| LGU     | Local Government Unit  |
| LNOB    | Leave No One Behind  |
| MAVG    | Mapping and Analysis of Vulnerable Groups                                    |
| MIC     | Ministry of Internal Affairs and Communications, Japan                       |
| MOFA    | Ministry of Foreign Affairs, Japan   |
| MSM     | Men who have sex with men  |
| NCR     | National Capital Region  |
| NDRRM   | National Disaster Risk Reduction and Management                              |
| NDRRMC  | National Disaster Risk Reduction and Management Council                      |
| NICTHS  | National ICT Household Survey  |
| PAGASA  | Philippine Atmospheric, Geophysical and Astronomical Services Administration |
| PAR     | Pressure and Release Model by Wisner et al. (2004)                           |
| PCCA    | Philippine Climate Change Assessment   |
| PSA     | Philippine Statistics Authority  |
| PWD     | Persons with Disability  |

|          |  |
|----------|--|
| SLR      | Sea level rise   |
| SMS      | Short Messaging Service  |
| UN OCHA  | United Nations Office for the Coordination of Humanitarian Affairs |
| UN OHCHR | United Nations High Commissioner for Human Rights                  |
| UNDP     | United Nations Development Programme                               |
| UNDP CO  | United Nations Development Programme Country Office                |
| UNDRR    | United Nations Office for Disaster Risk Reduction                  |

## 1. INTRODUCTION

The DX4Resilience project also known as “*Accelerating Disaster Risk Reduction and Enhancing Crisis Response through Digital Solutions*” is an initiative implemented by the United Nations Development Programme (UNDP) - Bangkok Regional Hub (BRH) which aims to strengthen disaster risk reduction and response by improving digitalization of data through innovative partnerships and solutions to support risk-informed development.<sup>4</sup> Funded by the Ministry of Foreign Affairs (MOFA) of Japan, it is being implemented in four (4) countries namely: Indonesia, Nepal, Philippines, and Sri Lanka.

As such, the project addresses challenges that are regional in scope, such as the increasing disaster and climate risks in the region; the need for accelerating progress towards sustainable development goals (SDGs) as well as disaster risk reduction objectives set by the Sendai Framework for Disaster Risk Reduction (SFDRR); the inadequacy of disaster loss and damage data; COVID-19 impacts; and the need to strengthen the role of the private sector in building resilient communities.<sup>5</sup>

The DX4Resilience project covers three (3) outputs namely:

- Output 1: Disaster data digitalized and integrated using cloud-based technologies to support disaster risk reduction and recovery in project countries
- Output 2: Targeted digital solutions for increased preparedness and response of vulnerable groups developed and applied
- Output 3: Strengthened capacities of national and subnational governments through partnerships for disaster risk informed development planning

As part of the DX4Resilience project’s output no. 2, this mapping and analysis of vulnerable groups (MAVG) for CCA-DRR study aims to provide a better understanding of who the most vulnerable are, their respective locations, the multiple risks they face, their priority needs, and the barriers and opportunities for developing digital solutions to address gaps and maximize opportunities for the most vulnerable to the impacts of climate change.

Based on the latest Global Climate Risk Index (CRI), although the Philippines has dropped off the list of the ten (10) most affected countries in 2019, it still remains no. 4 in the top ten (10) countries under the long-term CRI.<sup>6</sup> This highlights that the Philippines is one of the

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<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid.*

<sup>6</sup> Based on Germanwatch, the Philippines ranks 4<sup>th</sup> for countries affected by climate-induced hazards from 2000 to 2019 based on annual averages – the same ranking it had from 1999-2018. Having a high CRI emphasize the particular vulnerability of poor countries to climatic risks.

countries regularly exposed to tropical cyclones due to its geographical location, and continuously ranks among the most affected countries, both in the long-term index and in the index for each respective year (Eckstein et al., 2021). The Philippines is also one of the countries where the presence and corresponding impacts of sea level rise (SLR)—an inevitable consequence of climate change—are already felt. As an archipelagic country with an extensive coastline of approximately 36,289 km (Long & Giri, 2011 as cited by Villarin, et al., 2017), this phenomenon will have far reaching implications as far as climate-induced hazards are concerned. The majority of the country's growing population live in coastal lowlands, placing them at risk to the impacts of increased sea levels (Berdin, Siringan, & Maeda, 2003; Capili et al., 2005; Reyes & Blanco, 2012, as cited by Villarin, et al., 2016). Consequent hazards in relation to sea-level rise range from increased hazards posed by intensified storm surges, permanent flooding of low-lying areas, to salinization of coastal freshwater aquifers.

However, research focus is on sudden or quick onset hazards (i.e., typhoons, storm surges, earthquakes), which tend to overlook the slow onset processes such as extremes in temperature, variations in rainfall volume, and sea-level rise (Ayeb-Karlsson & Uy, 2021) that also impact people, especially vulnerable groups.

Another major gap in DRR in developing countries is on the scarcity of research on policy responses to disasters and decision-making as causes and drivers of vulnerability and risk since most studies have tended to focus on infrastructural causal factors and institutional susceptibility to disasters.<sup>7</sup>

To add to that, infrastructure reconstruction remains the focus of the majority of disaster response and recovery in the Philippines, rather than socio-economic recovery which compromised its poverty reduction efforts.<sup>8</sup> This has wide ranging repercussions on the plight of the marginalized and most vulnerable sectors of the Philippine society and highlights the urgent need for targeted interventions. These groups are usually excluded from the rest of the citizenry and are “left behind”.

Even in the digital world, availability and access to digital governance initiatives by vulnerable groups remains a gap. These initiatives include disaster response and recovery. Thus, there is an urgent need to first understand the situation of unconnected, least connected, and poorly connected before working on initiatives to make digitalization inclusive of disadvantaged communities (Roberts & Hernandez, 2019).

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<sup>7</sup> MOVE project (2012), as cited in Henriquez (2017).

<sup>8</sup> Terms of Reference for Mapping and Analysis of Vulnerable Groups (MAVG), UNDP Country Office.

This report provides valuable contribution in bridging those gaps and providing support in achieving the major objectives of the DX4Resilience project.

Thus, the purpose of this MAVG study is to produce a report with recommendations for future interventions in support of the development of Digital Readiness Strategy in the Philippines.

Results of this study would be instrumental in developing appropriate and relevant digital solutions that address the said problems and needs of vulnerable groups. The subsequent development of digital solutions is expected to contribute to the following:

- Improved data and information about the most vulnerable and their needs, and the effective use of the information to build their resilience to disaster risk and climate change;
- Vulnerable groups have access to and benefit from information about the risk they face, are aware of their rights, and can act on the information to reduce risk and adapt to climate change; and
- Vulnerable groups are included in the design, implementation, and monitoring of DRR and climate change adaptation policies and interventions.

As part of the outputs of the DX4Resilience project, this study also contributes to the foundation of other UNDP Country Offices' (CO) convergent projects such as the "*Strengthening Institutions and Empowering Localities Against Disasters and Climate Change in the Philippines*" (SHIELD) Program.

## **2. LITERATURE REVIEW**

### **2.1 Climate Change and its impacts to the Philippines**

Multiple researches have provided us with the present and the future climate scenario for the Philippines in terms of increase in frequency and intensity of extreme weather events (Cruz et al., 2007 as cited in Cruz et al., 2017); sea-level rise (Kahana et al., 2016); coastal erosion and salinization. The Philippines is highly exposed to various weather-related hazards by virtue of its geographical location, and has a large population dependent of natural resource-based livelihoods that are vulnerable to climatic changes (Ayeb-Karlsson & Uy, 2021).

Climate hazards will definitely impact different key sectors in municipalities and provinces of the Philippines. These sectors include agriculture; water and water systems; energy; coastal ecosystems; infrastructure and related services; and human health (USAID, 2017).

General climate projections show a 1.8 to 2.2° Celsius increase in temperature by 2050. Buendia et al. (2018) predicts an increased incidence of heavy and extreme rainfall in Luzon and Visayas during Southwest monsoon making wet season wetter; reduced rainfall from March-May in most areas; decreasing rainfall trends for most of Mindanao; increased incidence of extreme weather and hazard events (including days exceeding 35 °C, days with less than 2.5mm of rain, and days exceeding 300 mm of rain); 0.48 -0.65 m rise in sea levels by 2100.

The abovementioned climate projections are exacerbated by consequent sea level rise in the Philippines. Satellite observations from 1993-2015 show that the tropical Western Pacific region east of the Philippines experienced sea level increase of 5-7 mm/year, which is twice the global average. This is supported by coastal tide gauge records around the Philippines which indicate a general pattern towards increase sea levels over the past 50 years (Cruz et al., 2017).

Primary impacts of sea level rise in an archipelagic country such as the Philippines is significant. The country ranks 6<sup>th</sup> worldwide in terms of the length of its coasts (i.e., 36,289 km), and although its coastal zone covers approximately 11,000 km<sup>2</sup> or only 4% of its total land area, it is home to 63% of the country's total population or roughly 50 million people. With a growing population and increasing presence of infrastructure along the coasts, these communities become more and more at risk to coastal hazards brought about by the future climate. Kahana et al., (2016) enumerates possible consequent hazards in relation to sea-level rise:

- Increase hazards posed by intensified storm surges;
- Permanent flooding of low-lying areas;
- Shoreline erosion and retreat;
- Salinization of coastal freshwater aquifers;
- Damage to coastal defenses include both the green systems such as mangrove stands, coral reefs, seagrass areas, tidal flats etc., as well as hard engineering structures (e.g., seawalls, dikes, groynes); and
- Greater amount of flooding.

The coasts are also the center of most economic activities. Majority of the country's poor fisherfolk and subsistence farmers have chosen to settle down in the coasts because of these areas' rich natural resources, providing them food and livelihoods. The total monetary value of the Philippines' coastal and marine ecosystems has been estimated at almost USD 600 billion in 2007 (UNDP, 2015). Thus, the impacts of a changing climate characterized by extreme weather events is of urgent concern.

Extensive studies conducted in relation to the impacts of climate change to coastal ecosystems are highlighted in the Philippine Climate Change Assessment (PCCA) of 2017. Cruz, et al, (2017) cites several studies showing that Philippines coasts are vulnerable to sea level rise due to physical and socio-economic factors mainly excessive groundwater withdrawals (Perez, Amadore, & Feir 1999); beach mining as in the case of La Union (Siringan et al., 2005); coastal modifications as that in Banabang-Molino-Balayan Coast (David, et al., 2010); and mangrove removal as in Kampumpong River, Batangas City (David et al., 2010). Food security and livelihoods are at risk from climate and non-climate impacts to fish spawning and nursery areas in river and estuarine habitats in the Coral Triangle (Coral Triangle Initiative [CTI], 2011 as cited in Cruz, et al, 2017).

Observed climate change impacts on coastal systems include: i) damage to property (e.g., hotels, resorts, houses, and boat) during tropical or low pressure; ii) coral bleaching and increasing number of crown-of-thorns starfish; iii) impacts to livelihood and tourism in vulnerable coastal areas; iv) relocation of a number of houses because of coastal erosion; v) washing out of houses, boats, and trees during tropical cyclones; vi) decrease in fish catch during tropical cyclones; vii) increased risks of mangrove areas, coral reefs, and marine protected area and beaches; viii) storm surge inundation; and ix) loss of lives (Cruz, et al., 2017).

Furthermore, Cruz et al., (2017) adds that future changes in Philippine climate relative to the baseline climate (1971–2000) have been projected by PAGASA (2011) for the 2020s (2006–2035) and 2050s (2036–2065) in response to three emission scenarios characterized as low-range (B2), mid-range (A1B)<sup>9</sup>, and high-range (A2). In particular, climate projections under the mid-range scenario indicate increases in annual mean temperatures by 0.9°C to 1.1°C in the 2020s and 1.8°C to 2.2°C in the 2050s.

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<sup>9</sup> The A1 storyline and scenario family portrays a world with rapid economic development, population growth that peaks in mid-century, and faster introduction of more efficient technologies. This scenario also describes different technological emphases from fossil-intensive (A1FI), non-fossil (A1T) to balance across multiple sources (A1B).

## 2.2 Hazard, Exposure, Vulnerability, Capacity

Key concepts in the CCA-DRR discourse were presented in the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), whose interplay is described in Figure 1.

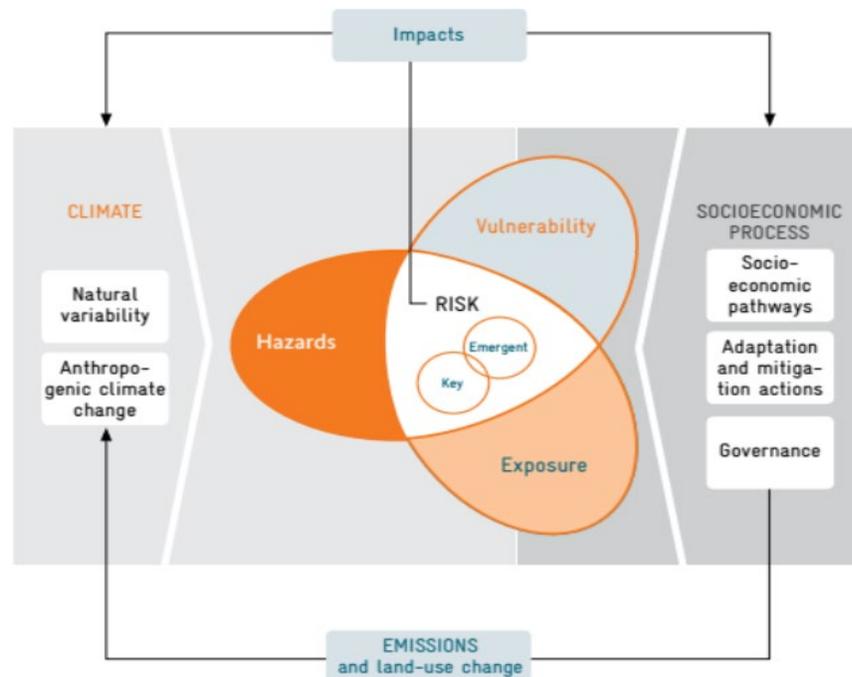


Figure 1. Key concepts in the IPCC Fifth Assessment Report (WGII) (IPCC, 2014)  
Source: EbA and Eco-DRR Guidelines, 2018.

The IPCC identifies the three (3) drivers of risk as “*hazard*”, “*vulnerability*” and “*exposure*” (IFRC, 2020). The UN International Strategy for Disaster Reduction or UNISDR (2009) and the IPCC 4<sup>th</sup> Assessment Report (2007) provide definitions as shown in Table 1

Table 1. Definition of key concepts used in CCA-DRR.

| CONCEPT       | Definition  |
|---------------|---|
| DISASTER      | A serious disruption of the functioning of a community or a society, which exceeds the ability of the affected community or society to cope using its own resources               |
| DISASTER RISK | Potential disaster loss in lives, health status, livelihoods, assets and services, which could occur in a particular community or a society over some specific future time period |

|               |  |
|---------------|--|
| HAZARD        | A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage |
| EXPOSURE      | People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.   |
| VULNERABILITY | Characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of hazard.  |

A hazard refers to both rapid onset (i.e., shocks), such as floods or drought, as well as slow onset (i.e., stresses) such as changing rainfall patterns. Hazards may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. There is a need to understand the dynamic nature and interactions of hazards to effectively analyze vulnerability. For example, several hazards, including climate shocks and stresses, combined with declining soil fertility, may result into food shortages (CVCA, 2009).

Vulnerability, aside from the susceptibility of a system to the damaging effects of hazards, is the inability to cope to the effects of climate change, including climate variability and extremes (IPCC, 2001). In general, those who have very limited access to resources that would facilitate adaptation are the most vulnerable (CVCA, 2009).

Vulnerability is closely related to the concept of exposure, sensitivity, and adaptive capacity. Exposure refers to people, property, systems, and other elements that are subject to losses due to its location in hazard zones (UNISDR, 2009). It is primarily a function of geography, for example, coastal areas are more exposed to sea level rise and coastal flooding (CVCA, 2009)

Sensitivity is the degree to which the community is affected by climatic stresses. A farming community highly dependent on rain-fed agriculture, for example, is considered much more sensitive than those working in sectors that are not affected by rainfall variations (CVCA, 2009).

The ability of a system to adjust to climate variabilities and extremes in order to moderate potential damages is called Adaptive Capacity (IPCC, 2001). It takes advantage of opportunities, cope with the consequences, and is dependent on how individuals, households and communities access and control natural, human, social, physical, and financial resources (CVCA, 2009).

## 2.3 The Vulnerable Groups

According to IFRC (2020), attempting to list vulnerable groups has “*serious limitations and cannot be automatically exhaustive as any group that experiences pre-existing discrimination and marginalization may be disproportionately affected by disasters, depending on the local context.*” Identification of vulnerable groups depending on the context is also needed in targeting appropriate adaptation strategies based on that context (CVCA, 2009). Table 2 show definitions of vulnerable groups as suggested by IFRC (2020) to provide “*comparative analysis and further investigation.*”

Table 2. Definition of vulnerable groups from various international documents.

| <b>International document</b>                            | <b>Definition</b>  |
|--|--|
| UN Agenda 2030   | “All children youth, persons with disabilities, people living with HIV/AIDS, older persons, indigenous peoples, refugees and internally displaced persons and migrants”  |
| Paris Agreement  | “Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations”   |
| Sendai Framework   | Vulnerable categories are “relevant stakeholders” governments should engage with in designing and implementing DRR policies, plans and standards, and includes women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons   |
| IFRC Checklist on and Disaster Preparedness and Response | VGs are those disproportionately impacted by disasters: “women and girls; children, particularly unaccompanied and separated children; adolescents and young adults; older persons; persons with disabilities; migrants, displaced persons and refugees and stateless persons; indigenous groups; ethnic and racial minorities; homeless persons; persons living in informal and unmapped settlements and sexual and gender minorities”. |

Source: IFRC, 2020

During the inception phase, the study has adopted the definition from the Office of the United Nations High Commissioner for Human Rights. The UN OHCHR defines vulnerable groups as

people living in poverty, workers, children, minority groups, indigenous peoples, migrants, among other vulnerable or susceptible groups, with highly gendered impacts.<sup>10</sup>

With the rapid nature of this study, key sectors considered in the MAVG are persons with disabilities; women and LGBTQI community; and farmers and fisherfolk. Note that these groups fall under the category of “vulnerable groups” as defined in Table 2.

### ***Who are the vulnerable groups?***

The UN OHCHR sees the vulnerable groups as having a high degree of susceptibility, and within the context of this study, it is susceptibility to shocks, both rapid and slow onset hazards. Thus, this study asks: in the Philippine setting, who really are the groups vulnerable to the impacts of Climate Change and Disasters?

Although the study adopted the working definition of UN OHCHR to include workers, children, minority groups, migrants, due to the rapid nature of the study as well as the COVID-19 pandemic, it was agreed during the inception phase that the focus of the study would be limited to persons with disabilities, women and LGBTQI community, and the agricultural sector.

Persons with disabilities are well represented in this study both in the online survey and the focus groups. The respondents from the online survey (n=107) were females (48.6%) and some members of the LGBTQI community (4.7%). Due to some limitations, respondents from the agricultural sector accounted to 5% of the total sample size. To supplement the scarcity of data sources, secondary sources of data were used to cover the intersectionalities between gender and DRR; and agricultural sector and DRR.

### ***Distribution of Vulnerable Groups in the Philippines***

Latest data sets from the Philippine Statistics Authority (PSA) were culled to show the distribution of vulnerable groups in the Philippines. Geographical Information System generated maps (Figs. 2-4) were developed from these data sets to visualize their density in the different regions. This can assist future planners in customizing potential digital solutions to address the needs and concerns of vulnerable groups as discussed in this study.

The Philippine Census on Population and Housing (2010) defines disability as:

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<sup>10</sup> As cited in the Terms of Reference for Mapping and Analysis of Vulnerable Groups (MAVG), UNDP Country Office

*“any restriction or lack of ability (resulting from impairment) to perform an activity in any manner or within the range considered normal for a human being. Impairments associated with disabilities may be physical, mental, or sensory motor impairment such as partial or total blindness, low vision, partial or total deafness, oral defect, having only one hand/no hands, one leg/no legs, mild or severe cerebral palsy, retarded, mentally ill, mental retardation and multiple impairment.”*

Table 3 shows a gender-disaggregated data on persons with disabilities by age group. In 2010, there were 1,443,000 household population with disability, which translates into 1.57% of the population from a total of 92.1 million household population (PSA, 2010). In terms of age group, majority belonged to the 15-49-year-old category, followed by 65 years old and over. We highlight two (2) important characteristics of this data. First, this represents a proportion of the working age population and the senior citizens. Second, there were more females with disability than males in the 65 years old and over category (UNDP, 2019). This suggests that gender and disability, compounded with old age, increases their vulnerability.

Table 3. Persons with Disabilities by gender and age.

| Age Group         | Persons with Disability<br>(in 1,000) by Sex |      |        |
|-------------------|--|------|--------|
|                   | Total  | Male | Female |
| All Ages          | 1,443  | 734  | 709    |
| 0 - 14            | 272  | 149  | 123    |
| 15 - 49           | 578  | 312  | 266    |
| 50 - 64           | 274  | 141  | 133    |
| 65 years and over | 319  | 132  | 187    |

Source: Philippine Statistics Authority, 2010 Census of Population and Housing

As shown in Table 4, CALABARZON Region had the highest number of persons with disabilities (193,000). This was followed by the National Capital Region (167,000), Region III (139,000), then Region VI (138,000). Ten (10) regions displayed a proportion of persons with disabilities higher than the national figure. These were Region VI (1.95 percent), Region IVB and Region V (both 1.85 percent each), Region VIII (1.75 percent), Region II (1.72 percent), Region I (1.64 percent), CAR (1.63 percent), Region XI and Region VII (both 1.60 percent each), and CARAGA (1.58 percent)

Table 4. Number of Persons with Disability per Region

| <b>Region</b>                               | <b>Household Population (in 1,000)</b> | <b>Household Population with Disability (in 1,000)</b> | <b>Proportion of Persons with Disability to the Household Population (in %)</b> |
|---|--|--|---|
| Philippines                                 | 92,098                                 | 1,443  | 1.57  |
| National Capital Region (NCR)               | 11,797                                 | 167  | 1.41  |
| Cordillera Administrative Region (CAR)      | 1,612                                  | 26   | 1.63  |
| Region I – Ilocos                           | 4,743                                  | 78   | 1.64  |
| Region II – Cagayan Valley                  | 3,226                                  | 56   | 1.72  |
| Region III – Central Luzon                  | 10,118                                 | 139  | 1.38  |
| Region IV-A – CALABARZON                    | 12,583                                 | 193  | 1.53  |
| Region IV-B – MIMAROPA                      | 2,732                                  | 50   | 1.85  |
| Region V – Bicol                            | 5,412                                  | 100  | 1.85  |
| Region VI – Western Visayas                 | 7,090                                  | 138  | 1.95  |
| Region VII – Central Visayas                | 6,785                                  | 109  | 1.6   |
| Region VIII – Eastern Visayas               | 4,090                                  | 72   | 1.75  |
| Region IX – Zamboanga Peninsula             | 3,398                                  | 46   | 1.35  |
| Region X – Northern Mindanao                | 4,285                                  | 67   | 1.56  |
| Region XI – Davao                           | 4,453                                  | 71   | 1.6   |
| Region XII – SOCCSKSARGEN                   | 4,103                                  | 59   | 1.43  |
| Autonomous Region in Muslim Mindanao (ARMM) | 3,249                                  | 35   | 1.07  |
| Region XIII - Caraga                        | 2,425                                  | 38   | 1.58  |

Source: Philippine Statistics Authority, 2010 Census of Population and Housing

Poverty, which further exacerbates the vulnerability of Persons with Disabilities was also taken into account in this study. Table 5 shows that 6.77% of total poor households are with persons with disabilities.<sup>11</sup>

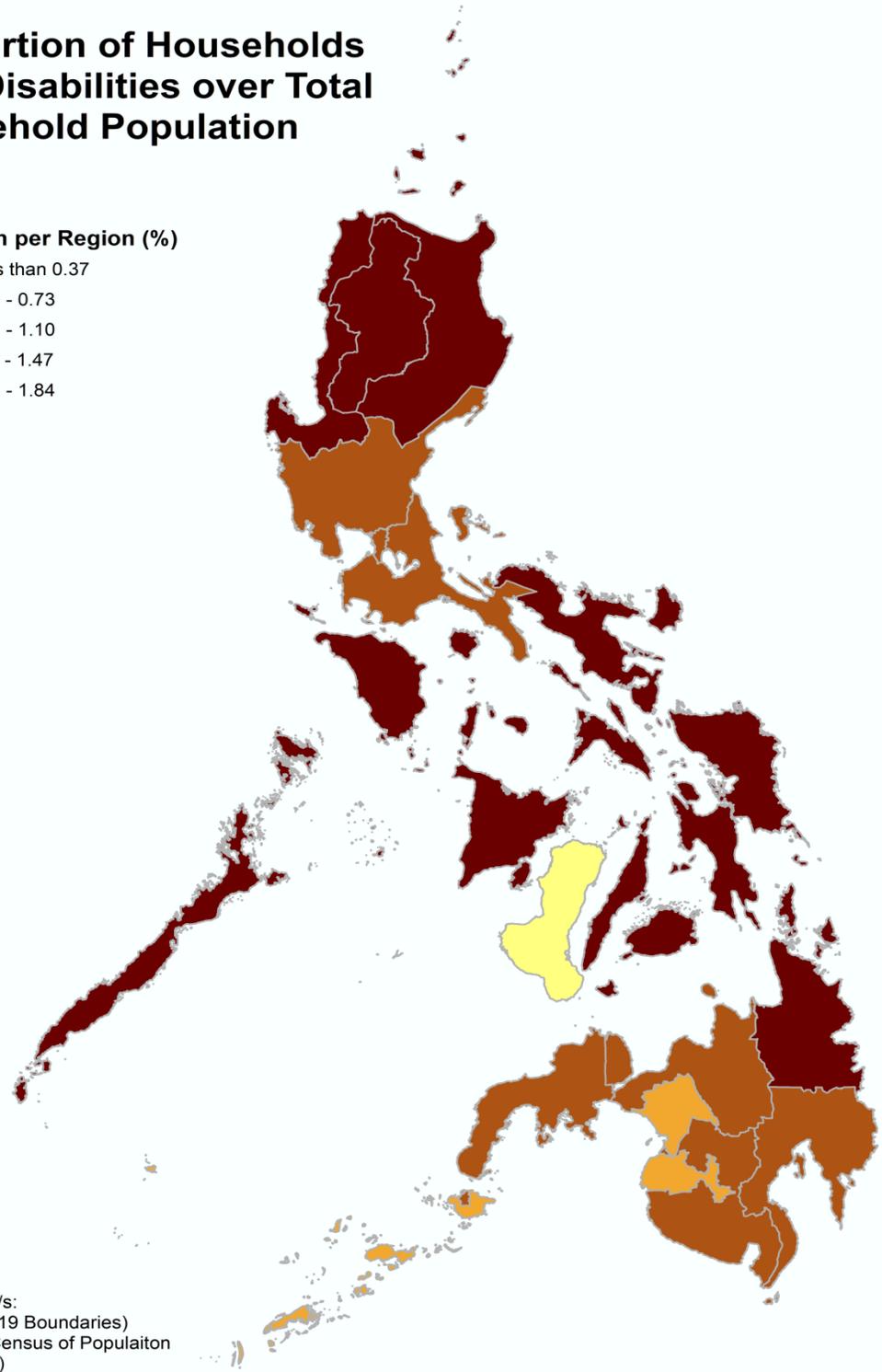
<sup>11</sup> This survey was conducted in 2011 by the Department of Social Welfare and Development (DSWD) for the Pantawid Pamilyang Pilipino Program (4Ps) or the Conditional Cash Transfer (CCT) program of the Philippine Government. 4Ps belong to the poorest of the poor in the Philippines.

Table 5. Number of Poor Households by Types of Disabilities

| <b>HOUSEHOLD</b>  | <b>TOTAL</b> | <b>PERCENTAGE</b> |
|---|--------------|-------------------|
| Household Surveyed                                      | 4,446,649    | 100%              |
| Household with Persons with Disabilities                | 302,421      | 6.77%             |
| Household with Hearing Loss                             | 27,972       | 0.63%             |
| Household with Vision Impairment                        | 53,034       | 1.19%             |
| Household with Speech Disability/Communication Disorder | 28,259       | 0.63%             |
| Household with Orthopedic Disability                    | 41,551       | 0.93%             |
| Household with Intellectual/Learning Disability         | 28,610       | 0.64%             |
| Household with Other types of disabilities              | 77,599       | 1.74%             |

Source: 2011 National Household Targeting System for Poverty Reduction, Department of Social Welfare and Development.

# Proportion of Households with Disabilities over Total Household Population



Data Source/s:  
NAMRIA (2019 Boundaries)  
PSA (2010 Census of Population and Housing)

A UNDP study entitled “*Building the Resilience of Persons with Disabilities to Cope with Climate Change in the Asia Pacific Region*” has gathered vital data relevant to the current state of Persons with Disabilities and CCA-DRR. These are:

- In 2016, around 12% or 12 million Filipinos age 15 and older experienced a form of severe disability;
- Almost one in every two (or around 47%) experienced moderate disability while 23% with mild disability;
- The disability prevalence rate corresponds to the percentage of persons with severe disability which This translates to 81% or 81 million Filipinos had some type of disability in 2016;
- A higher percentage of females than males experienced severe disability (i.e., 15% and 9%, respectively);
- Those who experienced moderate disability level were also higher for females at 49 percent than for males at 45 percent; and
- For mild disability, about 25% of males while 20 percent of females experienced it.

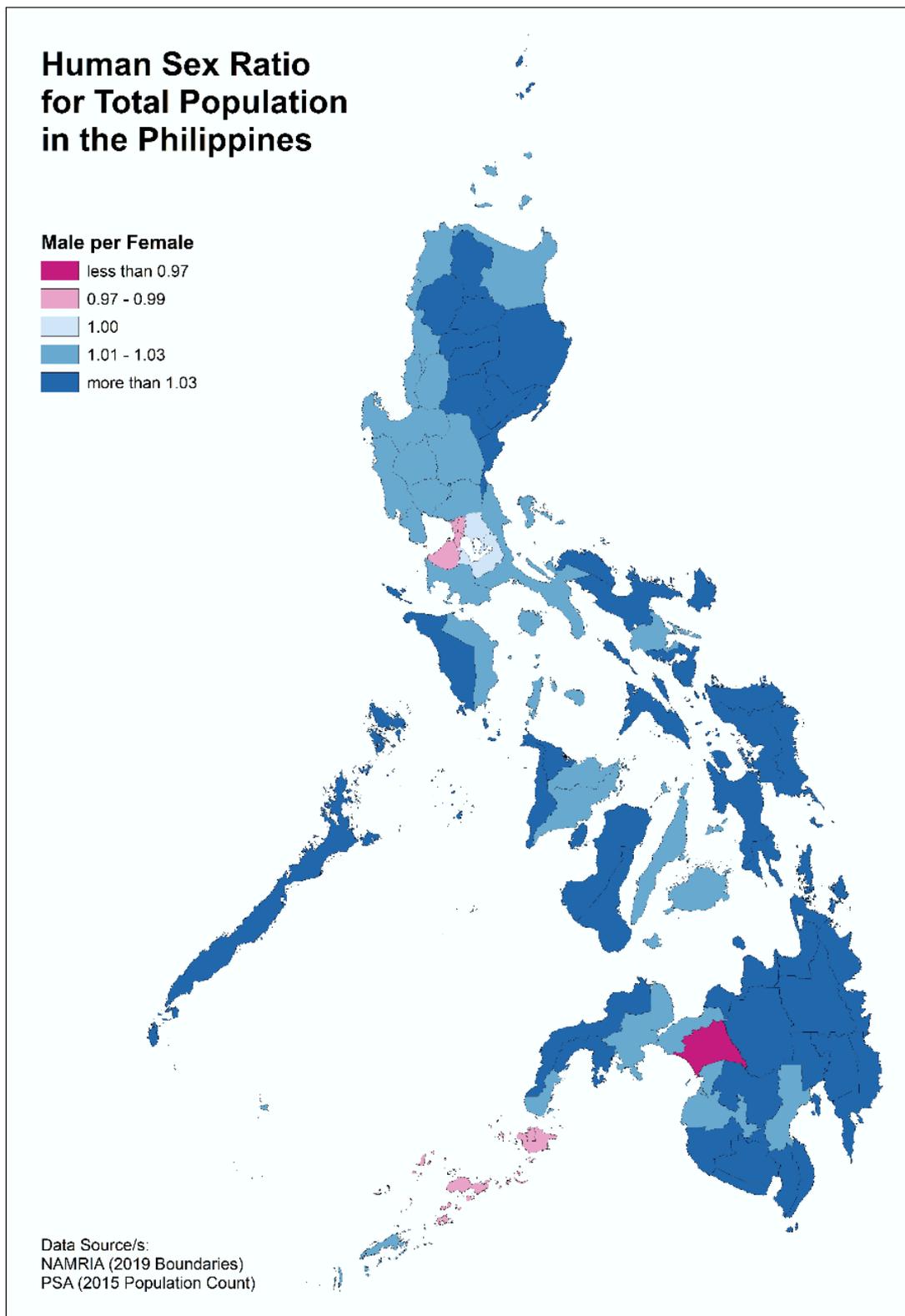


Figure 3. Human Sex Ratio for Total Population in the Philippines.

Table 6 show the distribution of women per region (PSA, 2018) showing the highest number in the Region IV-A; followed by National Capital Region (NCR); and Region III. The least number of women per region is in the Cordillera Autonomous Region.

Table 6. Philippine Women Population per Region (2015)

| <b>Region</b>                               | <b>Population</b> |
|---|-------------------|
| ARMM (Autonomous Region of Muslim Mindanao) | 1,896,407         |
| CAR (Cordillera Administrative Region)      | 842,666           |
| NCR (National Capital Region)               | 6,508,888         |
| Region I (Ilocos Region)                    | 2,489,831         |
| Region II (Cagayan Valley)                  | 1,692,637         |
| Region III (Central Luzon)                  | 5,548,798         |
| Region IVA (Calabarzon)                     | 7,193,286         |
| Region IVB (MIMAROPA)                       | 1,443,231         |
| Region V (Bicol Region)                     | 2,845,854         |
| Region VI (Western Visayas)                 | 2,205,575         |
| Region VII (Central Visayas)                | 2,988,443         |
| Region VIII (Eastern Visayas)               | 2,154,795         |
| Region IX (Zamboanga Peninsula)             | 1,778,905         |
| Region X (Northern Mindanao)                | 2,293,302         |
| Region XI (Davao Region)                    | 2,379,074         |
| Region XII (SOCCCKSARGEN)                   | 2,222,132         |
| Region XII (Caraga Region)                  | 1,260,369         |

Source: Philippine Statistics Authority 2018

Gender-disaggregated data is shown in Table 7. Note that a considerable number of females are engaged in agricultural activities, especially in Cagayan Valley (Region III); Bicol Region (Region V); Eastern Visayas (Region VIII); Region XII (SOCCCKSARGEN); and Region VII (Central Visayas). Figure 4 shows the distribution.

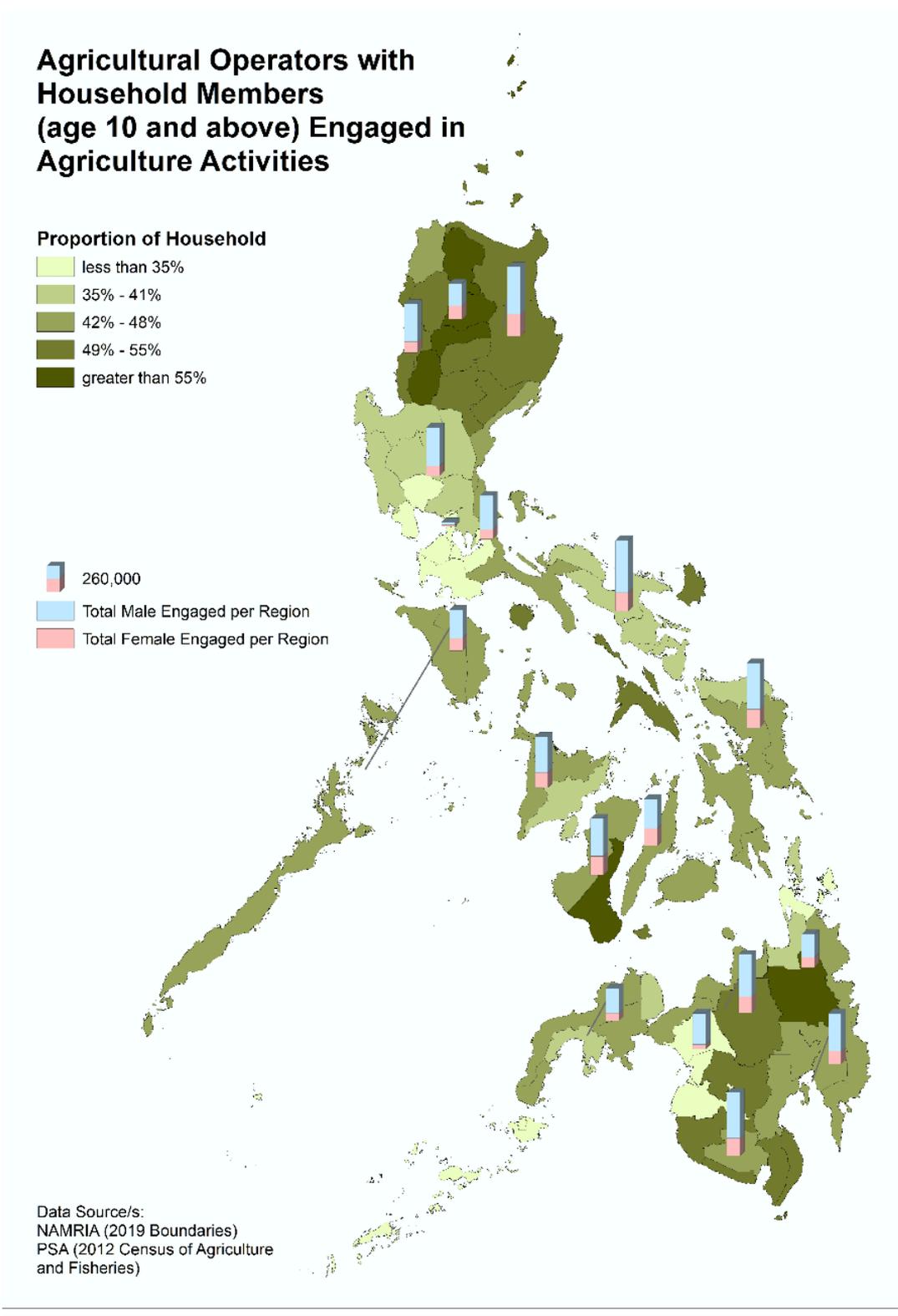


Figure 4. Agricultural Operators with Household Members engaged in Agricultural Activities.

Table 7. Agricultural Operators with Household Members (Age 10 and above) engaged in agriculture activities.

| Region                                      | Male    | Female  | Total Population |
|---|---------|---------|------------------|
| ARMM (Autonomous Region of Muslim Mindanao) | 311,415 | 44,117  | 355,532          |
| CAR (Cordillera Administrative Region)      | 218,270 | 137,136 | 355,406          |
| NCR (National Capital Region)               | 24,535  | 16,880  | 41,415           |
| Region I (Ilocos Region)                    | 375,887 | 110,447 | 486,334          |
| Region II (Cagayan Valley)                  | 475,142 | 217,360 | 692,502          |
| Region III (Central Luzon)                  | 383,521 | 99,721  | 483,242          |
| Region IVA (Calabarzon)                     | 338,317 | 95,514  | 433,831          |
| Region IVB (MIMAROPA)                       | 284,939 | 123,595 | 408,534          |
| Region V (Bicol Region)                     | 520,054 | 187,827 | 707,881          |
| Region VI (Western Visayas)                 | 355,641 | 151,793 | 507,434          |
| Region VII (Central Visayas)                | 293,237 | 173,539 | 466,776          |
| Region VIII (Eastern Visayas)               | 457,193 | 183,217 | 640,410          |
| Region IX (Zamboanga Peninsula)             | 247,718 | 76,032  | 323,750          |
| Region X (Northern Mindanao)                | 419,550 | 159,328 | 578,878          |
| Region XI (Davao Region)                    | 373,219 | 131,689 | 504,908          |
| Region XII (SOCCCKSARGEN)                   | 455,543 | 176,386 | 631,929          |
| Region XII (Caraga Region)                  | 230,027 | 99,534  | 329,561          |

Source: Philippine Statistics Authority, Census of Agriculture and Fisheries 2012.

## 2.4 “Leave No One Behind”

Based on 2030 Agenda for Sustainable Development by the 193 UN member states, the principle of “Leave No One Behind” or LNOB involves concerted effort to reach the furthest behind. According to UNDP (2018), there is a need to take “*explicit action to end extreme poverty, curb inequalities, confront discrimination, fast track progress for the furthest behind.*” The same publication answers the question of who is left behind. These includes persons living in any form of extreme poverty; those with disadvantages that limit their choices and opportunities compared to others; and those that fall within the intersecting factors of discrimination, geography, governance, socioeconomic status, and shocks and fragility, as show in Table 8.

Table 8. Essential factors to consider in understanding who is being left behind

| <b>Factors</b>        | <b>Definition</b>   |
|-----------------------|---|
| Discrimination        | Exclusion/bias/mistreatment: based on gender, ethnicity, age, class, disability, sexual orientation, religion, indigenous/migratory status  |
| Geography             | Physical isolation, vulnerability, deprivation, inequity based on person's residence  |
| Governance            | Global, national and/or sub-national institutions that are ineffective, unjust, exclusive, corrupt, unaccountable and/or unresponsive; and/or laws, policies and budgets that are inequitable, discriminatory or regressive (including taxes and expenditures)  |
| Socio-economic status | Disadvantages in terms of income, wealth, life expectancy, educational attainment or chances to stay healthy, be well-nourished, be educated; and access to energy, clean water and sanitation, social protection, financial services, vocational training etc. |
| Shocks and fragility  | Vulnerability and exposure to the effects of climate change, natural hazards, violence, conflict, displacement, health emergencies, economic downturns and other types of shocks.   |

Source: UNDP, 2018

## 2.5 Digitalization in the Philippines

### *Access to digital platforms*

A review of literature highlights the need to provide the general populace the access to digital platforms. In the recent national ICT baseline household and individual survey (NICTHS) by Department of Information and Communications Technology (DICT), that aims to assess the current status of the Philippines in terms of Information and Communications Technology, it was reported that from a household level, majority of Philippine homes (82.7%) access some form of information from their television sets, and less than half can access through radios (47.1%), while internet access (at home) is at 17.7% of homes (NICTHS, 2019).



Figure 5. The different classes of technology access and connectivity in the Philippines.  
Source: GSMA, 2016 as cited in Roberts and Hernandez (2019)

A study by Roberts and Hernandez (2019) argues that digital inequalities still persist despite increasing connectivity. Figure 5 illustrates that 54% of Filipinos have no mobile access (no phones or have basic phones that have no capability to download and utilize modern applications) and are more disadvantaged. It also outlines some key findings on digitalization in the Philippines.

- Connectivity is unevenly distributed in the Philippines as more than seven million Filipinos are not covered by a 3G mobile Internet signal;
- Even in areas of the Philippines where mobile Internet is available, 67% of the population do not use it; and
- 51% of offline Filipinos reported a lack of awareness about the usefulness of the Internet in general, and of locally relevant content in particular.

### ***Digitalization in the time of COVID-19***

With the rapid spread of the pandemic forcing many people to stay at home, there has been an acceleration of digitalization as many products and services, including education systems, have shifted to virtual and online methods. This increase in digital use has prompted opportunities for businesses and the economic sector, such as in the case of the UNDP Philippines Country Office’s business plan for 2021, where the provision of support to digital transformation and innovation in the public and private sector is one of their priorities. At the same time, COVID-19 has also clearly exposed longstanding and persistent inequalities. Access or the lack thereof to these digital services, as well as the inability to adapt to these changes due to existing barriers, has exacerbated the level of vulnerability of some sectors. This could therefore suggest cases wherein inequalities are widened due to digitalization.

### 3. CONCEPTUAL FRAMEWORK

The study adopts two (2) interrelated frameworks relevant to the MAVG report. Figure 6 shows the Pressure and Release or PAR Model (Wisner et al., 2004) which maintains that it is essential to reduce vulnerabilities and address its root causes to “*prevent disasters and promote effective disaster risk reduction and resilience*” which should make it the “*core policy objective of disaster risk management*” (Henriquez, 2017).

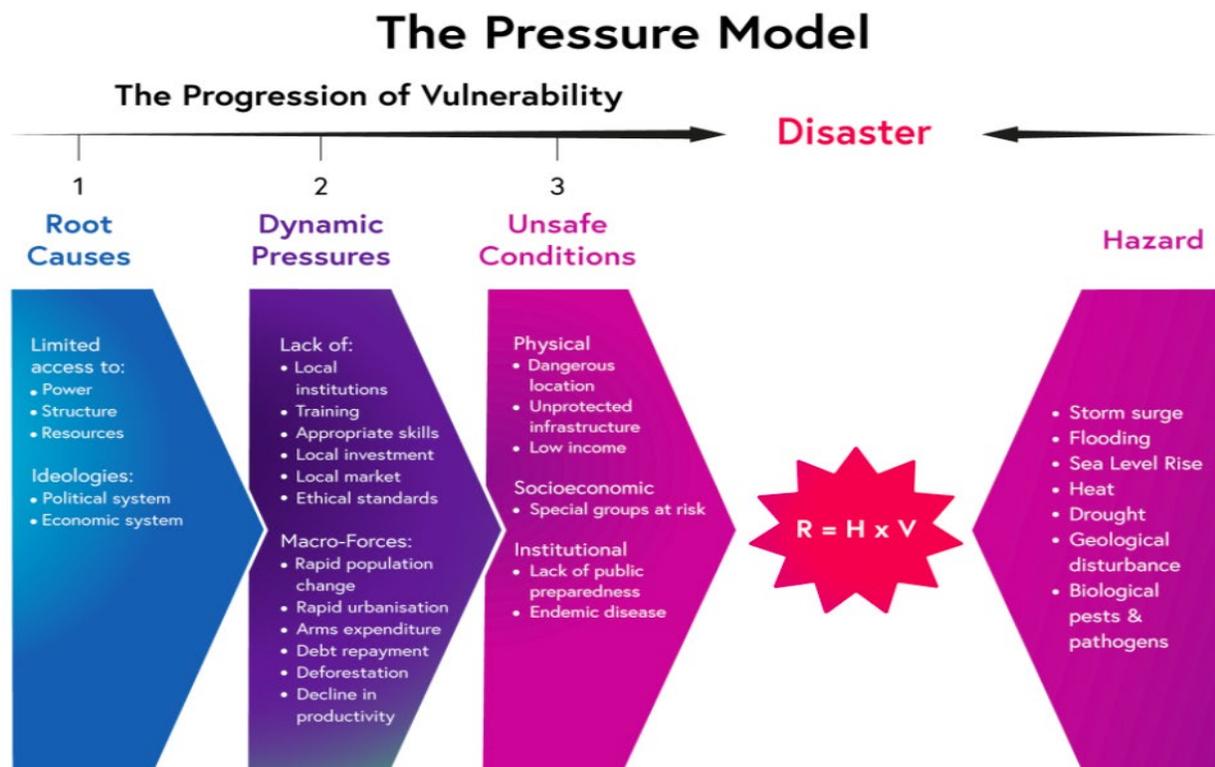


Figure 6. Wisner's (2004) Pressure model (also called Pressure and Release model)<sup>12</sup>

The MAVG study also adopted the Digital DRR Maturity Model (DDRRMM) as seen in Figure 2. DDRMM provides criteria for measuring the present capability of digital solutions in each country against five maturity levels across seven components: data, solutions, partnership, ICT infrastructure, users, policies, and alignment with/impact on DRR practices (UNDP, 2020).

DDRRMM provides targets in digital technology applications to DRR in each country and guides specific's country utilization of digital technologies to achieve various short- and long-term outcomes, of which the key outcome is reduced disaster risks and improved community resilience.<sup>13</sup>

The DDRMM, developed as the framework for the data governance study<sup>14</sup>, has seven (7) major components namely:

1. Shared Data Resources and Access
2. Digital Applications and Services
3. DRR Coordination and Collaboration
4. ICT Infrastructure
5. Stakeholder/User Competencies
6. Partnership Programmes
7. Policies, Standards, Guidelines and Best Practices

With the interplay of the 7 components of the Maturity Model, and incorporating the needs of the vulnerable groups, this study provided inputs to support planned digital initiatives that aim to ensure that no one is left behind.

<sup>12</sup> <https://www.futurelearn.com/info/courses/humanitarian-action-response-relief/0/steps/60984>

<sup>13</sup> DX4Resilience: Methodological Framework and Detailed Work Plan (2020)

<sup>14</sup> For a more detailed description, refer to DX4Resilience: Country Implementation Plan- Philippines.

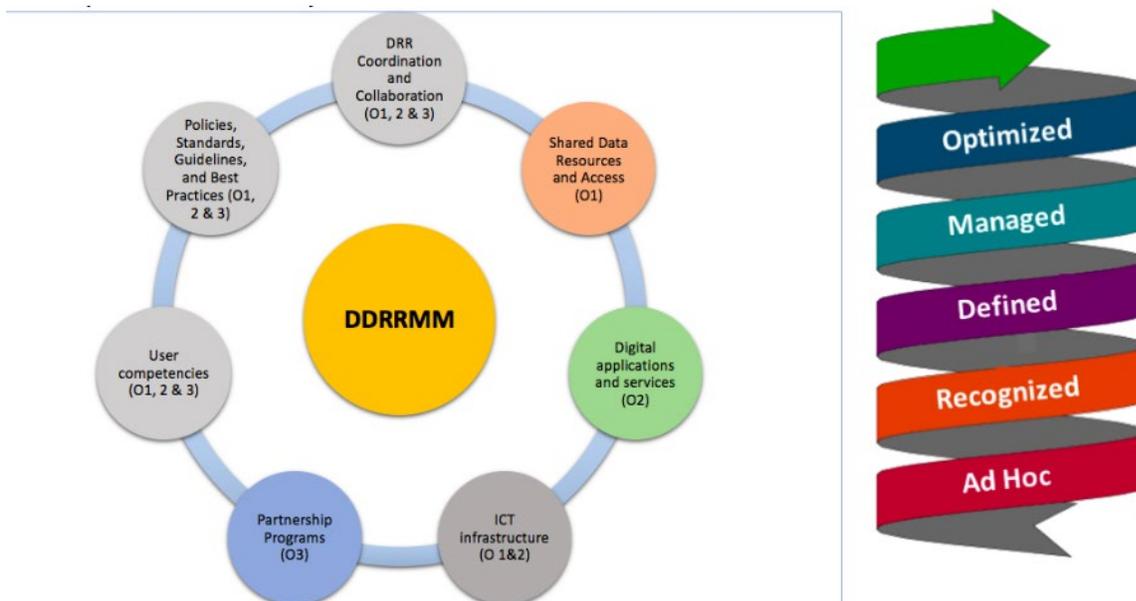


Figure 7. The DRRMM or the Digital DRR Maturity Model

The following were the main research questions addressed by this study:

- i. What are the problems, challenges, and priority needs of Vulnerable Groups in the Philippines?
- ii. What are the barriers faced by Vulnerable Groups in the access and use of digital technologies for DRR?
- iii. What recommendations would contribute to the use of digital solutions for increased disaster preparedness and response of Vulnerable Groups?

#### 4. METHODOLOGY

A mixed-method approach was used for this study to fill the gaps caused by the absence of disaggregated data. The limitations on travel due to government-imposed lockdowns, including the prohibition of traditional methods of data gathering such as face to face interviews and stakeholder meetings, posed a challenge to this study. The research team conducted desk review of pertinent knowledge materials; facilitated several focus group discussions; and administered an online survey. These data gathering methods, culled from various data sources, were triangulated to increase the validity and credibility of the major findings of this research.

The study areas for the online survey selected during the inception phase covered the three major island groups in the Philippines: Luzon, Visayas, and Mindanao, which runs parallel to the UNDP SHIELD program sites that adopted a rigorous and strategic site selection process. The survey was administered online using Google Forms. Due to the rapid nature of the study, respondents were chosen using purposive sampling with representatives from the persons with disabilities, women and members of the LGBTQI community, and farmers and fisherfolk.

#### 4.1 Data Collection

In view of the restrictions in travel and limitations in having in-person data gathering set by the Inter-Agency Task Force (IATF)<sup>15</sup> due to the pandemic, the study maximized the use of different online platforms to gather both primary and secondary data. Some key sectors included in the collection and analysis of relevant data on vulnerability include the following:

- Persons with Disabilities
- Women and the LGBTQI community
- Agricultural sector

The first level of data gathering was the conduct of focus group discussions with current organizations and groups whose advocacy include disaster risk reduction and management. Government agencies whose mandate is on DRRM were also invited. Purposive sampling of these organizations and groups was used.<sup>16</sup>

The second level of data gathering was done via an online survey involving 107 respondents spread across Luzon, Visayas, and Mindanao.<sup>17</sup>

The analysis of the mapping results relied both on primary and secondary data, in consonance to the Pressure and Release (PAR) framework and the Digital Disaster Risk Reduction Maturity Model (DDRRMM). The study identified gaps and opportunities to introduce digital solutions under each of the seven (7) components of the model. The result of the study, which is the final report on the MAVG, will feed into the other outputs of the DX4Resilience Project of UNDP, i.e., Digital Readiness Strategy, et al.

##### 4.1.1 Desk Review

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<sup>15</sup> Refer to <https://doh.gov.ph/COVID-19/IATF-Resolutions> for detailed IATF resolutions

<sup>16</sup> See Annex 4 on list of organizations interviewed/surveyed

<sup>17</sup> See Annex XX for questionnaire used in the online survey

A thorough review of relevant data and information on vulnerable groups in the country was conducted, including knowledge materials from UNDP and other organizations. Major thematic areas present in this study were compared with established findings from peer-reviewed journals; country-level reports; and other publications. Maps were created based on data sets from PSA. All materials used in this study were duly cited in the reference section.

#### **4.1.2 Focus Group Discussions**

A list of potential experts for the focus group discussions were identified by the National Consultant and the UNDP CO Team, based on UNDP's network of vulnerable groups, as early as the inception phase. These pre-identified individuals, agencies and organizations were provided a set of semi-structured guide questions. The use of this data gathering method is significant in promoting collaborative research and analysis with the development sector of the Philippines. Qualitative data gathering methods such as focus group discussions are vital in securing qualitative information and additional perspective from major groups and stakeholders (Reid et al., 2017).

FGD sessions were conducted online on May 16, 17, and 19, 2021 with a total of thirty-one (31) participants. Key findings and results of the MAVG was presented to various stakeholders. Inputs from the various organizations supplemented the final report. This will be the basis for formulating effective interventions.

#### **4.1.3 Online Survey**

An online survey was created and administered to 107 respondents through the use of the online platform Google Forms. It was conducted during the 3<sup>rd</sup> week of April 2021.

#### **4.1.4 GIS Mapping**

Basic GIS Maps on the distribution of vulnerable groups in the Philippines was created using ArcGIS 10.2. Datasets from PSA include 2010 Census of Population and Housing; 2012 Census of Agriculture and Fisheries; and 2015 Population Count.

### **4.2 Data Processing and Reporting**

Data from desk review of relevant publications and reports were processed in a straightforward manner. It provided the necessary scientific bases to support the major assertions of this study. GIS maps were also produced and presented to UNDP CO for review.

The online focus group discussions were video and audio recorded, with the consent of the attendees, and was transcribed by the National Consultant. Major themes from the focus group were categorized, analyzed, processed, and presented to the UNDP CO for further review. The online survey was data processed and cleaned by the National Consultant and the major findings presented to the UNDP CO.

The National Consultant, with guidance from the UNDP CO team, created the draft final report and distributed for review of the different groups and organizations from the previous FGD for final vetting and review. Comments coming from this consultation have been integrated into the final version of the MAVG report.

## **5. RESULTS AND DISCUSSION**

### **5.1 Mapping the Vulnerable Groups in the Philippines**

Through participatory data gathering methods, with some limitations due to the pandemic, the study was able to come up with the current status of vulnerable groups in the Philippines—their issues, concerns, and problems; the challenges and opportunities in DRR response; and opportunities and possible entry points offered by digital solutions.

The rapid online survey administered has a sample size of 107 respondents, with representation from person with disabilities; women and LGBTQI; and farmers and fisherfolk covering the three (3) major island groups of the Philippines (Fig. 8). The study considers this as a small subset of the actual number and distribution as seen in the maps based on PSA datasets shown in Figures 2, 3 and 4.

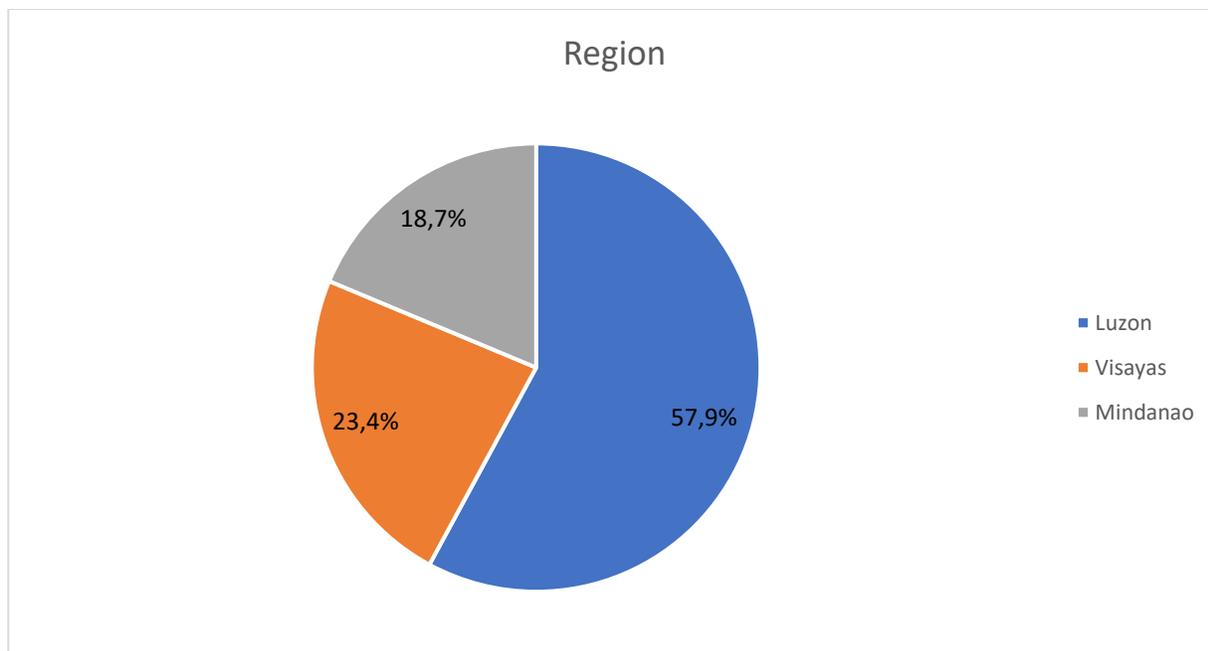


Figure 8. Geographical location of respondents

### Respondent profile

Majority of the respondents are from Luzon (57.9%); followed by the Visayas (23.4%) and Mindanao (18.7%). Respondents were predominantly females (48.6%); followed by males (42.1%); transgender (4.7%), with 3.7% preferring not to indicate their gender.

### Occupation and income profile

In terms of occupations, 30% of the respondents are professionals (e.g., teachers, lawyers, accountants) followed by clerical workers or clerks at 20.6%. Managers covering government and non-government groups comprise 15% of the total respondent sample, followed by technicians and associate professionals at 10%. Service and sales workers, as well as laborers and unskilled workers each represented 7% of the total sample size, while skilled agricultural workers such as farmers and fisherfolk, and workers under the trade and crafts sector each represented 5% of the total sample.

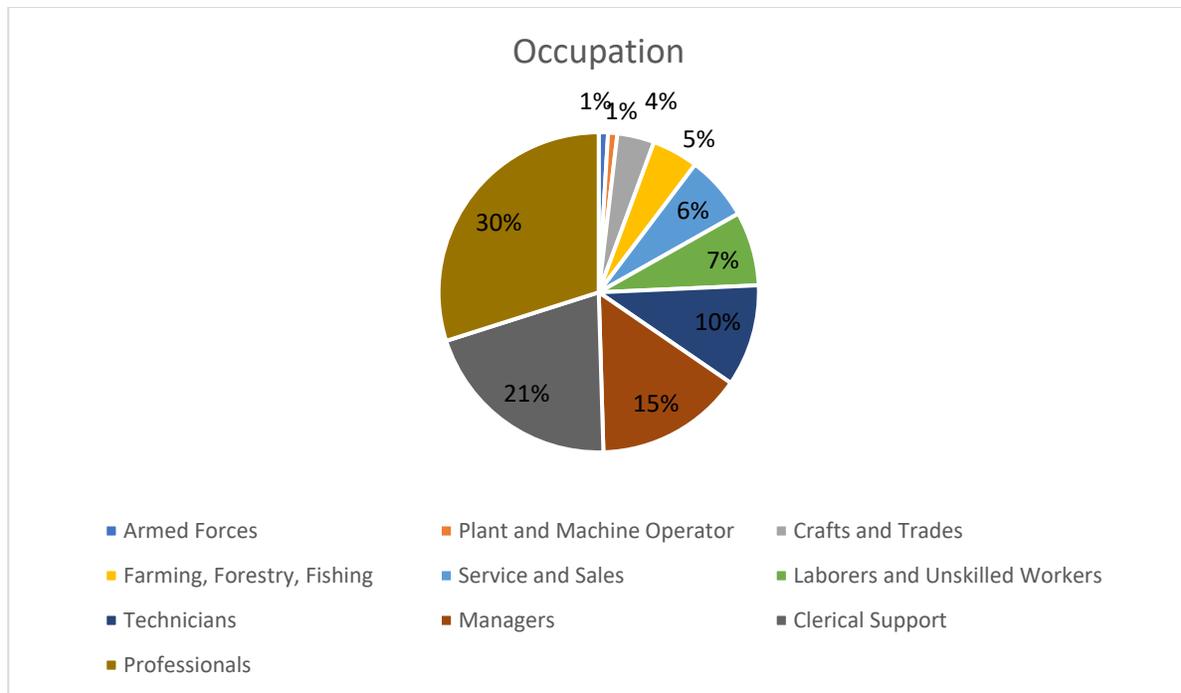


Figure 9. Occupation of respondents

Based on the responses regarding monthly household income, it was seen that more than a third (37.4%) of the respondents belonged to the poor socio-economic class wherein household income per month is less than PhP 10,957 (USD 229.15)<sup>18</sup>. This low income (<10,000 PHP) can be considered as an added layer of vulnerability (UNDP, 2021). Respondents belonging to the low-income bracket follows representing 26.2% of the total sample size, while 20.6% belong to the lower middle-income bracket (i.e., PhP 21,914 to 43,828) per month within their household. 12% are from the middle-income bracket, while the upper middle, upper middle but not rich, and rich classes in terms of household monthly income represent less than 2% of the sample respectively.

<sup>18</sup> 47.82 Philippine peso to 1 US dollar exchange rate as of June 2021.

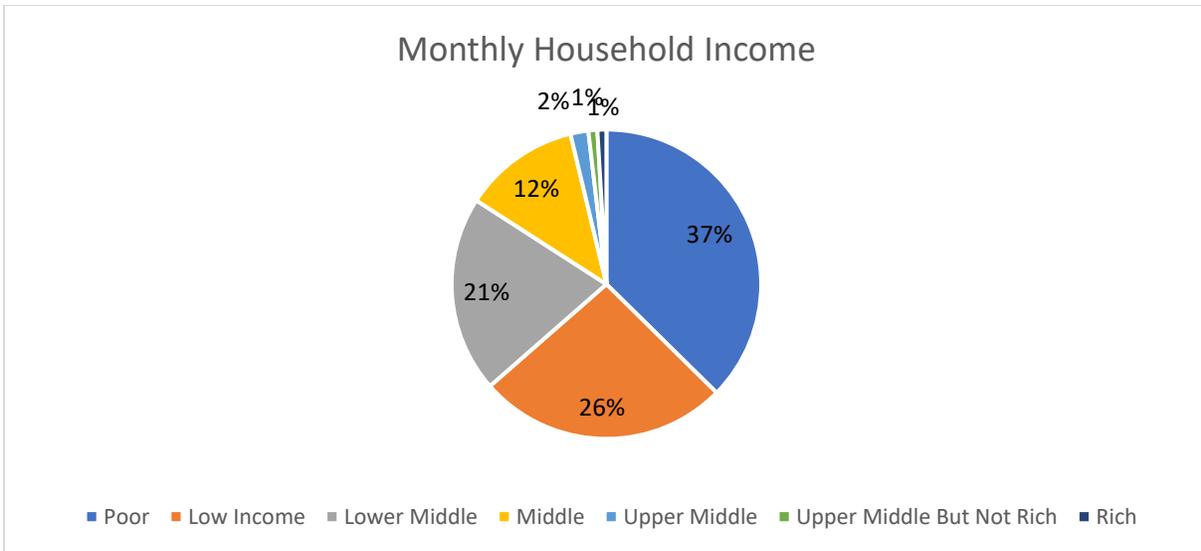


Figure 10. Monthly household income

It is important to note that among all the respondents, 86% have identified themselves to have a certain type of disability (Fig. 11) majority of which have some form of physical or orthopedic disability (40.2%); followed by hearing disability (28%), then those with visual impairment (7.5%). 14% of the respondents do have any disabilities. This data coincides with national trends in the number of persons with disabilities which, as of 2010, represented 1,443,000 household population with disability, which translates into 1.57% of the population from a total of 92.1 million household population (PSA, 2010).

Disability Status  
107 responses

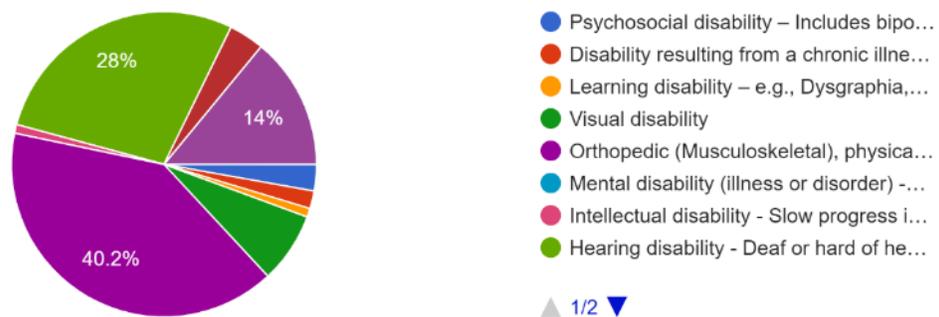


Figure 11. Disability status of respondents

### ***Hazards, exposure, and vulnerability***

*Key finding 1: Persons with disabilities, women and LGBTQI persons, farmers and fisherfolk are poor individuals coming from low-income class, highly exposed to various climate-induced hazards and are highly vulnerable.*

The trend that emerged from the survey showed that majority of the respondents have a high degree of exposure by virtue of their location. As seen in Table 9, respondents reside in urban settings/cities (36%), riverside (17%), floodplains (19%). 20% of the respondents also live along the foot of mountains, steep slopes, coastlines, and marshlands. A significant number of respondents also live in semi-permanent housing (i.e., mixed concrete and wood or bamboo). Although the study has no data on the structural integrity of the permanent housing, the respondents are still exposed to various hazards based on the location of their residence.

Table 9. Types of housing and percentage relative to location

| Location         | Type of house and percentage relative to location   |  |  |
|------------------|---|--|--|
|                  | <b>Light Materials</b><br>(bamboo, sawali, cogon, nipa, anahaw, salvaged/makeshift materials) | <b>Semi-permanent</b><br>(Mixed but predominantly strong materials, walls up to flood line is made of concrete block sand woven bamboo or sawali above the flood line) | <b>Permanent</b><br>(galvanized iron, aluminum, tile, concrete, brick, stone, wood, plywood) |
| City (39)        | 1 (2.56%)   | 8 (20.5%)  | 30 (76.9%)   |
| Riverside (18)   | 0   | 5 (27.8%)  | 13 (72.2%)   |
| Flood Plain (20) | 0   | 4 (20%)  | 16 (80%)   |

|                      |   |           |           |
|----------------------|---|-----------|-----------|
| Foot of Mountain (8) | 0 | 4 (50%)   | 4 (50%)   |
| Steep slopes (7)     | 0 | 1 (14.3%) | 6 (85.7%) |
| Near Coast (5)       | 0 | 1 (20%)   | 4 (80%)   |
| Marsh (1)            | 0 | 0         | 1 (100%)  |

It should be noted that, using the Pressure and Release Model (Wisner et al.,2004) dangerous locations and unprotected infrastructure, as the 3<sup>rd</sup> stage in the progression of vulnerability, coupled with the presence of hazards, increases the risk. Figure 12 illustrates that majority of the respondents have experienced hazards more than three (3) times a year. Major disasters of 2020 started with the Taal volcano eruption, the start of the COVID-19 pandemic lockdown in March, and the three (3) out of nine (9) consecutive typhoons that entered the Philippine Area of Responsibility between October and November 2020.

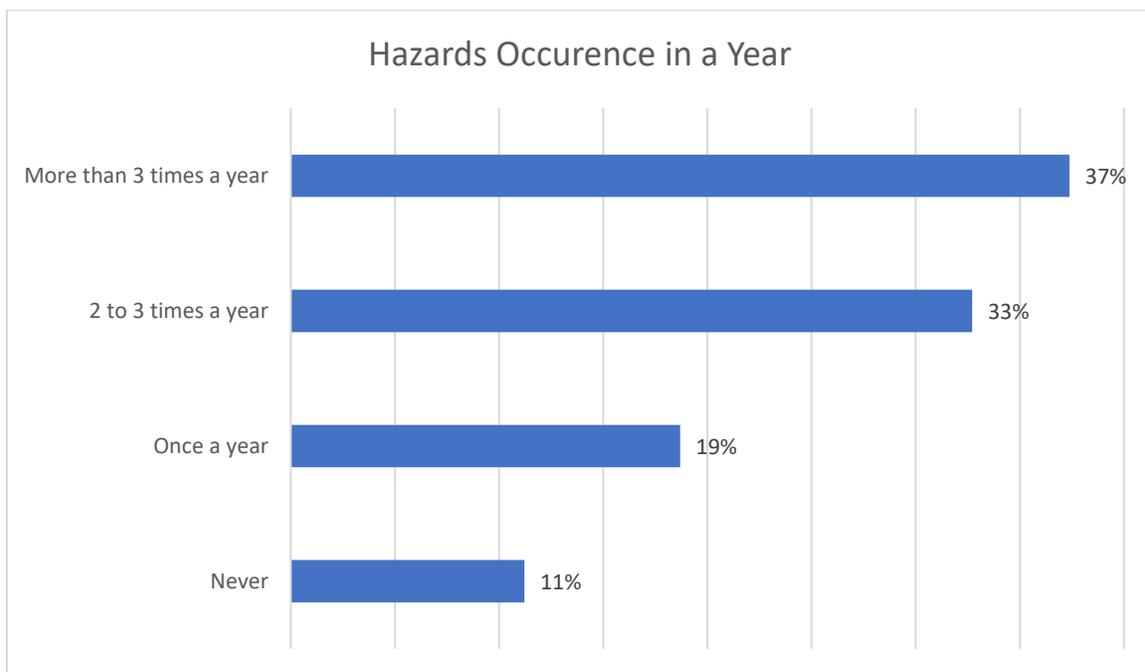


Figure 12. Frequency of hazards experienced respondents

Typhoons and flooding still account for the majority of hazards that are climate-induced (i.e., 67.5% and 48.6%, respectively) with 5.6% experiencing rainfall-induced landslides and 3.7% experiencing storm surges (Fig. 13). Although 35% of the respondents never

experienced flooding events, 68 out of 107 of them still experienced flooding 1-3 times a year (Fig. 14), with ten (10) respondents flooded more than three (3) times a year. This suggests that majority of them have first-hand experience of the seasonal nature of this extreme weather event. This is not an uncommon scenario in the Philippines, since most typhoons bring flooding events, such as those recorded during Typhoon Ondoy (Ketsana) in 2009. Quite recently, Typhoon Quinta (Molave), Rolly (Goni), and Ulysses (Vamco) caused 304 flooding events in Regions 3, 4a, 4b, 5, 6, 7, 8, CAR and NCR.<sup>19 20 21</sup>

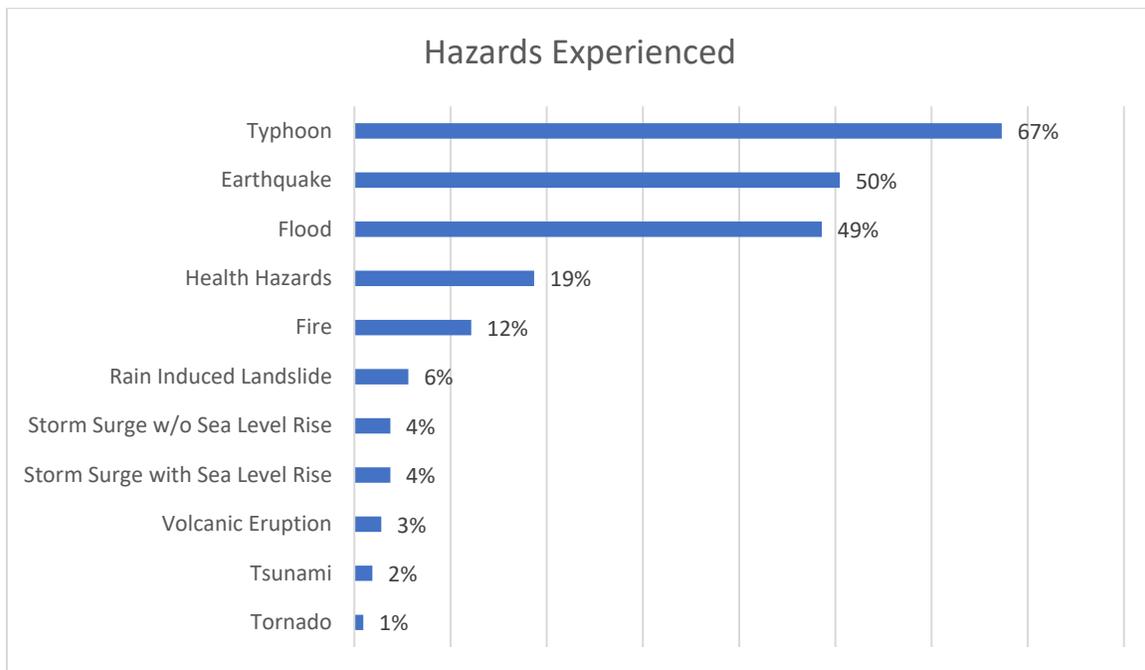


Figure 13. Types of hazards experienced by respondents

According to the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA), Typhoons Quinta (Molave), Rolly (Goni), and Ulysses (Vamco), which made landfall in a short interval, one after the other, was exacerbated by the southwest monsoon rains, a La Niña event, and the COVID-19 pandemic that made it more difficult for people to bounce

<sup>19</sup> Source: NDRRMC Situation Report #8 (November 3, 2020).

<sup>20</sup> Source: <https://reliefweb.int/report/philippines/dswd-dromic-report-35-super-typhoon-rolly-09-december-2020-6pm>

<sup>21</sup> Source: NDRRMC Situation Report # 28 (November 11, 2020).

back and recover. During the timeline of typhoons, there were already 474,000 active cases of COVID-19 in the country.<sup>22</sup>

These are parallel disasters that have cumulative and interconnected effects, thus difficult to manage (UNDP and UN OCHA, 2021). For example, COVID-19 pushed these marginalized sectors further into poverty<sup>23</sup> with income losses (70%); job losses, including closure of businesses (60%); hunger and food insecurity (40%); difficulty in accessing health services (37%); children stopped from attending school (13%) (COVID Pulse PH, 2021). The same report shows the impact of the pandemic on women. In terms of income, the same study showed women in Metro Manila reported lower revenues (30%) than men (17%) and had difficulties maintaining income due to restrictions (41%).

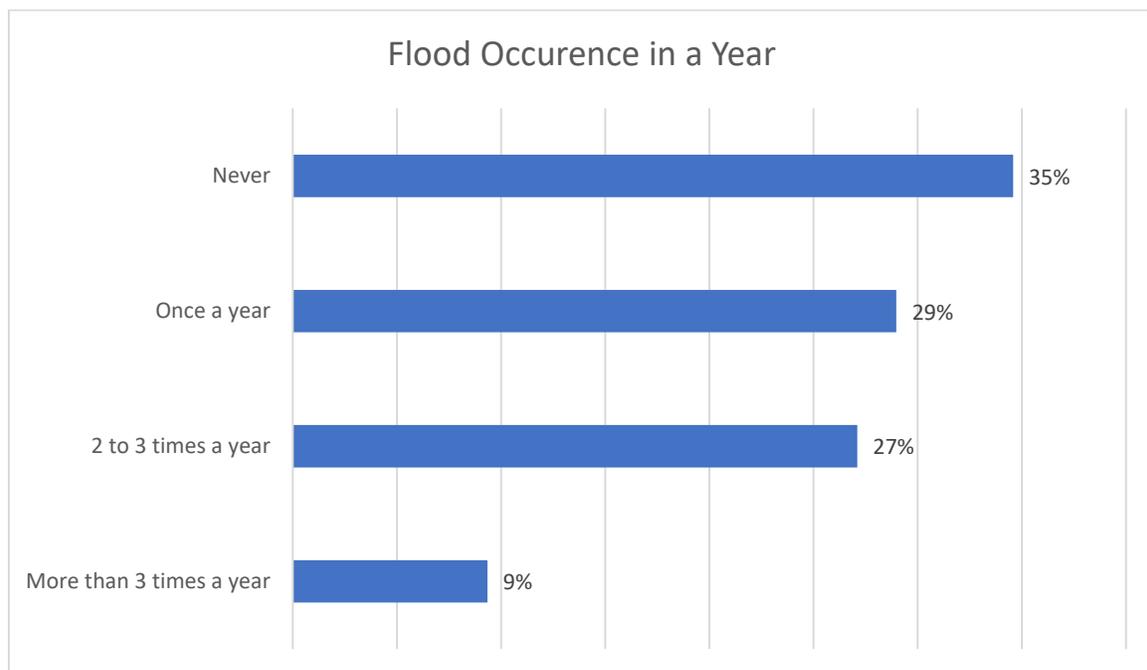


Figure 14. Frequency of flood occurrence experienced by respondents

<sup>22</sup> Source: <https://reliefweb.int/report/philippines/philippines-typhoon-goni-rolly-and-vamco-ulysses-situation-report-no-1>

<sup>23</sup> Survey of 2,250 poor and vulnerable households in nine cities. Most households (56.2%) had 4-6 family members. Of those who responded for their families, 81% were female and 43.8% were aged 26 to 40.

The COVID-19 pandemic was a concern of the respondents with 19% considering this pandemic as a health hazard. The pandemic was an added challenge to the already problematic situation during typhoons and aggravated existing vulnerabilities of persons with disabilities, women and LGBTQI persons, and farmers and fisherfolk.

Geological hazards (i.e., earthquakes) still impact 50.5% of the respondents as they are vulnerable in relation to their location (i.e., urban settings; foot of the mountain; steep slopes). This gives rise to other consequent hazards such as landslides, tsunami, river bank failures, among others.

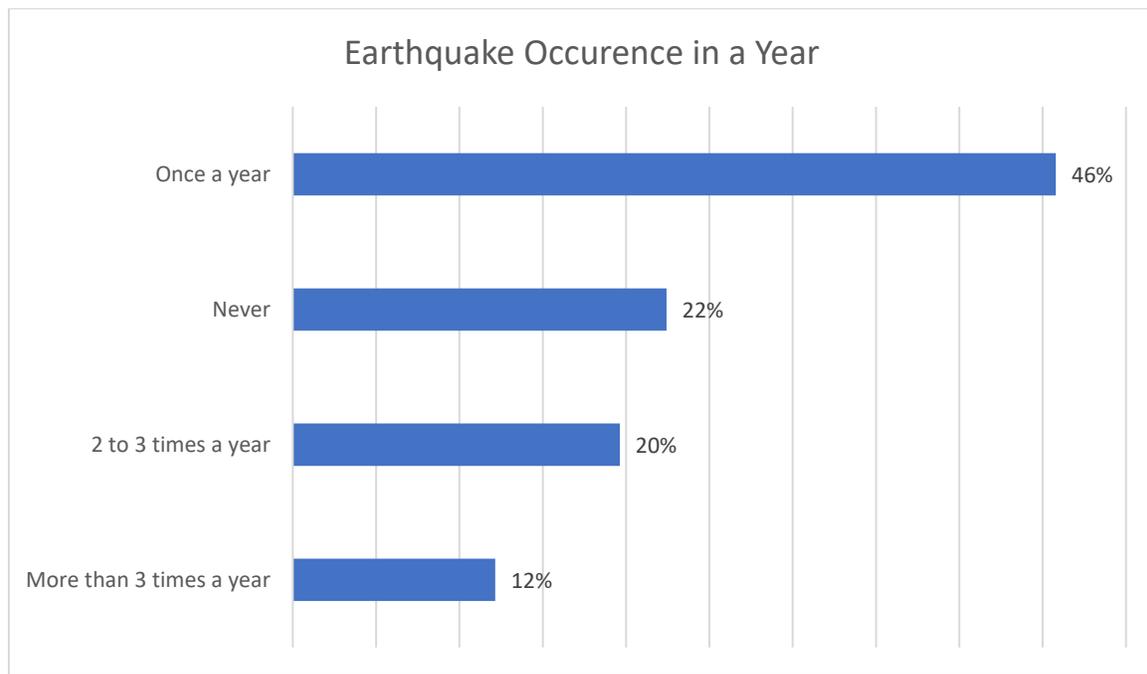


Figure 15. Frequency of earthquakes experienced by respondents

Urbanization, in itself, increases vulnerability since uncontrolled development and unplanned settlements have resulted exposure to garbage pollution flooding due to poor drainage, leading to increased health risks and greater frequency and intensity of hazards caused by climate change (Ayeb-Karlsson and Uy, 2021). Cramped and overpopulated settlements increased the risk of pathogen contamination. Infectious diseases still are rife in the Philippines as a developing country, characterized public health systems that are challenged, and with the unabated degradation of natural systems, will take its toll on the health and wellbeing of the human population (Cruz et al., 2017).

85% of the respondent believe that there will be more disasters to come in the future. This perception is supported by future climate projections of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), suggesting increasing rainfall, as shown in the number of days with heavy rainfall (i.e., greater than 200 mm). This scenario is expected to increase with global warming by the year 2020 and 2050 (Cruz et al., 2017).

### ***Progression of multiple vulnerabilities***

Wisner et al., (2004) provided a practical framework to analyze the progression of vulnerability of these groups. Based on both the qualitative and quantitative methods, the study exposed that vulnerable groups had limited access to power, structure, and resources. Using this model, results suggest that persons with disabilities, Women and the LGBTQI community, farmers and fisherfolk are vulnerable to the effects of climate change as they are highly exposed to different hazards. These groups have the least capacity to adapt to these due to their disabilities, their low-income class, and lack of access to resources.

Moreover, the vulnerability of these groups progresses even further due to the presence of dynamic pressures such as lack of training and appropriate skills (i.e., identified in the focus groups as the need for digital literacy). Under local investment and local market, the need for digital platforms for vulnerable groups was also identified in the focus groups:

*“Digital solutions are based on market demands and there should be a platform for this to grow and be sustainable. However, there are no platforms for PWDs of the digital solutions to anchor to.” (Male)*

Unsafe conditions, both physical (i.e., dangerous location; unprotected infrastructure; low income), socioeconomic (i.e., special groups at risk), and institutional (i.e., lack of public preparedness; endemics), has pushed persons with disabilities, women and members of LGBTQI community, farmers and fisherfolk further into vulnerability.

This study suggests that the current situation of these vulnerable groups went beyond the description of “unsafe conditions” in the pressure model. Houses of these vulnerable groups were located in exceptionally dangerous locations, ranging from steep slopes to river banks, exposing them to consequent hazards. COVID-19, for instance, is not simply an endemic disease but is pandemic in scope. The pandemic has aggravated the effects of rapid onset hazards such as flooding and typhoons (UN OCHA, 2021) and even slow onset environmental stresses such as temperature increase and variations in rainfall (Ayeb-Karlsson and Uy, 2021).

Thus, this study argues that what we see is more of a progression multiple and intersectional vulnerabilities. It has established that multiple vulnerabilities exist, not only among the respondents, but also in the mapping of vulnerable groups in different regions of the country, as shown in the trends of national data. These are women and transgender with disabilities; women and transgender working in farming, fisheries, and forestry; and women and transgender having more than one disability. These intersectional vulnerabilities (IFRC, 2020), overlapping with the effects of climate change and economic inequalities, are further intensified due to poverty (i.e., 37% of respondents are “poor”; 26% are “low income”), creating a vicious vulnerability-poverty cycle (UNDP SHIELD, 2019). These shocks have a role in preventing individuals from moving out of poverty—and pulling back those who were able to escape it (Skoufias et al., 2019), as it affects the livelihoods and source of income people, especially those along the coastal areas (UNDP, 2017).

With the presence of different climate-induced hazards, whose frequency and intensity is predicted to increase based on future climate projections, and geological disturbances, coupled with the high degree of vulnerabilities as shown in the different stages of the Pressure and Release Model, there is a heightened potential for disaster risks that would impact vulnerable groups including persons with disabilities, women and LGBTQI community, and the members of the agricultural sector.

The principle of the Leave No One Behind (LNOB) agenda provides further basis to the vulnerabilities of the groups mentioned in the study. The survey and the focus groups suggested that these groups have the predisposition to be left behind even further based on five (5) key areas, unless appropriate digital interventions are put in place. These are: discrimination (i.e., due to types of disabilities, gender, or class); geography (i.e., due to inequalities based on residence); governance (i.e., national and local policies that are discriminatory); socioeconomic (i.e., disadvantages in terms of income); and shocks and fragility (i.e., vulnerability and exposure to the impacts of climate change).

These findings suggest that it is crucial to reduce vulnerabilities and address its root causes in order to prevent disasters and promote resilience (Wisner et al., 2004). This also suggests that this should be part of the core policy objectives in the design of digital solutions.

### ***How vulnerable groups cope with disasters***

*Key finding 2: Persons with disabilities, women and LGBTQI persons, farmers and fisherfolk need better government support and access to resources and information, survive mostly on their own capacities, and have a strong sense of community.*

As such, survey questions delved deeper into how vulnerable groups cope with stresses brought about by disasters. More than half of the respondents or 54.2% rated themselves to have an average coping ability; 25.2% have quite high abilities, and 10.3% believed they have low ability to cope.

### Disaster Preparedness

Respondents also identified how they usually prepare for disasters. Majority or 85% of the respondents made necessary preparations while 15% do not usually prepare. As shown in Table 10, the top 3 strategies employed by the respondents to prepare for and survive disasters are: storing food and other basic needs, learning to prepare how to evacuate to safe places, and climate-proofing their homes by strengthening it.

### On adaptive capacity

This study highlights the role of adaptive capacity which is vital in decreasing vulnerabilities of these groups. We note the portion of the respondents (15%) who identified that they have not made any changes in the past year regarding the way they prepare or protect themselves from future disasters.

First, adaptive capacity is highly contextual and depends on the capital, and may differ in relation to particular hazards (CVCA, 2009). Since the survey explored different demographics including different types of hazards present, and levels of exposure based on their location, there were variations in the way they perceive their access to and control over different resources. For instance, during the Philippines' Extended Community Quarantine phase (i.e., second re-implementation) due to COVID-19, those with access and control over resources had more abilities to cope: 37% had savings for emergencies, 21% relied on family and friends, while only 18% had access to government aid (COVID Pulse PH, 2021).

The study believes that there is a gap in terms of encouraging people to participate in efforts to increase their adaptive capacities as a community. Bollettino et al., (2020) found out that, although Filipinos perceive that natural hazards are a risk to them, only a third of them undertake measures to prepare for these disasters, with those directly impacted more likely to act. However, this also presents an opportunity for possible support and capacity building, including digital solutions, to inspire them to help themselves.

This study notes that adaptation and coping, although used interchangeably in some literature, are different concepts. Coping is short-term, immediate; reactive and motivated by crisis; degrades the resource base; and prompted by a lack of alternatives. Adaptation, on the other hand, is oriented towards longer term livelihood, continuous, uses resources efficiently and sustainably, involves planning, and focused on finding alternatives (CVCA, 2009). However, this research argues that most of the respondents' answers can be considered as adaptation, based on the defining characteristics given by CARE (2009), as seen in Table 10.

Although migration was not covered by the online survey, a recent study by Ayeb-Karlsson and Uy (2021) cites Quisumbing and McNiven (2010) in showing that migration as an adaptation strategy to environmental stress is a common livelihood strategy for individuals as well as for whole families. This internal migration is usually carried out by women and youth, from urban to rural, and rural to rural (Gultiano and Xenos 2004; Quisumbing and McNiven 2005, as cited in Ayeb-Karlsson and Uy, 2021).

The study shows 15% of the respondents have not made any changes in the past year regarding the way they prepare or protect themselves from future disasters. Reasons for this include: lack of government support (51.4 %); lack of cooperation in the community (43.2%); lack of information about how to protect/prepare themselves and their family for disasters (40.5%); loss of income/livelihood (35.1%), too busy (32.4%), and poor health (27%).

Table 10. Various ways of preparing for disasters

| <b>Ways of disaster preparation</b>                       | <b>Percentage in online survey</b> | <b>Coping or Adaptation<sup>24</sup></b> |
|---|------------------------------------|--|
| Storing food and other necessities                        | 85%                                | Adaptation                               |
| Learning to prepare to evacuate in safer places           | 54.3%                              | Adaptation                               |
| Making their homes and other relevant structures stronger | 46.8%                              | Adaptation                               |

<sup>24</sup> Definition adopted from CARE (2009)

|  |       |                                 |
|--|-------|---------------------------------|
| Made structural improvements in the area around the house to protect against future disaster | 44.7% | Adaptation                      |
| Increased savings  | 37.2% | Adaptation                      |
| Seeking for a better job   | 24.5% | Adaptation                      |
| Purchasing disaster insurance  | 17%   | Adaptation                      |
| Changed farming and fishing practices  | 4%    | Coping/Adaptation <sup>25</sup> |

Based on the survey results, respondents survive mostly on their own capacities through resourcefulness or in the Filipino language, “*diskarte*”. This reinforces the concept of “*diskarte*” in the UNDP and ZEP PH 2030 report “*#tawid covid*” as a means of surviving disasters including the pandemic.

85% of the respondents believe that there will be more disasters to come in the future, and were likewise asked how they think they can be able to cope with these disasters. They were asked to rate the extent to which they agree to different relevant statements. “*I will be able to improve my ability to cope with future disasters and crises if I am able to...*”

In determining ways to improve people’s coping abilities to future disasters, they were asked to rate the extent to which they agree to different relevant and related statements. Clustered according to themes of the statements, results showed (Figs. 16-17) that when it comes to factors that would make them better cope with disasters, respondents put emphasis on the following: i) having savings and being able to manage finances better; ii) getting support from government including having more access to information and social services; and iii) having a community that is inclusive, looks after one another in times of disaster, and a community that is able to work together in protecting the environment.

### *Saving and Managing Money*

Results from the survey show that being able to save more money and manage it efficiently, as a means to be able to better handle disasters, are strongly agreed upon by 49% and 43% of respondents, indicating that financial capacity of an individual is an important aspect in reducing disaster risk. Related to increasing their financial capacity, 42 % of the respondents

<sup>25</sup> Depends on whether change in farming/fishing process is short or long term; sustainable or unsustainable that impacts the resource base

also value having more employment and business opportunities as a means to cope with disasters.

#### *Government Support, Access to Resources, Information, and Other Services*

In terms of government support, majority of respondents (i.e., those who strongly agree and agree) mention that receiving cash aids, disaster relief, and other government services can increase the coping capacity of individuals after disasters. Related to this, respondents also find it important that they are able to voice their disaster-related concerns to their local government. Apart from receiving government support, 43% of respondents also agree that having access to agricultural and health information and services can help them cope with disasters better. Majority of respondents also either strongly agree and agree that receiving disaster trainings, and being able to have timely disaster warnings, can increase their coping abilities.

#### *Values, Traits, and Actions of the Community*

While increasing individual capacities contribute to an increased rate of reducing disaster risk, having a strong sense of community may also heighten the chances of better coping with disasters. According to more than 80% of the respondents, belonging to a group that protects vulnerable groups such as persons with disabilities, senior citizens, and members of the LGBTQI during disasters is an important trait of a community that could help in reducing disaster risk. Majority of respondents also identified that communities that work together to protect the environment, as well as those that include vulnerable groups in decision making, will allow better survivability and adaptability from disasters. This points to the consciousness that environmental protection provides a certain degree of ecosystem and community resilience (Stewart-Hariwara, 2018).

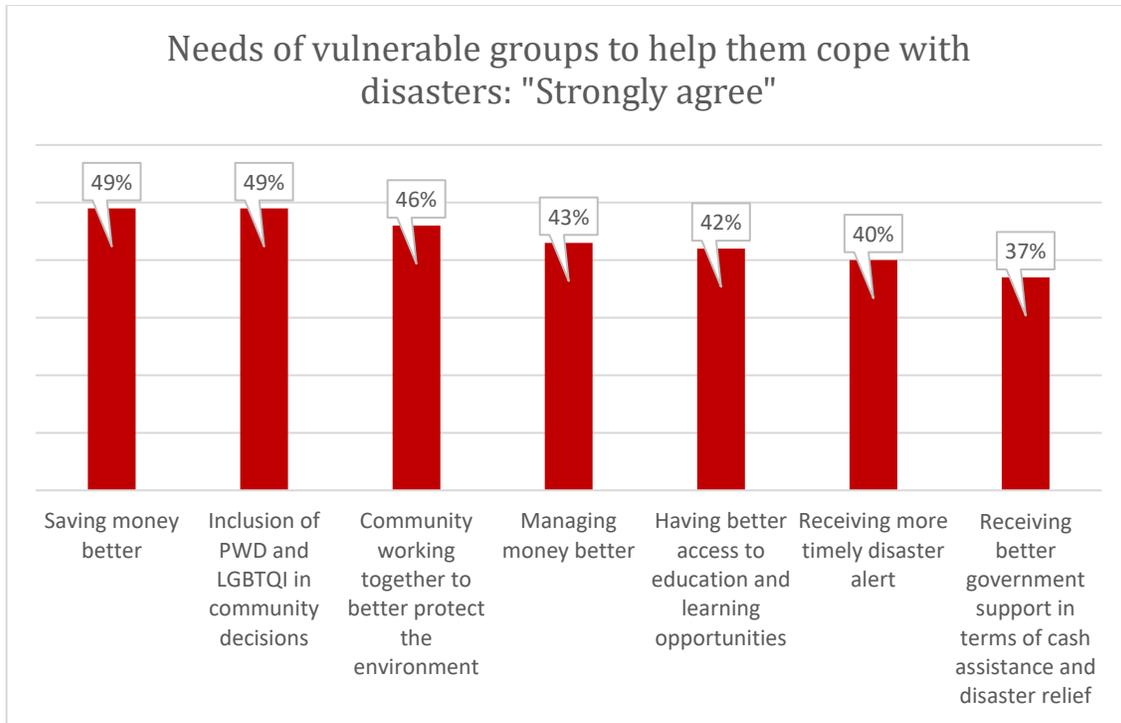


Figure 16. Statements on coping with disasters “strongly agreed” upon by respondents

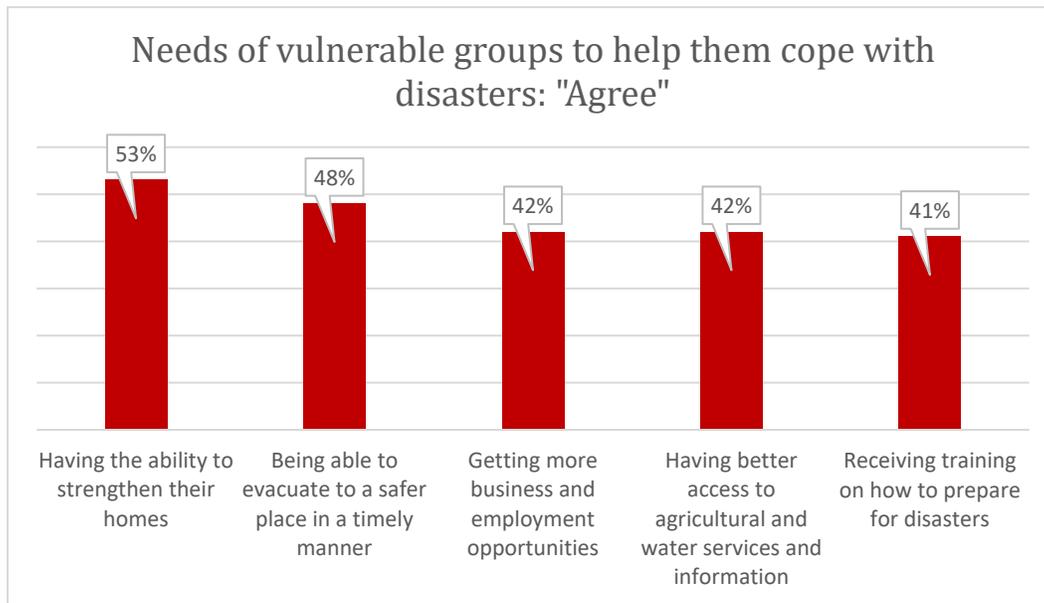


Figure 17. Statements on coping with disasters “agreed” upon by respondents

Access and use of evacuation centers

Evacuation areas are also important aspects of disaster preparedness (NDRRM Plan, 2020). As such, the study also asked the respondents about: i) evacuation in a timely manner; and ii) access to evacuation areas.

60.7% of the respondents believe that they are able to evacuate in a timely manner; 32.7% are not sure; and 6.5% are not able to evacuate quickly. 86% of the respondents have disabilities (i.e., 40.2% of respondents have physical or orthopedic disability) with 60% of which not having the proper assistive devices. Reasons given why some respondents cannot evacuate to a safe area in a timely manner: i) lack of information about where to evacuate; ii) no proper communication or alerts from barangay; and iii) difficulty in accessing evacuation areas.

In terms of access to evacuation areas, a little above half of the total sample (59.8%) have access to evacuation centers, while 30.8% are unsure of where these centers are; 9.3% said they do not have access to evacuation areas or facilities (Fig. 19). This coincides with the result that coping to disasters mean being able to evacuate to safer place in a timely manner (48%). Narratives from some studies show that, during rescue from floods, wheelchairs are left behind since boats are not fitted to accept wheelchairs. If in case there are wheel chairs, evacuation centers are too narrow for its use. Persons with disabilities depend on family and friends for assistance since evacuation centers, although available, were not accessible (UNDP, 2019).

This study also notes that persons with disabilities are “invisible” in major government data on evacuation centers and evacuees. A review of data, such as situation reports from Department of Social Welfare and Development (DSWD) and NDRRMC on evacuees showed no information on persons with disabilities, and thus remains a gap in data collection vital in the assessment and planning on the impacts of climate change and disasters on persons with disabilities (UNDP, 2018). Also, there is a scarcity of research or documentation that disaggregates impact per type of disability (UNDP, 2019). This complements most of the concerns raised during the focus groups on the unavailability of data.

#### Assistance and support received

Assistance provided to the respondents during times of disaster include food donations (74.8%); cash assistance (49.5%); transportation and evacuation services (9.3%). Using cash assistance to support the most vulnerable families affected by the disasters (i.e., typhoons) has proven to be an effective and dignified way to provide aid while helping boost local economy (UN CERF, 2021). However, 9.3% of the respondents believe that they have not

received any assistance nor help at all from the government during disasters. This lack of financial assistance from the government is also one factor that influence people's decision to migrate as an adaptation to extreme weather events (Ayeb-Karlson and Uy, 2021).

Sources of assistance in times of disaster include community health center (41.1%); religious groups (38.3%); Social media groups and network (30.8%); school (13.1%); community associations such as livelihood and women's groups (10%). Only 13.1% of the respondents got assistance from the government, both local and national which further reinforces the key finding that vulnerable groups survive disasters using their own means. Skoufias et al., (2019) argues the Philippines is still fortunate that it has one of the most advanced Social Protection systems in the East Asia Pacific region with comprehensive social welfare reforms including the large conditional cash transfer program called *Pantawid Pamilya Pilipino Program*, commonly known as the 4Ps. The 4Ps cash transfer was not explored in this study.

### Participation in DRR activities

Survey results showed that more than half (54.2%) are able to participate in DRR activities and programs in the community. However, 24.3% and 21.5% are respectively unable to and unsure that they can take part in such activities.

The following are reasons mentioned by the respondents why they are not able to attend:

- not very accessible for people with disabilities;
- usually only limited to barangay officials;
- no invitation of notices being received; and
- unaware or not being made aware of such activities.

This theme also surfaced in the focus group with one participant highlighting the need to have access to support for persons with disabilities:

*"We should know unmet needs and support requirements and barriers for PWD to participate; if this is not resolved, persons with disabilities will continue to be left out" "Access to support requirements is a precondition to inclusion. We cannot say that "Leave No One Behind" if this is not addressed" (Male)*

Again, the recurring issue of accessibility, as seen in the focus groups, is verified by the survey results. There are still significant number of individuals belonging to vulnerable groups that are left behind and excluded in activities like this.

As a follow-up question, respondents also identified some ways that would make them participate or attend these activities (Fig. 18)

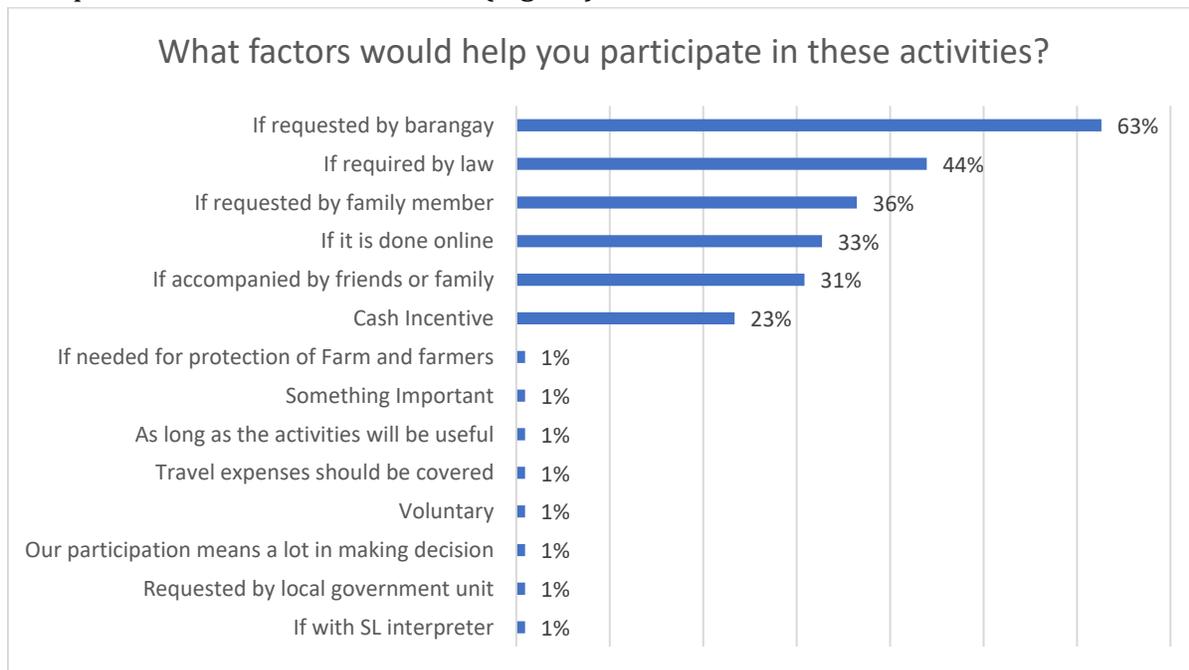


Figure 18. Factors influencing participation in DRR activities

Based on the above figure, majority of respondents (63%) agree that they will most likely attend if they are requested to by the *barangay* or by the law. This highlights the fact that effective governance and good planning includes everyone and leads to action on reducing disaster risk.<sup>26</sup>

Request from family members was also noted as a factor (36.4%), as well as being accompanied by friends (30.8%). The idea of having such activities be done online was also a top factor (32.7%) indicating the reality in relation to usual activities amidst the pandemic. Cash incentive is also an important factor for 23.4% of the respondents.

In relation to finding out of about their ability to attend planning activities, respondents also answered if they have had the chance to attend trainings and seminars related to disaster risk reduction and climate change adaptation awareness. Survey results also show that a relatively large percentage (70.1%) of the sample group were at some point in their lives

<sup>26</sup> Source: [https://idrr.undrr.org/?fbclid=IwAR3aetjp\\_QouUJc-AV58qUkM5\\_-VXU43\\_-GWThbkRShspPVoNAGhYN\\_4SpE](https://idrr.undrr.org/?fbclid=IwAR3aetjp_QouUJc-AV58qUkM5_-VXU43_-GWThbkRShspPVoNAGhYN_4SpE)

able to attend such trainings. On the other hand, 15.9% say they have not yet attended such programs, while 14% were unsure if they already had.

## 5.2 Problems, challenges, and priority needs of vulnerable groups

*Key finding 3: Persons with disabilities, women and LGBTQI persons, farmers and fisherfolk are differentially and disproportionately impacted by disasters. Existing multiple vulnerabilities and societal inequalities are greatly magnified by the COVID-19 pandemic placing them at higher levels of risks.*

To supplement the result of the survey and focus groups, the study reviewed, mapped and analyzed various documents and other published researches on persons with disabilities, women and LGBTQI community, and farmers and fisherfolk.

### ***Persons with Disabilities***

Among those vulnerable groups that face a greater risk in disaster situations are persons with disabilities. Although there is a scarcity in research and documentation on the impacts of climate change to persons with disabilities, and almost none that are available disaggregate impacts based on the type of disability, there are reports on the interface of DRRM and persons with disabilities (UNDP, 2018). Even on non-disaster situations persons with disabilities already have existing challenges—economically, physically (environment), and socio-culturally—of which should be taken into consideration when it comes to responding to their needs and priorities in the communities they live in. In the context of the Philippines, prior to the ratification of the Philippine Coalition on the U.N. Convention on the Rights of Persons with Disabilities (UNCR Persons with Disabilities) in the Philippines in 2008, at least twelve (12) disability-related laws concerned with persons with disabilities were passed since the 1950s. However, challenges in implementation, monitoring, and budget allocation have been long-term barriers to these policies (Philippine Coalition on the U.N. Convention on the Rights of Persons with Disabilities, 2013).

Persons with disabilities are disproportionately impacted by the impacts of climate change and its related disasters, and belong to the “*socially and geographically disadvantaged people*” cited in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report as “*asymmetrically impacted by climate change and climate disasters*” (Adaptation Fund, n.d.). Review of literature presents evidence that persons with disabilities are between 2-4 times likely to be killed during disasters compared to others (UNDP, 2019). Persons with disabilities also are often found to have difficulties in evacuating during emergencies such as

during the 2011 earthquake and tsunami in Japan where the mortality rate of persons with disabilities was two times that of the rest of the population (UNDP, 2020)

Other reports (e.g., World Bank, 2008; Lewis & Ballard, 2012 as cited in UNDP, 2018) note that, as climate change exacerbates food shortages and malnutrition, there will be increased risks for persons with disabilities already facing food shortages. Persons with disabilities will also be left behind as people become displaced by climate disasters and eventually migrate. Those without family members or support systems may get deprived from development aid, relief materials, and other basic rights including food, education, and shelter (UNDP, 2018).

Contributing factors to the vulnerability of persons with disabilities identified in the study *“Building the Resilience of Persons with Disabilities to Cope with Climate Change in the Asia Pacific Region”* include education, employment, health, inclusivity, and social insurance. The same study outlines risks identified by key stakeholders and persons with disabilities (Table 11).

Table 11. Identified risks to persons with disabilities.

| IDENTIFIED RISKS          |  |
|---------------------------|--|
| Health                    | <ul style="list-style-type: none"> <li>• Issues on facilities/provisions for needs of persons with disabilities</li> <li>• Inadequate preparedness in the status of evacuation centers</li> <li>• The infrastructure, particularly public schools, health facilities, temporary shelters constructed primarily after the climate induced disaster are not accessible</li> <li>• Hygiene and sanitation</li> <li>• High risk of illness and injuries</li> <li>• High loss of lives</li> <li>• Conflict risk due to scarce resources</li> <li>• Food security</li> </ul> |
| Economic                  | <ul style="list-style-type: none"> <li>• Property damage</li> <li>• Livelihood loss</li> <li>• Loss/decrease in income</li> </ul>  |
| Information/Dissemination | <ul style="list-style-type: none"> <li>• Lack of information</li> <li>• Inaccessibility of vital information to persons with disabilities</li> </ul>   |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• Lack of device to access information</li> <li>• Inability to factor in specific needs of persons with disabilities</li> </ul>   |
| Agency-specific risks  | <ul style="list-style-type: none"> <li>• Perceptions of persons with disabilities as a burden to society and mere recipients of welfare</li> <li>• Lack of prioritization in times of disasters (i.e lack of specific plans for persons with disabilities; non-inclusion in initiatives)</li> <li>• Persons with disabilities are not able to participate in all stages of CCA-DRR activities</li> </ul> |
| Specific risk (ADHD, autism, neurodevelopmental disabilities)                              | <ul style="list-style-type: none"> <li>• Inability to follow instructions</li> <li>• Meltdown can be triggered by unfamiliar circumstances (i.e. sight of floodwaters)</li> <li>• Lack of assistive devices and facilities during and after rescue</li> <li>• Functional difficulties during disasters</li> </ul>  |
| Specific risk (wheelchair users, stroke survivors, persons with intellectual disabilities) | <ul style="list-style-type: none"> <li>• Heat stress</li> <li>• Functional difficulties during disasters</li> </ul>  |

Source: UNDP, 2018

The same study suggests that Early Warning Systems (EWS) should also be appropriate to the needs of persons with disability. The following key issues were summarized in the study:

- Delays in receiving information or warning due to lack of signal (i.e., not received in real time);
- Existing systems and information are not inclusive of the needs of persons with disabilities—there is a need for sign language interpreters in TV and/or subtitles for the deaf/ hard of hearing;
- Interventions do not focus at the long term and just on imminent preparedness;
- Lack of technology to allow effective announcements at the barangay level for the deaf;
- Redundant but inefficient of systems (e.g., news that are not updated being disseminated by various sources);
- Underused platforms and lack of devices;
- EWS dependent on social media but social media may not always be accessible to persons with disability;

- Prevalent use of technical terms that often do not translate well (i.e., sign language) when disseminating information; and
- Information is limited in scope, poorly disseminated, and inaccessible especially in geographically isolated and disadvantaged areas (GIDAs).

Does your barangay have an operational community-based early warning system?  
107 responses

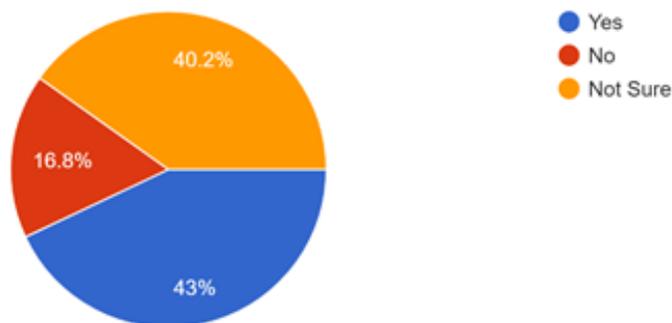


Figure 19. Response on presence of an operational EWS in the community

The focus groups and the online survey showed similar results. When asked whether there exists a functional Early Warning System (EWS) in their community, 43% of the respondents answered yes. However, data also show that a close 40.2 % are either unaware or unsure of such. This further illuminates the state of EWS when we consider that 16.8% of the respondents are sure that there are no community-based EWS in their area (Fig. 19). It should be noted that 40% of the respondents “strongly agree” to having timely alerts to help them cope to disasters.

This study claims that the mere presence of EWS in the community does not automatically translate into functionality and proper use, as shown in the survey. Based on the breakdown of the respondents with EWS, although 67% say that they understand EWS and act accordingly, there are still 26% who are not sure; and 6.8% who do not understand the EWS. These groups (32.8%) are most likely to be left behind. The result is verified by the narrative culled from the focus group:

*“There is no support given to PWDs in accessing information. EWS should be customized for the specific needs of specific disabilities. Existing EWS is designed only for those without disabilities”*  
(Male)

### ***Women and the LGBTQI community***

Disasters have the tendency to magnify existing inequalities in society, and by doing so also increases the vulnerability of certain groups and communities. More than ten million Filipino women today still live in poverty, with rural and indigenous women being the most vulnerable (UNDP, 2010). Gender inequality has resulted to more women than men being disadvantaged, with regard to factors affecting vulnerability (and invariably, resilience), to hazards and disasters, such as in terms of nutrition, literacy and health; access to information, resources and legal protection; survival skills; and influence over decision-making processes (Abarquez and Perreno, 2014).

Disasters themselves do not discriminate, but it leaves a significant impact on how communities and populations experience them.<sup>27</sup> For women, bad situations become worse as disasters reinforce, perpetuate, and increase gender inequality (UN Women and UNICEF, 2019). Inequalities due to gender may eventually result to increased vulnerability and higher degree of exposure to risk. Compared to men, women are less likely to receive information, are more likely to be responsible for child rearing and elderly care, and less likely to have access to social protection and insurance while engaging more in informal jobs (UNDP, 2020).

Given the prevailing situation marked by gender inequalities, women and the LGBTQI community may not have access and control over resources necessary for adaptation that should cushion shock coming from disasters, since they have less ownership over land, property, household assets and savings (UNDP, 2020).

The Sendai Framework acknowledges that women and children are disproportionately impacted by disasters, and advocates for a more people-centered approach to DRR. It further recognizes that women, the youth, and children should be considered in designing and implementing gender-sensitive DRR policies, plans, and programmes (UN Women and UNICEF, 2019).

Women are vulnerable to the impacts of climate change and this is again intertwined to their domestic responsibilities and limited access to information, resources and services (CVCA, 2009). Studies show that gendered domestic roles increase women's vulnerability. Case in point: during the Indian Ocean tsunami, men were found to be less affected since they were

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<sup>27</sup> Inception report on "Gender and Social Inclusion Advisor for Recovery and Resilience Approaches in the Philippines." (2021). UNDP Philippine Country Office.

out in their boats compared to women who were more exposed at home and on the shore (Brown et al., 2019).

According to Ayeb-Karlsson and Uy (2021), female gender roles in the Philippines expect women to manage the household including the daily needs of the family, household chores, in the rural areas, farm work, including selling produce in the market. In cases where a spouse migrates to other areas for work, mothers are left behind with the double burden of child rearing and supplementing the household income.

Furthermore, when it came to deaths during disasters, gender differences were linked to women's economic and social rights (Neumayer and Plümper, 2007 as cited in Brown et al., 2019). The same report shows inequalities even during rescue efforts wherein boys were favored over girls.

In examining the nexus between gender and disasters, the said findings coincide with studies (UNDP, 2021; Ching et al., 2015) on the devastating impact of Typhoon Yolanda (Haiyan) on women:

- More than 3.5 million women and girls were affected, 250,000 of them were pregnant and 169,000 were breastfeeding.
- 64% of the 6,300 casualties were women.<sup>28</sup>
- 40% of an estimated six million workers who reported loss of income sources were female workers.
- Coping with disasters was more difficult for women due to unmet nutritional needs.

Post disaster, women survivors still undergo social, financial, and physiological stresses with a significant number forced into trafficking and consequent violence (UN Women and UNICEF, 2019).

Apart from women, the LGBTQI community specifically, is also considered as a vulnerable sector as a result of discrimination and health related concerns such as higher exposure to HIV. Persons living with HIV and AIDS were also identified as being part of the vulnerable group (CVCA, 2009). Transgender people also lack legal recognition and protection in the Philippines, making them both vulnerable and marginalized (UNDP, 2018). The lack of data on the situation of the LGBTQI community before, during, and after disasters lead to further

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<sup>28</sup> <https://www.preventionweb.net/news/view/61777>.

marginalization and gaps in protection. As a result, members of the LGBTQI community are excluded from development aid and allocation of resources, including much needed support through post-recovery programs (UNDP, 2018). Additionally, this is compounded by the challenges LGBTQI individuals face in employment as they are subject to discrimination and abuse.

It is important that a gender-based lens be used in mapping and understanding the various vulnerable groups in the Philippines. The current status of vulnerable groups and their access to digital platforms when viewed from a gender perspective can reveal the potential gaps and opportunities which are essential for the development of digital solutions for DRR-CCA.

For instance, a foreseeable gap can be identified from the findings of Roberts and Hernandez (2019) in their research on the 5'A's (i.e., Availability, Affordability, Awareness, Ability, and Agency) of Technology Access in the Philippines. In their study, they found that women, indigenous people, and those on low incomes were most excluded from digital citizenship initiatives and were most constrained by low levels of agency and that relatively well-off, educated, urban men are more likely to engage in digital citizenship than relatively poor, rural women. Lack of time as barrier from using the internet was also cited by more women than men in their study. This finding could also be a validation to the reality that most women especially in rural communities enjoy less free time than men because of the gendered burden of unpaid domestic work (Bardasi & Wodon, 2006).

On the other hand, based on different literature that concerns gender issues and access to digital services, opportunities worth considering can also be drawn out from some gender studies. As such from the World Bank published review of Gender Equality in DRRM (2014), one of the issues raised is that since most women are more engaged home and domestic work, they become more engaged in disaster prevention and mitigation activities which have a direct impact on their own households. For most women, DRRM activities were viewed as an extension of their caregiving work for the reason that Women have more free time to attend trainings while men are often out the whole day working, and Women need it more than men because they are the ones left at home (Abarquez and Perreno, 2014).

Such situations could be viewed as opportunities to further the development of digital solutions in DRR-CCA, as knowledge on digital solutions could be used to empower women, maximizing their willingness to participate in activities wherein their own household can benefit from. Apart from identifying opportunities for digital solutions from the current status of vulnerable groups regarding the social inequalities that they face, other gender

related issues and studies such as health may also be used as basis in determining opportunities for the design of digital solutions.

In a 2015 UN report entitled *“Towards Universal Access: Examples of Municipal HIV programming for Men who have sex with men and Transgender persons in Six Asian Cities”* it was mentioned how men who have sex with men (MSM) and transgender from different Asian countries, including Manila are increasingly using mobile phone technologies to chat and *‘hook-up’* through *‘apps’* (applications), which inform the user when someone signed up to a particular e-network is in close proximity to them. While there is no specific mention in the report that participants also use the internet for obtaining DRR related information, this increasing awareness and technological savviness from this marginalized and vulnerable sector, therefore, is an area that could also be explored further in the design of DRR services online.

The Philippine Disaster Risk Reduction and Management Act of 2010 (i.e., Republic Act No. 10121, s. 2010) explicitly states that disaster risk reduction and climate change measures employed by the government should be gender responsive, culturally sensitive and considerate of human rights. RA 10121 further provides that the early recovery and post-disaster needs assessment undergo a gender analysis.

### ***Agriculture sector: Farmers and Fisherfolk***

The vulnerability of the agriculture sector is based on the extensive study<sup>29</sup> conducted by leading Filipino scientists. It notes that climate change has *“profound effects and impacts on agriculture and fisheries threatening their sustainable development”* and communities in the agriculture and fisheries sectors *“are among the most vulnerable since poverty incidence is high.”* (Cruz, et al., 2017). Filipinos have one of the highest per capita fish consumption of 23 to 43 kg per year. Fisheries and fisheries-associated livelihoods are one of the main economic sectors of the Philippine society. This combined natural exposure and heavy reliance on the coastal system makes the Philippines highly vulnerable to climate change (UNDP, 2015).

Rice production, which is very sensitive to water and temperature stress, has suffered from extreme weather events characterized by excessive rainfall and variable rainfall patterns. Unpredictable weather patterns also increased incidences of crop failure due to pests (e.g., rice black bugs) whose population swelled due to a decrease in biodiversity, including its natural predators (Ayeb-Karlsson & Uy, 2021).

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<sup>29</sup> Philippine Climate Change Assessment, Working Group 2 (WG2).

The Philippine Climate Change Assessment (2017) also observed that sea level rise has affected the fisheries sector by setting into motion a “*domino effect*” wherein temperature-induced shifts in adult fish distribution and cycles of reproduction has reduced fish stocks. Fish populations further diminish due to combined factors of increased coral bleaching events as well as collapse of coral reef systems from ocean acidification and runoff (Cruz, et al., 2017). Eventually, fisherfolk would have less catch and lose their source of livelihood leaving them more vulnerable to various environmental shocks and stresses.

A case study on the effects of climate change and climate-related disasters on a coastal community (Tapnio, 2020) illustrate the vulnerability of the agriculture sector to both sudden or rapid onset and slow onset hazards. Results of the study showed that drought brought about by El Niño episodes affected crop production as it was aggravated by factors such as: i) crops were highly dependent on rain since crops are rain-fed; ii) there were no available irrigation facilities; and iii) water sources cannot be sustained during prolonged dry season. The increase incidence in pests and diseases during dry season, such as the “*cocolisap*” and the low market value of copra<sup>30</sup> further pushed the farmers into poverty. The La Niña, on the other hand, flooded agricultural production areas due to the overflow of inland bodies of water.

A study by Ayeb-Karlsson and Uy (2021) highlighted different environmental stresses in Luzon, Visayas, and Mindanao that impacts on fisheries and agriculture, as shown in Table 11. Note that the high risk of typhoon and flooding in the Luzon, for example, exacerbates the vulnerability of the urban poor. The high amount of rainfall causing severe flooding events in the Visayas directly affects the economy dominated by agriculture and fisheries. This is similar in Mindanao where agriculture contributes less than half of the country’s food requirements.

Table 12. Environmental stresses affecting chosen sites in the 3 major island groups

| Island Group | Description | Environmental Stress |
|--------------|-------------|----------------------|
|--------------|-------------|----------------------|

<sup>30</sup> Data from Philippine Coconut Authority (PCA) show average farm-gate price of copra fell to Php 13.71/kg (2019), below breakeven price, against Php 25.13/kg (2018). See <https://business.inquirer.net/269100/copra-prices-continue-slide-as-global-demand-for-coconut-oil-remains-soft#ixzz6E2rLguXe>

|                           |  |  |
|---------------------------|--|--|
| Luzon (NCR) <sup>31</sup> | Center of socio-economic activities  | High risk of natural hazard (typhoon and flooding) and high vulnerability of urban poor            |
| Visayas (Eastern Samar)   | Economy dominated by agriculture and fishing; 95% of total agricultural land covered with crops but with low productivity. | Has one of the highest rainfalls in the Philippines that cause severe flooding events.             |
| Mindanao                  | Ideal for crop production all year round; contributes 40% to country's food requirements and 30% to national food trade    | Vulnerable to extreme typhoon events (Northern Mindanao); experienced changes in rainfall patterns |

Source: Ayeb-Karlsson and Uy (2021)

The El Niño Southern Oscillation (ENSO) has largely influenced climate variability in the country with drought and water scarcity during El Niño events while heavy rainfall occurs during La Niña events (Villarin et al. 2016). This has huge implications to the agricultural sector. For instance, the combined destructive power of Typhoons Quinta, Rolly, and Ulysses during the latter part of 2020 caused severe damage to agriculture amounting to PhP 14.3 billion with Region 4b (MIMAROPA) experiencing a massive loss of PhP 876 million; Region 4a (CALABARZON) of PhP 679 million; and Region 5 (Bicol) of PhP 393 million from Typhoon Quinta alone. Region 5 (Bicol) again suffered the most with a PhP 3.5 billion worth of damage in the agricultural sector from Typhoon Rolly. Agriculture in CALABARZON was again heavily damaged by Typhoon Ulysses, with losses pegged at PhP 1.26 billion. However, Region 2 and 3 felt most of this onslaught, with damages amounting to PhP 2.1 billion and PhP 1.37 billion respectively.<sup>32</sup>

For farmers and fisherfolk, diverse ways of coping to the effects of extreme weather events include taking on other seasonal jobs such as construction work in neighboring cities with their wives engaging in other livelihood activities such as handicrafts (Ayeb-Karlsson and Uy, 2020), driving pedicabs and tricycles, bookies for local numbers game, other odd jobs (Tapnio, 2020) to supplement household income.

### ***COVID-19 and the vulnerable groups***

<sup>31</sup> NCR is included in the table since it is the prime migration destination for people coming from the Luzon, Visayas and Mindanao.

<sup>32</sup> NDRRMC Situation Reports # 8, 12, 28

The UNDP (2020) report “*Recovering from COVID-19: Lessons from Past Disasters in Asia and the Pacific*” highlights the impacts of COVID-19 pandemic on vulnerable groups. It notes that, just like natural hazards, pandemic risks are likely to intensify existing inequalities and further burden already vulnerable groups including women, LGBTQI, persons with disabilities, minorities, refugees, and migrant workers. The global scope of COVID-19 also affected key sectors of the economy such as agriculture, education, commerce, industry and transport.

COVID-19 has further underscored the structural inequalities and discrimination towards women resulting in women being affected differently by disasters than men, more than any other disasters (UNDP, 2020). One, with the closure of schools due because of the pandemic, it has increased the burden of child care while hindering women’s ability to keep to home clean and hygienic due to lack of information. Job losses were reported by women working as in micro, small and medium sized enterprises due to business closures. Women engaged in industries such as hospitality, tourism, garment and textile manufacture were also severely affected, while women working within the health sector have been under increasing risk of contracting the virus (UNDP, 2020). In Manila, Philippines, for instance, women reported lower incomes (30% compared to 17% for men) and had difficulties maintaining income (41%) due to the extended lockdowns and business closures (UNDP/ZEP PH, 2021).

The pandemic also placed further pressure on resources and priorities, originally meant for women’s health, which were reallocated to COVID-19 response. Aside from scaling down sexual and reproductive health services, women’s mental and emotional health also worsened due to an increase in unpaid domestic work and care work since the pandemic as seen in Thailand and the Philippines (UNDP, 2020).

The pandemic has also greatly impacted on persons with disabilities. The Asia-Pacific region, including the Philippines, has the world’s largest proportion of persons with disabilities at 690 million (UNDP, 2020). Aside from placing them at a high risk from COVID-19 due to their underlying medical conditions, the pandemic also heightened discrimination towards persons with disabilities. Additional factors that contributed to COVID-19 impacts include limited access to information because of barriers in communication as well as having lower incomes placing them at greater risk to COVID-19 (UNDP, 2020).

The agriculture sector, already highly sensitive and vulnerable to both sudden/rapid onset and slow onset hazards, suffered throughout the pandemic. Lockdowns and travel

limitations due to COVID-19 prevented transport of produce to the market severely affecting their only source of income.<sup>33</sup>

### ***Multiple vulnerabilities***

Multiple vulnerabilities, also called intersectional vulnerabilities, is a factor of complexity that needs to be considered (IFRC, 2020), such as persons having two (2) or more vulnerabilities. The study notes these multiple vulnerabilities present in the sample size: those with multiple disabilities; and those who fall under more than one category (i.e., women engaged in farming; disabled members of the LGBTQI community). Double-triple marginalization was also mentioned in the focus group as an important factor to be considered in designing potential solutions.

Table 13-15 show the frequency of multiple vulnerabilities among the sample: female respondents with disabilities; LGBTQI respondents with disabilities; and females working in the agricultural sector (i.e., farming, forestry, fisheries)

Table 13. Female respondents with disabilities

| <b>Disability Status</b>  | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Disability resulting from a chronic illness - Includes orthopedic disability due to cancer, blindness due to diabetes, and other disabilities due to a chronic disease) | 2                | 1.86%             |
| Hearing disability - Deaf or hard of hearing  | 11               | 10.28%            |
| Intellectual disability - Slow progress in mental development   | 1                | 0.93%             |
| Orthopedic (Musculoskeletal), physical disability - - Includes people with dwarfism and amputated hands or feet, scoliosis.   | 23               | 21.50%            |

<sup>33</sup> WFP-DAP (2020). Comprehensive Report the Implementation of Forecast-based Financing in the Philippines. <sup>1</sup> Early Action and Early Funding Mechanisms in the Province of Benguet, Philippines

|   |                   |       |
|---|-------------------|-------|
| Psychosocial disability- Includes bipolar disorder, depression, ADHD, epilepsy, and other long-term and recurring mental or behavioral issues   | 1                 | 0.93% |
| Speech, language impairment - Includes developmental language disorder, language delay, or developmental dysphasia; communication disorder that adversely affects a person's ability to talk, understand, read, and write; trouble producing certain sounds accurately. | 3                 | 2.8%  |
|   | Visual disability | 4     |
|   | <b>TOTAL</b>      | 45    |

Note that majority of the respondents with multiple vulnerabilities are women with orthopedic (i.e., musculoskeletal) and physical disabilities (21.50%); those with hearing disabilities (10.28%); intellectual disability (9.3%) and psychosocial disability (9.3%).

LGBTQI respondents on the other hand have hearing disabilities (2.8%); psychosocial disability (0.93%); and speech and language impairment (0.93%).

Table 14. LGBTQI respondents with disabilities

| <b>Disability Status</b>  | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Hearing disability - Deaf or hard of hearing  | 3                | 2.8%              |
| Psychosocial disability- Includes bipolar disorder, depression, ADHD, epilepsy, and other long-term and recurring mental or behavioral issues | 1                | 0.93%             |
| Speech, language impairment - Includes developmental language disorder, language delay, or developmental dysphasia; communication disorder    | 1                | 0.93%             |

|  |   |              |
|--|---|--------------|
| that adversely affects a person's ability to talk, understand, read, and write; trouble producing certain sounds accurately. |   |              |
| <b>TOTAL</b>   | 5 | <b>4.67%</b> |

Table 15. Female working in the skilled agriculture sector (Farmers, forestry workers and fisherfolk)

| <b>Disability Status</b>  | <b>Frequency</b> | <b>Percentage</b> |
|---|------------------|-------------------|
| Hearing disability (e.g., deaf or hard of hearing)  | 1                | 0.93%             |
| Orthopedic (i.e., musculoskeletal), physical disability (i.e., includes people with dwarfism and amputated hands or feet, scoliosis). | 1                | 0.93%             |
| <b>TOTAL</b>  | 2                | <b>1.86%</b>      |

Females with hearing disabilities and orthopedic and physical disabilities working in the skilled agricultural sector are also represented, both at 0.93%.

### ***Vulnerable groups and access to digital platforms for CCA- DRR***

*Key finding 4: Persons with disabilities, women and LGBTQI persons, farmers and fisherfolk have little or no access to appropriate online CCA-DRR services due to different barriers to technological access.*

As a key theme of this study, awareness of and accessibility to online CCA-DRR services, including weather and disaster information, was probed through quantitative and qualitative data-gathering methods.

#### *Data access and availability*

One of the main guiding questions during the three (3) sessions of the focus group was on the barriers vulnerable groups face in access to and use of ICTs. This was a key question based on Component 1 of the Maturity Model (“*Shared data resources and access*”) and Outcome 1 of the updated NDRRM Plan (“*Improved access and understanding, and use of updated risk information and research*”). Based on the thread of responses, there was a general consensus among the participants that access to data is still a major barrier for vulnerable groups. As a participant from a research center mentioned:

*“We are overflowing with technologies here in the Philippines but are not accessible. Bureaucratic access to data remains an issue. Writing letters and MOUs in accessing data takes time and is problematic for planning.” (Male)*

Aside from data access, data availability (i.e., lack and/or insufficiency of data); data disaggregation; data reliability; inconsistencies in data collection and sharing are recurring themes in the focus groups. These concerns resonated well with persons with disabilities’ advocacy groups:

*“There is no data all over the Philippines on how many have these neurodevelopmental conditions. What digital solution is appropriate? How will these solutions reach us if we do not have data to find out who these people are?” (Female)*

*“There is a need to have data on persons with neurodevelopmental disabilities or else they will again be left out from programs for vulnerable groups. We need shared resources and how Early Warning Systems (EWS) can be improved.” (Male)*

Suggestions and solutions were offered during the focus groups on how to address these issues:

*“We have to make the PWD data reliable. Increase DOH database from 300k to half million and then to one million. Disaggregate data by geographical spread, age/age bracket to determine those needed employment and livelihood programs; those with mild disabilities etc. Populate real database of DOH by encouraging everyone to get PWD ID. Transmit these data to DOH database.” (Male)*

### ***Can we tear down the barriers to technological access?***

According to Roberts & Hernandez (2019), there exists different classes of technological access in the Philippines by virtue of different demographics, which stratifies and determines who is able to participate in digital governance, and who is left behind. Among the important classes to consider for digital governance include those without phones or connectivity (i.e., “digital underclass”), and those with basic phones with text and call functions only (i.e., “working class ICTs”). People get left behind when they lack choices and opportunities required to participate and benefit from development progress (UNDP, 2018). Consequently, if digital solutions are designed and limited to be internet or web-based only, these vulnerable groups are already considered excluded and left behind.

Which is why this MAVG study has explored a set of different demographics through the use of quantitative methods. To facilitate a structured analysis of the barriers faced by vulnerable groups in terms of access and use of digital technologies, raw data from the online survey and inputs from the focus groups were analyzed using the DRRMM Model or Maturity

model, which provided guiding questions on its 7 components, and the 5'A's framework adopted by Roberts & Hernandez (2019).

According to the paper "*Digital Access is not Binary: The 5 'A's of Technology Access in the Philippines*" by Roberts & Hernandez (2019), access to technology can be broken down to five constituent elements: availability, affordability, awareness, ability, and agency. This MAVG report adopted these dimensions in order to explore and highlight the different socio-economic and political factors that limit access to digital solutions by the vulnerable groups.

### **Barrier 1: Availability**

The focus groups identified *availability* as a major barrier to technology access. This came in the form of lack of data/insufficiency of data especially for vulnerable groups. Result from the survey show that a majority (89.7%) of the respondents do have access to the internet. However, availability is not limited to the availability of connectivity but also on: i) the availability of relevant content in local languages (i.e., lack of indigenous or local languages as screen interface for digital applications or platforms; and ii) availability of adaptive and assistive technologies for PWDs (Roberts & Hernandez, 2019). The need to personalize digital solutions was validated in the focus groups and provides a possible entry point in the design of solutions (i.e., "*People who use Tagalog and other local languages are more emotional and more personalized*").

### **Device ownership and use**

In terms of access, use, and affordability of ICTs, the key finding of the study is that most own and have access to smartphones and log on to the internet using these devices from their homes or through mobile cellular data (Fig. 21).

Which of the following devices do you have access to and own? (tick all that applies)

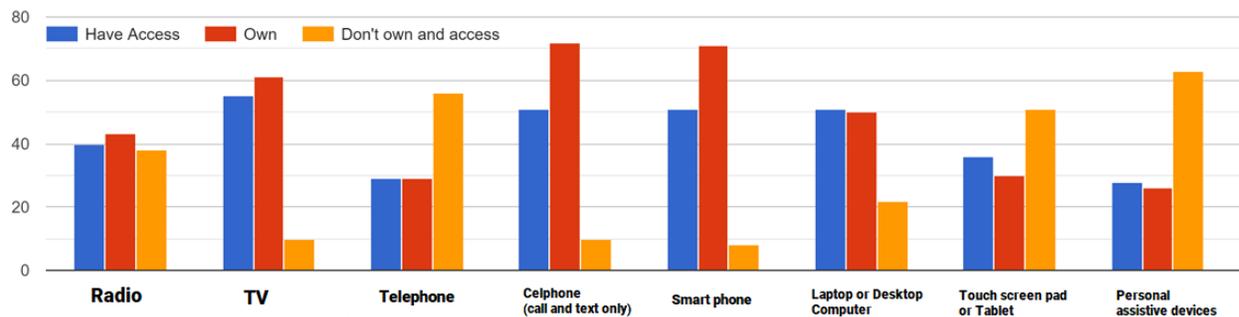


Figure 20. Ownership and Access to Specific Devices

Note that an equal number of respondents own cellphones (i.e., call and text only) and smart phones. This is an important finding since access to online sites can only work with smart phones. Furthermore, results of this survey support the assertion from the focus groups that most persons with disabilities have no access to any personal assistive devices (60%) which has a significant repercussion in the DRR discourse with regard to their safety and wellbeing during disasters.

Where do you access these devices?

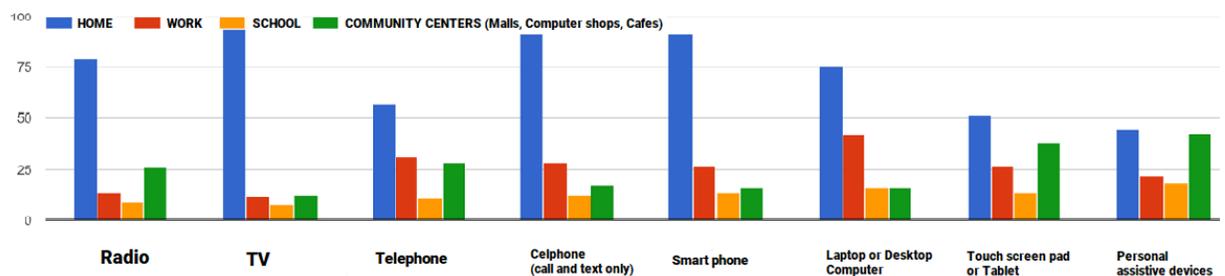


Figure 21. Places where devices are accessed

The study also explored the online activities of respondents to find out patterns or trends in their daily internet use. Almost 80% of respondents use online services such as Facebook, YouTube, and shopping applications at least once every day. The use of SMS, emails, and calls are largely done on a daily basis; while the least done activity on a daily basis is finding

information on weather and disaster events. Accessing the internet to get information related to weather and disaster events are mostly done at least once a week.

Important transactions such as online banking and the use of mobile money (i.e., PayMaya, G-cash) also rank as top online activities of the respondents. However, based on results, chat apps (i.e., Viber, FB messenger, WhatsApp) and use of social media (i.e., Facebook, Twitter) represent majority of daily use. This trend of internet use exhibits the concept of frugality (Roberts & Hernandez, 2019) wherein people tend to use their mobile data on “free apps” and not on online sites that would diminish their “load”.

Looking at the demographics, we see what literature calls a “*digital divide*” among the respondents in terms of access to devices. An equal number of respondents own cellphones (i.e., call and text only) and smart phones (3G or 4G capable devices). This exposed the fact that not everyone can access online sites since that can only work with smart phones. This lack of access to 3G or 4G capable phones alone already excludes a portion of the population from participating in internet-based digital initiatives. The qualitative nature of the focus groups allowed us to substantiate the fact that reduced income, due to the pandemic, and higher spending, has become a barrier for digital solutions since vulnerable groups cannot invest in internet-ready gadgets.

To add to this, smartphone users are further challenged with intermittent and unreliable coverage since connectivity speeds in the Philippines vary (Roberts & Hernandez, 2019). In a study on factors affecting internal migration, aside from environmental stresses, internet connectivity was mentioned as a one of the consideration in moving from rural to urban settlements (Ayeb-Karlsson & Uy, 2021). Also notable is that all devices were accessed in their homes. This points to the fact that the inability to connect to and use the internet mainly stems from slow connection problems and lack of free public Wi-Fi sites. As such, Component 4 of the Maturity Model highlights the need for better connectivity through ICT infrastructure.

### **Barrier 2: Affordability**

What then is the price of being “*connected*”? The study again builds up from the results of the survey and the 5 ‘A’s framework. In terms of *affordability*, majority of the respondents have no access to home Wi-Fi, and either rent computers (i.e., with internet) or purchase mobile phone data (i.e., “*pre-paid load*”). The cost is in itself a barrier for participating in digital initiatives by the government as seen in the survey where only 2.8% of the respondents find current prices to be cheap.

Affordability is a major consideration in the ability to access the internet (Roberts and Hernandez, 2019). On a monthly basis, majority of the respondents spend less than PhP 1,000 (USD 20.89)<sup>34</sup> a month for mobile phone data. Those using home and Wi-Fi broadband spend more than PhP 1,000 but not more than PhP 5,000 per month. Other expenditures specified are electric bills which also is valued at under PhP 1,000 per month. It should be noted however, that most of the respondents either buy mobile phone data (called “pre-paid load” in the local context) or access the internet through computer rentals precisely because they cannot afford a home and Wi-Fi broadband. These respondents represent the 38.3% who found the cost too expensive. Although 46.7% found costs or prices to be fair, 12% still opted not to comment; and only 2.8% find these prices to be cheap

In accessing the Internet, how much do you spend per month?

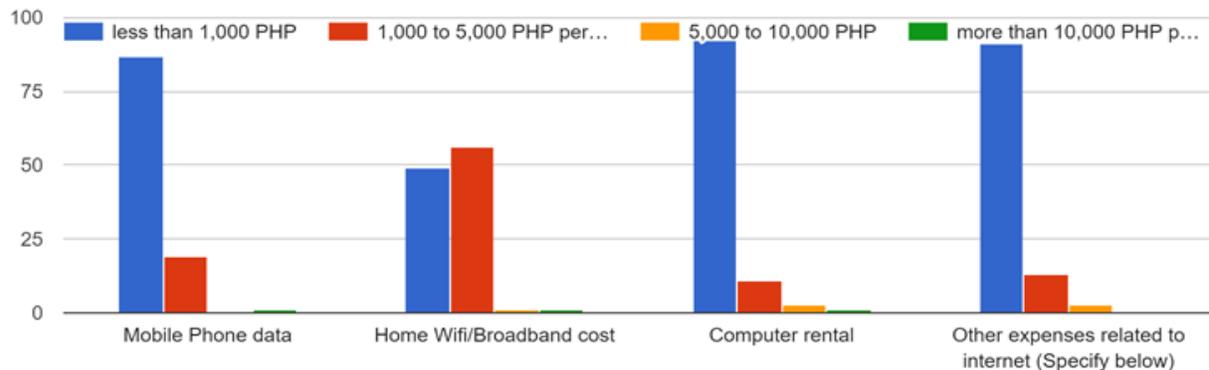


Figure 22. Costs per month in accessing the Internet

According to Roberts & Hernandez (2019), the Philippines has one of the most expensive costs of mobile data in Asia which is three (3) times the cost as compared to Thailand, Indonesia, and Vietnam. It is not uncommon to see working class and vulnerable groups save up on the cost of accessing the internet by purchasing promotional deals, which only allow the user to access messaging apps, but not online digital government platforms or websites. This was validated in the study which showed majority of the respondents using messaging apps (i.e., Viber; WhatsApp; Messenger) but did not access and are not even aware of DRR-related initiatives such as GeoRiskPH or Hazard Hunter, Project NOAH, Project Agos, among

<sup>34</sup> 47.82 Philippine peso to 1 US dollar exchange rate as of June 2021.

others. In fact, daily internet access to get information related to weather and disaster events ranked the lowest compared access to social media sites (e.g., “free” Facebook).

Considering this trend, the study suggests that respondents prioritized use based on what is important to them in order to save “load” or mobile data. Less time is used for other online activities that would “eat up” their mobile data. This frugality in action unfortunately disconnects them from accessing digital solutions that require the use of mobile data, which is beyond their means.

Although not explored as part of the online survey, the concept of affordability in terms of “*spending time*” on digital initiatives, but not money, as espoused by Roberts and Hernandez (2019), is noteworthy since this has repercussions on gender. Some researches (Bardasi & Wodon, 2006; Web Foundation report) point to the fact that time was the single most important barrier preventing women from using the internet more often due to engendered burdens of unpaid domestic work.

### **Barrier 3: Awareness**

Affordability, though, is only part of the reason why these DRR-related sites are not accessed and why they are not aware of its existence. *Awareness*, specifically the lack of it, as a barrier also explains this. This finding is not new and was noted by Roberts & Hernandez (2019), that “*a large number of digital governance initiatives have been launched in the Philippines, but levels of public awareness about them remain low, reducing their uptake levels.*” This is obvious in literature: 51% of offline Filipinos are not aware about the usefulness of the internet including locally relevant content (Roberts & Hernandez, 2019).

### **Sources of CCA-DRR information**

Based on survey results, for 90% of the respondents, the internet is the main source of weather and disaster-related information. Apart from the internet or online services and apps as being preferred ways of getting disaster information, traditional means such as TV (85%); SMS (66%); announcements from barangays (42%); news and information from radio (41%) are still highly favored. Figure 23 show a breakdown of main sources of weather/disaster information.

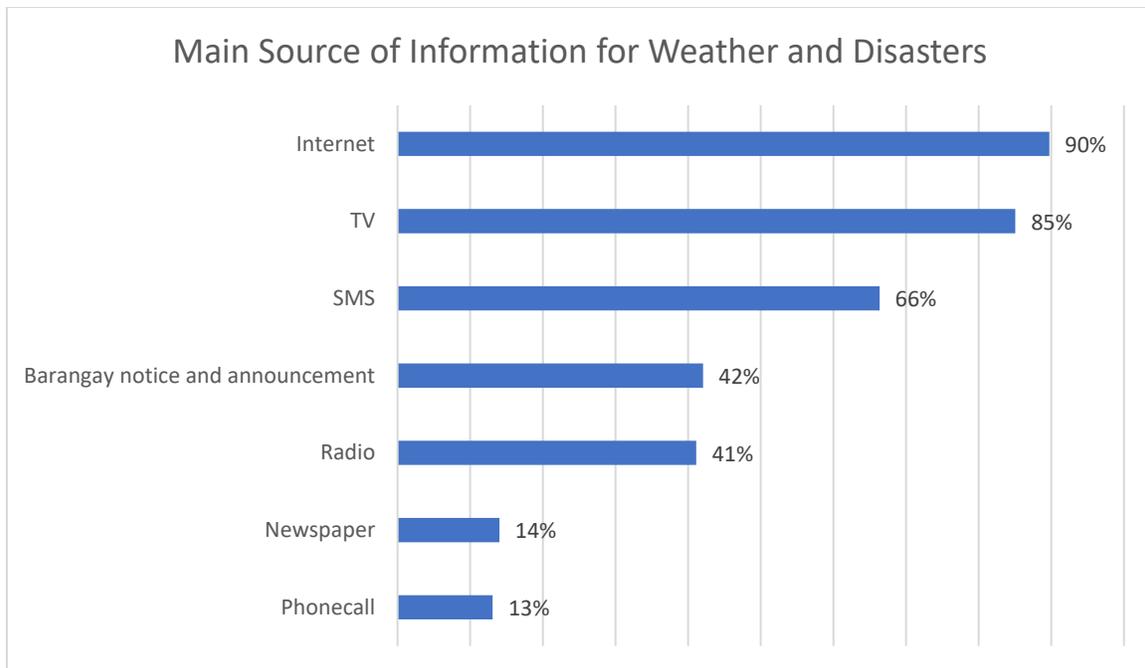


Figure 23. Main sources of information for weather and disasters.

When asked on the preferred means of getting weather and disaster information (Fig. 24), TV (76.6%) and the internet (75.7%) are the two (2) leading sources of said information. Online sites or apps frequently visited for weather or disaster information are Facebook (70.1%); Twitter (23.4%); Viber (15%); WhatsApp (7.5%).

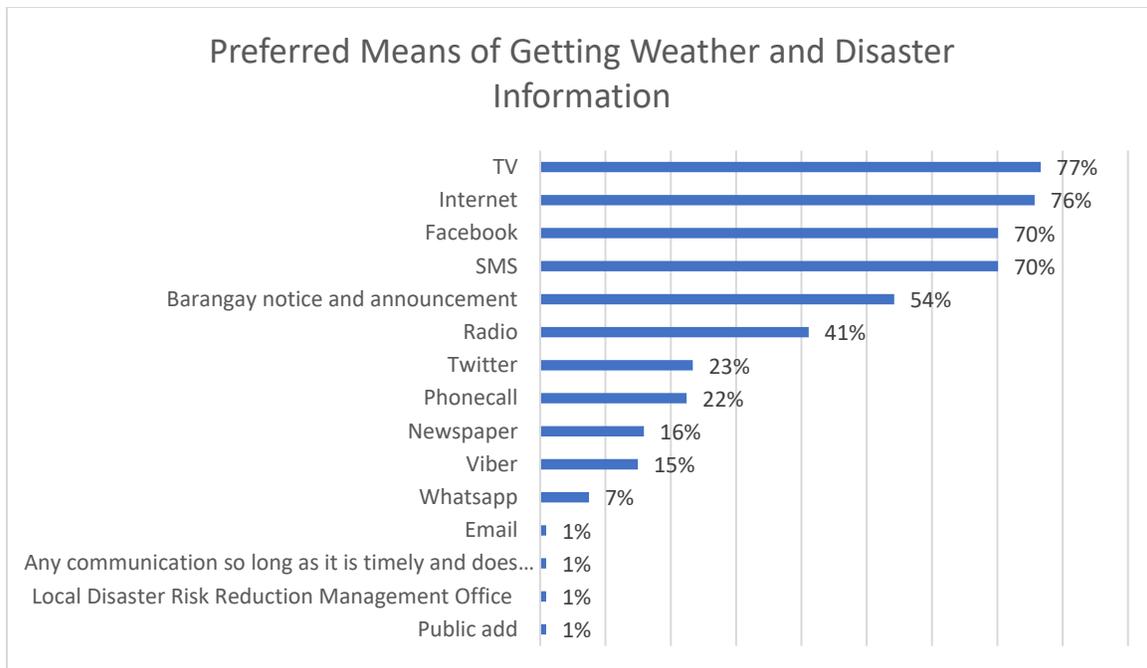


Figure 24. Preferred means of getting weather and disaster information.

However, issued questions on the personal utility of disaster-related online services and websites, namely GeoRiskPH and Hazard hunter; Project NOAH; Project *Agos*, resulted to a majority of the respondents saying they have never heard, never used, or have no opinion on these DRR services. Less than 20% found these digital initiatives as useful or extremely useful. Majority depended on PAGASA, NDRRMC, and IM Ready from GMA Network. This opens possible opportunities for digital solutions to provide vulnerable groups with disaster-related information from more reliable sources such as GeoRiskPH rather than Facebook.

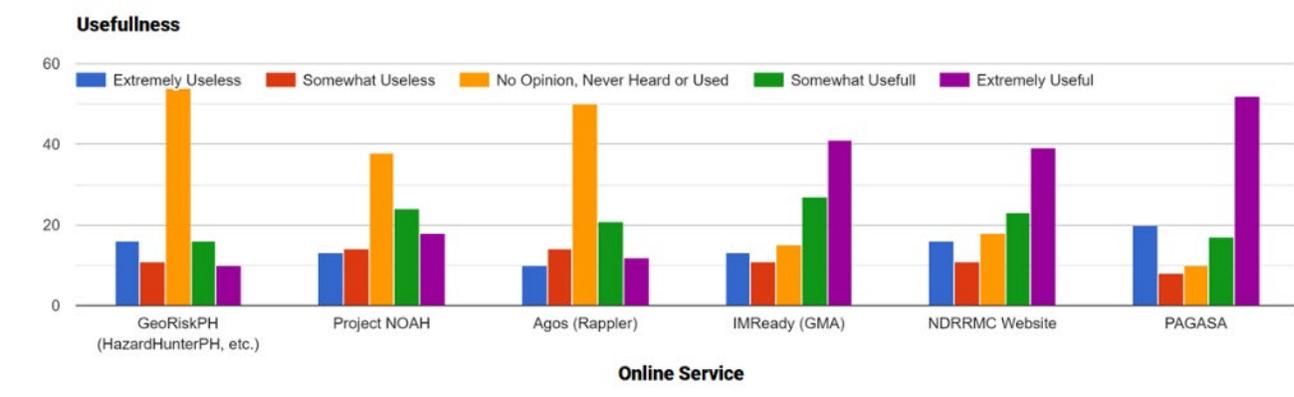


Figure 25. Usefulness of Online Services related to Disasters.

It is notable to mention that these websites that were found to be extremely useful by the majority of respondents, were found extremely useless by almost 20% of the sample.

How can digital solutions be adopted to demographics characterized by both low income and low education if the awareness barrier prevents inclusivity? Thus, this MAVG study suggests that there should be sufficient funding, marketing, and awareness-raising to make any digital solutions successful.

#### **Barrier 4: Ability**

Most of the focus group participants acknowledge the need to ensure that digital tools are user friendly, and that digital literacy must be first ensured before cascading any digital initiatives to the general public, especially to the vulnerable groups. Again, Roberts & Hernandez (2019) provides a strong argument for this and insists that a person's *ability* to make effective use of a technology can be limited by a lack of digital literacy, skills, or knowledge, even when availability, affordability, and awareness are high. Thus, user-experience and human-centeredness should be considerations in the design and updating of CCA-DRR applications.

Moreover, this MAVG study notes that risk communication can still be improved further to appeal to the lowest rung of the technological ladder to address issues such as the low uptake of and seemingly lack of interest in DRR-related digital initiatives as was seen in the survey results. For example, component 4 of the Maturity Model, as well as Outcome 9 of the updated NDRRM plan, calls for increasing the capacities and capabilities of vulnerable groups to receive, understand, and act on early warning messages.

Another interesting insight came as a result of the survey which was on participation in DRR-related activities in the community. This was explored by the study as it assumes that level of interest and participation in community events can also influence participation in digital initiatives. Not only was there a portion of the sample that did not attend (45.8%), some of them (21.5%) are unsure if they can take part in DRR-related activities.

#### **Barrier 5: Agency**

This barrier is called *agency* or the lack of aspiration, appetite, or self-belief needed to act and bring about change (Roberts & Hernandez, 2019). This interplay of the 5 'A's in technology access highlighting the concept of agency as a barrier is seen in a study on labor migration in Pakistan (Karell et al., 2021), wherein respondents with smartphones were

provided with monthly mobile data (availability and affordability) and have the awareness and ability to participate in that digital governance initiative. However, the engagement was still very low due to the agency barrier.

This is further explained by Freire (1970), as cited in the 5 'A's research, that a "*culture of silence*" breeds among vulnerable and marginalized groups who have been systematically left out and left behind, opinions never sought, interests always ignored by those in power—to the point that they already doubt the worth of their voices, insights and opinions. This "*depressed sense of political agency*" (Roberts & Hernandez, 2019) should be addressed through well-planned activities for vulnerable groups as part of any digital solutions to be implemented. Their lack of voice and agency in CCA-DRR planning and implementation generally reinforces inequitable and unsustainable outcomes (SHEILD, 2019).

One major priority need that came out from the focus group is on accessing information for Early Warning System (EWS) and how it can be improved and institutionalized to be more timely, responsive, context and culture specific. It is worth noting that the need for EWS is part of Outcome 4 of the updated NDRRM Plan as well as of Component 2 of Maturity Model<sup>35</sup> (i.e., "*Digital applications and services*"). Result of the focus group show that there is little or no support to persons with disabilities in accessing information, including customizing EWS for their specific needs. This is also evident in the lack of inclusion of persons with disabilities in DRRM Plans of most local governments.

### ***Digital solutions for increased preparedness and response of vulnerable groups***

*Key finding 5: There are potential digital solutions to address the multiple risks vulnerable groups face and meet the priority needs of the most vulnerable to the impacts of climate change.*

The main discussion point of the focus groups was on the possible use of digital solutions to address these gaps. One major hindrance resulting to the slow progress for digital solutions targeting persons with disabilities is the lack of platforms for these initiatives to anchor to. Since digital solutions are based on market demands, there should be a platform for this to grow and be sustainable. Additionally, digital solutions should be well-planned:

*"Digital solutions should not be implemented piecemeal but should be holistic that would include employment, livelihood, and education" (Female)*

Participant feedback in the focus groups on digital solutions are summarized below:

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<sup>35</sup> See Appendix 4

- Be more personalized and be in the local dialect and language;
- Be task focused, sector inclusive, and narrative driven;
- Consider far flung areas with connectivity issues;
- Identify problems of users and providers in order to design and implement appropriate solutions;
- Be openly available and accessible to everyone;
- Link all available tools and data in providing risk-informed solutions;
- Consider interoperability; and
- Ensure that data privacy of vulnerable groups is protected

Stakeholder or user competencies was also identified as vital for any digital solution. As one of the components of the Maturity Model (Component 5) and Outcome 9 of the updated NDRRM Plan (*“Enhanced risk awareness and risk-informed decisions and actions of governments and communities”*), participants were asked on opportunities on building CCA-DRR capacity of vulnerable groups. Capacity building should include ensuring digital literacy for all, and that the tools are user-friendly. There is also a need to provide support and increase capacities of persons with disabilities. Lastly, stakeholders should be involved in data validation and trainings should be provided on how to use data.

The survey results validate the need for digital solutions. When asked what could help them in improving coping abilities to future disasters, respondents *“strongly agree”* with: receiving more timely disaster alerts; better inclusion from people with disabilities and the LGBTQI community; conducting business online—the feedback suggests restrictions due to the pandemic, resulted in more people being engaged in online businesses.

Most of the organizations invited to the focus group discussions are active in the field of CCA-DRR. Since partnerships and linkages between and among these organizations exist, it addresses both Component 3 of the Maturity Model (*“DRR Coordination and Collaboration”*) and Outcome 11 of the updated NDRRM Plan (*“Strengthened partnerships and coordination among all key actors and stakeholders”*).

When asked about gaps and opportunities or potential solutions to improve coordination and collaboration with major stakeholders, towards ensuring that voices of vulnerable groups are heard, received narratives highlighted the need for online and offline tools by various government agencies to complement each other, as well as further capacitating other actors in CCA-DRR:

*“Interoperability of the template or tools that are provided (including online and office tools) of different agencies should complement each other and provide the broadest possible data collection approach. Data requirements should be consistent with one another.” (Male)*

*“Raise level of scientific discourse to community level. Provide support to local universities for this and capacitate them to become data collectors in their area.” (Male)*

Recognizing all the inputs from the focus groups on what digital solutions should be like (e.g., user-friendly, sector inclusive), Table 15 illustrates potential entry points of digital solutions for increased preparedness and response of vulnerable groups. The study suggests that the list should undergo several iterations and encourages the major stakeholders to improve and add to it.

Table 16. Potential digital solutions to address gaps, problems, challenges, and need of vulnerable groups identified in the mapping and analysis study.

| Gap/problem/challenge/needs  | Potential digital solutions  |
|--|--|
| Need for responsive, timely, appropriate Early Warning Systems                                     | <ul style="list-style-type: none"> <li>• TV White Space especially in rural areas with no internet connectivity</li> <li>• J-alert type Early Warning Systems</li> <li>• Near-cloud communication systems</li> <li>• Use of free messaging apps for information-dissemination (e.g., Viber, WhatsApp, Messenger)</li> <li>• Use of non-internet, SMS based EWS<sup>36</sup></li> </ul> |
| Need for technological access/<br>Disaggregated data needs/ Breaking down the 5 'A' barriers       | <ul style="list-style-type: none"> <li>• Digital solutions supporting open data access</li> <li>• Kobo collect type data collection and management apps</li> </ul>   |
| Need for better management of money/savings  | <ul style="list-style-type: none"> <li>• Digital solutions on financial literacy/savings</li> </ul> <p>Micro credit</p>  |
| Need to access education and learning opportunities; support and training on disaster preparedness | <ul style="list-style-type: none"> <li>• TV White Space</li> <li>• Near-cloud communication systems</li> </ul>   |
| Loss of income sources   | <ul style="list-style-type: none"> <li>• Online business hubs for micro to small enterprises</li> </ul>  |
| Food insecurity  | <ul style="list-style-type: none"> <li>• SCOPE-like cloud based aid distribution platforms</li> </ul>  |

<sup>36</sup> This has been adopted and widely used during the pandemic by the Republic of Korea. The CBS does not use the general SMS text messaging system so local governments can send messages to the public based on their locations without any obstacles through its Central Broadcasting Service.

|   |   |
|---|---|
|   | <ul style="list-style-type: none"> <li>• Potential digitalization of food pantry systems</li> </ul>   |
| Health concerns                             | <ul style="list-style-type: none"> <li>• Telemedicine/Apps for online delivery of medicines</li> <li>• WhatsApp Coronavirus Information Hub<sup>37</sup></li> </ul> |
| Environmental resource protection/fisheries | <ul style="list-style-type: none"> <li>• WiForFISH-MIS<sup>38</sup></li> </ul>  |

### ***Digital Technologies***

Innovations, including the use of digital technologies, must be inclusive to all, and should reinforce the SDGs rather than exacerbate inequality (UNDP, 2020). There are several digital technologies that have been introduced in the Philippines. This study examined the potential of these innovations to be used and customized as part of digital solutions in CCA-DRR response for vulnerable groups. These includes the TV White Space (TVWS) Technology, the Near-Cloud Communication System, and the SCOPE Beneficiary and Transfer Management Platform.

#### *TV White Space*

TV White Space (TVWS) refers to television frequencies which are vacant that are located between broadcast TV channels, and have the potential to be used in providing wireless data connectivity to remote communities in the country. Recent policy developments directing a 95% shift from analog to digital television by 2023<sup>39</sup>, supported by the Ministry of Internal Affairs and Communications (MIC), Government of Japan, together with other opportunities TVWS provide in addressing the digital divide that were outlined in a study by Carpio (2015), allows various entry points for the consideration of this technology solution. One, it was noted in the study that TVWS are particularly abundant in rural areas where traditional ICT infrastructure have limitations in delivering broadband services. Two, compared to the usual

<sup>37</sup> WhatsApp Coronavirus Information Hub provided simple, actionable guidance for health workers, educators, community leaders, local governments and local businesses to reduce the spread of rumors and connect with accurate health information.

<sup>38</sup> The WiForFISH-MIS stands for Wildlife, Forestry and Fisheries Indicator Spatial Hub- Management Information System, a digital innovation: See <https://conservation-innovations.org/project/wiforfish/>

<sup>39</sup> In the Philippines, the National Telecommunication Commission has commenced the migration from analog to digital via Digital Terrestrial Television Broadcasting (DTTB) based on Memorandum Circular 07-12-2014. See [https://dict.gov.ph/wp-content/uploads/2017/10/PHL-Framework-for-the-DTTB-Migration-Plan\\_V1-3-1.pdf](https://dict.gov.ph/wp-content/uploads/2017/10/PHL-Framework-for-the-DTTB-Migration-Plan_V1-3-1.pdf)

home Wi Fi, White Space broadband can cover a greater distance (i.e., >10 kilometers) penetrating obstacles such as built structures and vegetation. Various gadgets ranging from phones, tablets, and computers can access this wireless internet using TVWS via both fixed or portable stations. Three, although the amount of spectrum varies depending on the location, TVWS spectrum still ranges from 470 MHz to 790 Mhz.<sup>40</sup> These findings point to the use of TVWS in DRRM.

In 2013, the Philippines became one of the leading countries in Asia where this technology was deployed (Carpio, 2015). This initially involved registering fisherfolk to a system to access health care but was subsequently redirected and used after the Bohol 7.2 magnitude earthquake to connect the isolated municipalities to the internet.<sup>41</sup> The TVWS was also utilized in the aftermath of Typhoon Yolanda (Haiyan), providing internet connectivity to affected families to contact relatives via social media. With the installation of additional radio transmitters, the TVWS became a medium in providing ICT to far-flung rural municipalities not served by local telecommunication companies.

The effective use of the TVWS technology in bridging the digital divide as shown in the vital role it played during the disasters mentioned, provides possible entry points to its potential use in providing cost-effective and rapid communications in the disaster response and recovery stages. With the updated NDRRM Plan, there are opportunities to utilize it even in disaster mitigation and preparedness. As such, this MAVG study considers this technology as a possible opportunity to further explore its role as a digital solution for vulnerable groups hardly reached by the internet in DRR response.

### Near Cloud Communication System

Before, during, and after disasters, communication plays a vital role that would spell the difference between life and death. The Ateneo Innovation Center (AIC), Ateneo de Manila, Philippines developed a Near Cloud Communication System that could be used for DRRM. In a paper published in the *2020 IEEE Global Humanitarian Technology Conference (GHTC)* entitled “*Caching Strategies with Near Cloud Wireless Mesh: A Study in Disaster Risk and Resilience*” the AIC pushes for a “*holistic and comprehensive disaster preparedness and risk*

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<sup>40</sup> The Digital Dividend or the freed-up channel capacity by the switch from analog to Digital TV can be reallocated to maximize 4G or 5G and other mobile broadband technologies in the 700 MHz up to 890 MHz band previously classified as UHF Band V broadcast service as per determination of the government

<sup>41</sup> Based on the same report, the project in Bohol was pursued in partnership with Filipino-Singaporean TVWS technology firm Nityo Infotech with an investment of about \$5 million allocated to set up the 100 sites and other technical requirements of the pilot project (Carpio, 2015).

reduction management” through “prepositioning a low-cost and low-powered caching terabyte caching system” that could be used in disaster scenarios.

A Near Cloud is a system that has powerful capabilities as far as computing and caching is concerned. It is defined as a “flexible, resilient, opportunistic communication tool that uses ad hoc Wi-Fi network capabilities.” The Near Cloud work starts with LoRa beacon aggregators that compile all vital data it collected and forwards it to different information kiosks and Near Cloud servers. The aggregator then receives messages and other important data from beacons and forwards them to different receivers included in the system (Fig. 26).

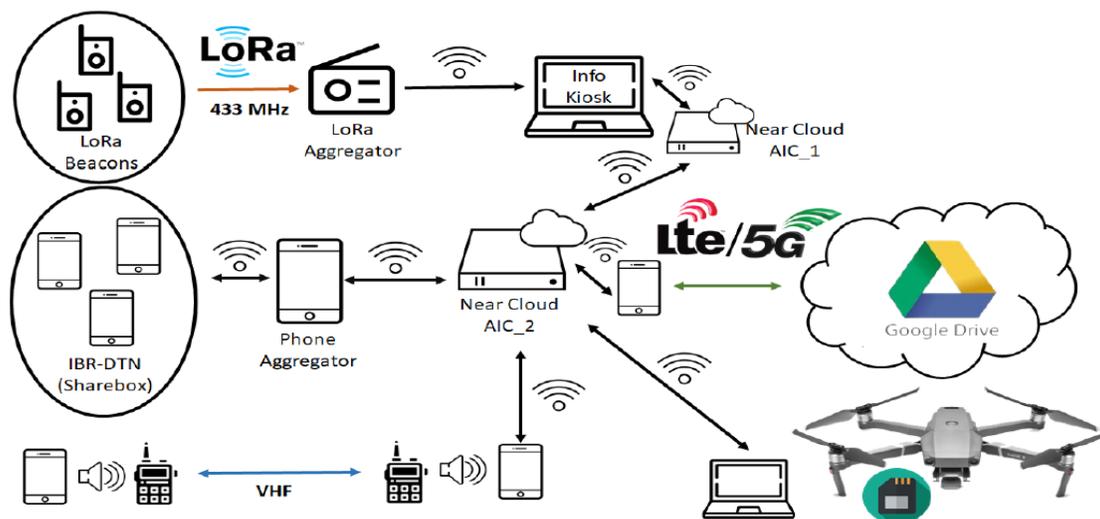


Figure 26. The New Cloud system developed by AIC as part of its DRRM  
Source: Mercado, et al. (2020).

Near Cloud allows communication and the transfer of vital data and information even in places where 3G/4G access is cut off, which is the common scenario during and after disasters.

This has huge implications in DRRM especially in remote areas where the communication infrastructure has been severely damaged by a climate-induced hazard. Aside from being easily deployable and prepositioned in strategic areas (i.e. evacuation centers, command centers, schools etc.), the Near Cloud can function in a variety of ways as shown below:

- It acts as a repository of data that can include survivors and victims of disasters. This contributes to faster survivor and victim location;

- It allows the flow and control of information between disaster responders and the command center in a more efficient and reliable way;
- Using an interactive digital signage, it can be an emergency tool that provides vital information such as exit routes, evacuation centers, hospitals, and the like;
- It can be used pre-disaster, during disaster, and post disaster;
- It consumes low power that allows it to be deployed in places not connected to a power grid; and
- Emergency signage content can be updated real time.

The Near-Cloud System was put in use during the 2019 university-wide emergency drill in Ateneo de Manila and showed its caching function capabilities (Mercado, et al., 2020) such as:

- Aggregator collected messages from beacons and uploaded in Near Cloud and kiosk;
- Aggregator downloaded data from previous site and download acknowledgement file which is proof that connection and data-sharing was successful; and
- Information was sent by the system to the outside world once connected to a cellular network.

The Near-Cloud System was also used in the aftermath of the Davao del Sur earthquake in 2019. A Near Cloud unit was donated through a partnership between the Ateneo Innovation Center and the Center of Psychological Extension Research Service in Ateneo de Davao University. This was used in the post disaster evaluation, recovery and management including the provision of psychosocial support and the much-needed medical services and relief good for earthquake victims (Mercado, et al., 2020). The same study show a promising opportunity of mainstreaming the Near Cloud system based on the positive response of institutions such as the Makilala Institute of Science and Technology (MIST) and Notre Dame of Makilala School in Kidapawan City which were severely affected by a series of earthquakes in 2019.

### J-Alert system

The J-alert system is a satellite based system that broadcasts alerts to the general public via cell broadcasts, television, radio, email, and loudspeakers. Newer models released in March 2019 automatically processes information within two seconds, and allows for granular, location-specific alerts. It is an early warning system for earthquakes (i.e., updates magnitude, hypocenter, precautions on possible tsunami), issues major tsunami warning and advisory, emergency warning for volcanic eruption, severe weather (i.e., heavy rains,

landslides, tornado), and special emergency threats (e.g., ballistic missiles, terrorist threats etc.).<sup>42</sup>

This study revealed the dominance of television and radio as the prevalent and preferred means of receiving early warning and disaster alerts for the vulnerable sector. Further, the policy shift directing a 95% shift from analog to digital television by 2023<sup>43</sup>, supported by the Ministry of Internal Affairs and Communications (MIC), Government of Japan, among other developments towards the modernization of the Philippines' ICT infrastructure, allows for a similar or comparable system, or certain portions or aspects of the system, to be applied in the Philippines, that could potentially benefit the marginalized and vulnerable groups in far flung areas if adopted nationwide. Notably, the DTTB Migration Plan of the Philippines states that it intends for the said shift to support a *“more efficient and richer information dissemination platform for a well-prepared Philippines in times of calamities.”*

#### SCOPE: Beneficiary and Transfer Management Platform

SCOPE is a cloud-based digital solution that serves as the World Food Programme (WFP) beneficiary identity and management system, and acts as the central repository for WFP beneficiary identity information. It provides a direct line of sight between the desired food security outcome and the beneficiaries (WFP, 2016).

WFP uses this digitalized information and transfer management platform in identifying households and individuals for cash-based assistance in support of WFP programme intervention cycle from beginning to end. As a web-based application, it is used for beneficiary registrations, intervention setups, distribution planning, transfers and distribution reporting, and can support beneficiaries from vulnerable groups in kind, voucher, and cash for a variety of project activities (WFP, 2014).

SCOPE is currently being used by WFP in its fifty-three (53) country offices, including the Philippines. In the aftermath of Typhoons Rolly and Ulysses during the latter part of 2020, the World Food Programme (WFP), using SCOPE, identified 2,268 households or 11,340 individuals which included the most vulnerable families with a focus on women, girls, people with disabilities, and the elderly as beneficiaries to its cash-based assistance.<sup>44</sup>

<sup>42</sup> Source: <https://www.centreforpublicimpact.org/case-study/disaster-technology-japan>

<sup>43</sup> In the Philippines, the National Telecommunication Commission has commenced the migration from analog to digital via Digital Terrestrial Television Broadcasting (DTTB) based on Memorandum Circular 07-12-2014. See [https://dict.gov.ph/wp-content/uploads/2017/10/PHL-Framework-for-the-DTTB-Migration-Plan\\_V1-3-1.pdf](https://dict.gov.ph/wp-content/uploads/2017/10/PHL-Framework-for-the-DTTB-Migration-Plan_V1-3-1.pdf)

<sup>44</sup> Source: <https://reliefweb.int/report/philippines/typhoon-rolly-and-typhoon-ulysses-situation-report-4-23-december-2020>

One of the many advantages of SCOPE in the DRRM context is that it can work with or without connectivity due to its online/offline capabilities.<sup>45</sup>

### WiForFISH-MIS

The WiForFISH-MIS stands for Wildlife, Forestry and Fisheries Indicator Spatial Hub-Management Information System, an operational prototype whose aim is to enhance Coastal Resource Management Planning and Enforcement in Tayabas and Pagbilao Bay in Quezon Province, Philippines. It is a digital innovation that can collect field data, measure, evaluate, and improve effectiveness of plant and wildlife monitoring. Maps on the location of threats on biodiversity are produced based on the information gathered from the field with a feedback and reporting mechanism. This innovation can help protect forest and aquatic wildlife.<sup>46</sup>

For instance, food security is a major concern in preparing for disasters identified in the MAVG. WFP has used SCOPE, a cloud-based digital solution to provide cash aid, voucher, food to disaster victims in fifty-three (53) countries where it operates. Other digital solutions addressing hunger in the time of COVID-19 include a rice ATM in Vietnam offering 1.5 kilograms of free rice; the use of WhatsApp in Sabah, Malaysia to advertise local produce and connect villagers with authorized transport services. Recently, to address food insecurity due to the pandemic, food pantries have sprouted in many cities and rural areas of the Philippines. Incorporating a digital innovation to this initiative (e.g., locator apps; SMS based information and dissemination; beneficiary registration and disaggregated data collections systems) is a possibility.

The shortcomings of our Early Warning Systems not being accessible to vulnerable groups and appropriate to those with specialized needs can be addressed potentially by digital solutions. We can build on innovations, which, although already utilized in the country, still need further support, such as the TVWS technology, and the Near-cloud system, which saw limited exposure in areas in Mindanao. We can adapt and learn from proven EWS such as the J-alert system of Japan.

### ***Moving forward: MAVG and the SHIELD Program***

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<sup>45</sup> See [WFP.SCOPE@wfp.org](mailto:WFP.SCOPE@wfp.org) on more details about SCOPE.

<sup>46</sup> <https://conservation-innovations.org/project/wiforfish/>

Lastly, findings and results of the mapping and analysis of vulnerable groups in the Philippines can contribute to other UNDP CO initiatives namely Strengthening Institutions and Empowering Localities Against Disasters and Climate Change in the Philippines (SHIELD) Program. The main aim of the SHIELD program is to support the Philippine government in building institutional and community resilience to climate change and natural hazards.<sup>47</sup> This program may benefit from the findings of the MAVG since both SHIELD and the need for appropriate digital solutions, as a key objective of the MAVG, puts significant consideration on gender equality, disability, and social inclusion. Furthermore, potential digital solutions recommended in this MAVG study may become part of the investment in SHIELD which involves unlocking finance for resilience building as well as implementing climate and hazard resilient actions in the country.

Digital solutions such the use of social media, for instance, can be used by SHIELD as a platform for reaching vulnerable groups and, together with research and scientific organizations, analyze themes and trends in the general sentiments over social media. This would allow us to better understand the needs of the vulnerable groups and customize appropriate communication strategies, not simply to inform them, but to instill a culture of community resilience building. Additionally, digital solutions focused on developing more efficient and appropriate early warning systems to address the needs of the vulnerable groups can be included in and supplement SHIELD outputs on the creation of climate-sensitivity models and hazard maps for local governments in SHIELD program sites.

## 6. CONCLUSION AND RECOMMENDATIONS

The need to support the DX4Resilience project of the government was the main stimulus for the conduct of this study. Its rapid nature pushed us to proceed with available resources using remote data-gathering methods which, due to the pandemic, has become part of the so-called “*new normal*”. Nonetheless, this study has produced both qualitative and quantitative data that would feed into larger digital governance initiatives.

The use of participatory and mixed methods in this study generated information on the problems encountered by vulnerable groups and the challenges that acted as barriers in accessing and using digital technologies before, during, and after disasters. The focus group discussions extracted real-life experiences, the survey provided us an insight on the knowledge and perceptions of vulnerable groups with respect to CCA-DRR and their use of

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<sup>47</sup> SHIELD Program. Theory of Change Workshop (2021)

technology, and the review of literature provided science-based validation on our major points.

This Mapping and Analysis of Vulnerable Groups study has confirmed the following. First, that persons with disabilities, women and LGBTQI, and farmers and fisherfolk are highly vulnerable to the continued effects of both rapid onset events and slow onset events related to extreme weather events and climate variability. There exist multiple vulnerabilities compounded by poverty and socio-economic inequalities that repeatedly pulls them back in a vicious cycle marked with inequalities once environmental shocks and stresses occur. Although some have access to and control over resources to increase their capacities to adapt, a significant portion are still left behind and need urgent and appropriate digital interventions.

Second, the study confirmed the existence of different classes of technology access in the country. This “stratification” based on the different levels of availability, affordability, awareness, ability (i.e., digital literacy), and agency is reflected in the survey results and focus groups. Together, its credibility was triangulated with results of the literature review.

Third, we now know that the success of any digital solutions depends on first acknowledging that a digital divide exists in the country, and recognizing that the ability of vulnerable groups to participate in any digital DRR initiative largely depends on breaking down the barriers discussed in this study.

This rapid mapping and analysis has shown that there are multiple entry points for digital solutions for CCA-DRR to address the priority needs of vulnerable groups. Those who will design digital solutions in the future must take advantage of these opportunities identified in the study. For instance, the study recognizes that the key outcomes present in updated NDRRM plan (2020-2030) complements the components of the DRRMM and presents a very good opportunity to design appropriate digital solutions in addressing the gaps, challenges, and barriers identified in the study. As such, as was highly recommended in literature reviewed, there is a need to ensure that funds are allocated to the appropriate programs and projects for the Digital Readiness Strategy including the need for ICT Infrastructure. Part of the programs is to cascade the updated NDRRM Plan to the local government including capacity building that addresses digital literacy as well as establish, enhance, enrich partnerships and linkages between and among the different stakeholders in CCA-DRR and the vulnerable groups. The study also cites the importance of addressing the root causes of vulnerabilities as core policy objectives for digital solutions.

It is also recommended that digital solutions must first take into account the interplay of various socioeconomic and political factors that affect technological access of vulnerable groups that occupy the lowest ladders of the largely stratified digital world. Genuine digital inclusion should address the gaps presented by lack of availability, be it due to poor connectivity, inadequate ICT infrastructure, and the lack of digital platforms for vulnerable groups. Creating digital solutions that are only web-based or app-based defeats the purpose and further widens the technological divide.

Due to the rapid nature of this research and the minimal sample size it is recommended that a deeper study—with a larger sample size, wider geographical reach, and longer time frame be conducted to determine appropriate digital interventions.

Digital solutions must also hurdle the challenges presented by affordability; provide activities that would foster digital awareness; conduct trainings and capability building to build up abilities and digital literacy; and implement grassroots level initiatives to encourage community participation to voice out their insights and opinions freely.

Digital solutions must be inclusive, openly available and accessible to all, personalized, holistic, and user-friendly. Only then can we be assured that no one is left behind.

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## APPENDICES

### Appendix 1: Focus Group Discussion (FGD) including guiding questions based on the 7 components of the Maturity Model<sup>48</sup>

Suggested respondents: Local government, DRR organizations and UN agencies

The guide questions listed below are grouped according to component and does not indicate the flow of the discussion. These questions can be regrouped for better flow of discussion or as you see fit.

#### Shared Data Resources and Access

- Is disaster data disaggregated by gender, disability, age, income, ethnicity that can be used to target interventions at those furthest behind?
- Are these data used in the analysis of hazard, exposure, and vulnerability in the development of local and national DRRM strategies?
- What are the gaps and opportunities for creating and/or integrating disaggregated data in DRRM strategies, plans, and policies, and improving the understanding of the differential risks and intersectionalities among vulnerable groups?
- What are ways to improve data collection system from the local to the national level that is disability inclusive, gender sensitive, and addresses the need for the vulnerable sector to have direct and indirect access to various digital services for DRR?<sup>49</sup>

#### Digital Applications and Services

- What are the gaps and opportunities for developing digital applications and services that directly build the resilience of vulnerable groups, or provide information about the most vulnerable and their needs to ensure policymakers, planners, responders, etc. can make informed decisions that leave no one behind?
- How can Early Warning Systems (EWS) be improved and institutionalized to be more timely, responsive, context and culture specific so that no one is left behind?<sup>50</sup>
- For the agricultural sector:
  - What are possible solutions to improve agriculture and fisheries supply chain and logistics?
  - How can you ensure the continuous delivery of agriculture products during disasters?
  - Do farmers have access to financial services and cash assistance? How can this be improved through digital solutions?<sup>51</sup>

<sup>48</sup> These can be integrated in one or all the data-gathering methods (i.e. online survey, KII, FGD)

<sup>49</sup> Supports Outcome 15 Updated NDRRM Plan 2020-2030

<sup>50</sup> Supports Outcome 4 Updated NDRRM Plan 2020-2030

<sup>51</sup> Supports Outcome 20 Updated NDRRM Plan 2020-2030

## DRR Coordination and Collaboration

- To what extent does DRR coordination and collaboration involve civil society and consider the needs of vulnerable groups?
- What are the gaps and potential solutions to improve coordination and collaboration, to ensure that the voices of vulnerable groups are heard, to engage vulnerable groups in the co-design and monitoring of interventions?<sup>52</sup>

## ICT Infrastructure

- What are the barriers vulnerable groups face in access to and use of ICTs (affordability, poor-quality connectivity, lack of awareness, lack of literacy and digital skills, lack of relevant content, privacy and security issues, socio-cultural constraints)?
- What are the opportunities and solutions to overcome these barriers that vulnerable groups face in accessing ICT to better understand and use updated risk information.<sup>53</sup>
- What are the main channels for accessing information and for communicating?
- What devices are vulnerable groups using and what are they using the devices for (social media, entertainment, e-commerce, digital wallet, online learning, etc.)?

## Stakeholder/User Competencies

- What are the gaps and opportunities to build DRR and CCA capacity of vulnerable groups (e.g., to prepare for disaster and climate risks; to receive, understand and act on early warning messages), and of DRR policymakers, planners, responders, etc. to engage with vulnerable groups?<sup>54</sup>

## Partnership Programmes

- What are the gaps and opportunities for partnerships in developing/co-designing digital solutions with and for vulnerable groups?
  - What are gaps and opportunities in partnering with ICT and other companies that can facilitate digital information collection, analysis and dissemination to vulnerable groups?

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<sup>52</sup> Supports Outcome 11 Updated NDRRM Plan 2020-2030

<sup>53</sup> Supports Outcome 1 Updated NDRRM Plan 2020-2030

<sup>54</sup> Supports Outcome 9 Updated NDRRM Plan 2020-2030

- What are gaps and opportunities in partnering with non-ICT companies that can support vulnerable groups during risk management, response and recovery stages.
- What are the barriers for partnerships in developing/co-designing digital solutions with and for vulnerable groups?

**Policies, Standards, Guidelines and Best Practices** in DRR, ICT, urban, agriculture and other sectors

- Do they specifically mention vulnerable groups (e.g., are there guidelines to ensure applications are accessible to persons with disabilities)?
- If yes, are the policies being put into practice?



## Appendix 2: Survey Questionnaire

### Digital Access to, and use of, DRR-CCA Information

**Suggested respondents: Individuals from vulnerable groups**

| <b>Awareness to DRR-CCA ICT</b>  |  |                            |                                    |                          |
|--|--|----------------------------|------------------------------------|--------------------------|
| 1. Where is your house located?  | <input type="checkbox"/> Steep slope<br><input type="checkbox"/> Riverside<br><input type="checkbox"/> Along the coast<br><input type="checkbox"/> Foot of mountain<br><input type="checkbox"/> Floodplain<br><input type="checkbox"/> Marsh<br><input type="checkbox"/> Other _____   |                            |                                    |                          |
| 2. What material is your house made of?                                | <input type="checkbox"/> <b>Light Materials</b> (bamboo, sawali, cogon, nipa, anahaw, salvaged/makeshift materials)<br><input type="checkbox"/> <b>Semi-permanent</b> (Mixed but predominantly strong materials, walls up to flood line is made of concrete blocks and woven bamboo or sawali above the flood line)<br><input type="checkbox"/> <b>Permanent</b> ((galvanized iron, aluminum, tile, concrete, brick, stone, wood, plywood)   |                            |                                    |                          |
| 3. What hazards (natural and human-induced) do you usually experience? | <input type="checkbox"/> Flood<br><input type="checkbox"/> Rain Induced Landslide<br><input type="checkbox"/> Typhoon<br><input type="checkbox"/> Earthquake<br><input type="checkbox"/> Volcanic eruption<br><input type="checkbox"/> Storm Surge (with Sea Level Rise)<br><input type="checkbox"/> Storm Surge (without Sea Level Rise)<br><input type="checkbox"/> Tsunami<br><input type="checkbox"/> Tornado<br><input type="checkbox"/> Fire<br><input type="checkbox"/> Health hazards (Specify) _____<br><input type="checkbox"/> Others _____ |                            |                                    |                          |
| 4. How many times are  | <b>Hazard</b>  | <b>Once<br/>a<br/>year</b> | <b>2 to 3<br/>times a<br/>year</b> | <b>More than 3 times</b> |

|   |   |  |  |  |
|---|---|--|--|--|
| <p>these hazards usually experienced in a year?</p>   | <input type="checkbox"/> Flood<br><input type="checkbox"/> Rain Induced Landslide<br><input type="checkbox"/> Typhoon<br><input type="checkbox"/> Earthquake<br><input type="checkbox"/> Volcanic eruption<br><input type="checkbox"/> Storm Surge (with Sea Level Rise)<br><input type="checkbox"/> Storm Surge (without Sea Level Rise)<br><input type="checkbox"/> Tsunami<br><input type="checkbox"/> Tornado<br><input type="checkbox"/> Fire<br><input type="checkbox"/> Health hazards (Specify)<br>_____<br><input type="checkbox"/> Others _____ | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> |
| <p>5. Do you think there will be more disasters and crises such as flooding, landslide, storm surge and/or health disasters such as Covid-19 in the future?</p> | <input type="checkbox"/> Yes<br><input type="checkbox"/> No   |  |  |  |
| <p>6. How would you rate your ability to cope with these disasters</p>  | <input type="checkbox"/> High ability<br><input type="checkbox"/> Quite high ability<br><input type="checkbox"/> Average ability<br><input type="checkbox"/> Quite low ability<br><input type="checkbox"/> Low ability  |  |  |  |

|  |  |
|--|--|
| and crises?  |  |
| 7. In the past year, have you made changes to protect/prepare yourself, your family and/or your community for the next disaster? | <input type="checkbox"/> Yes<br><input type="checkbox"/> No  |
| 8. If yes, what changes have you made? (tick all that applies)   | <input type="checkbox"/> Stored food, water and other necessities<br><input type="checkbox"/> Prepared to evacuate to safer place<br><input type="checkbox"/> Made the house and other assets stronger to withstand the next disaster<br><input type="checkbox"/> Made structural improvements in the area around the house to protect against future disaster<br><input type="checkbox"/> Changed farming/fishing practice<br><input type="checkbox"/> Looked for a better job<br><input type="checkbox"/> Increased savings<br><input type="checkbox"/> Purchased disaster insurance<br><input type="checkbox"/> Others (please specify) _____ |
| 9. If no, why not? (tick all that applies)   | <input type="checkbox"/> Loss of income / livelihood<br><input type="checkbox"/> Poor health<br><input type="checkbox"/> Lack of information about how to protect/prepare myself and my family for disasters<br><input type="checkbox"/> Too busy<br><input type="checkbox"/> Lack of cooperation in the community to support change<br><input type="checkbox"/> Lack of local government support<br><input type="checkbox"/> Others (please specify) _____  |
| 10. What type of support did you receive from the  | <input type="checkbox"/> Cash assistance<br><input type="checkbox"/> Food donation<br><input type="checkbox"/> Transportation to evacuation center<br><input type="checkbox"/> Others (please specify) _____<br><input type="checkbox"/> None  |

|   |   |                              |                          |                          |                          |                                 |                          |
|---|---|------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|--------------------------|
| <p>government during disasters or COVID-19? (tick all that applies)</p>   |   |                              |                          |                          |                          |                                 |                          |
| <p>11. When disasters strike, where do you get support from? (tick all that applies)</p>  | <input type="checkbox"/> Family, relatives and friends in the community<br><input type="checkbox"/> Local government<br><input type="checkbox"/> Community organizations<br><input type="checkbox"/> Religious group<br><input type="checkbox"/> School<br><input type="checkbox"/> Community health center<br><input type="checkbox"/> Farmers' association<br><input type="checkbox"/> Women's group<br><input type="checkbox"/> Social media network (Facebook, Twitter)<br><input type="checkbox"/> Others (please specify) _____ |                              |                          |                          |                          |                                 |                          |
| <p>12. Rate the extent to which you agree with these statements:</p> <p><b>I will be able to improve my ability to cope with future disasters</b></p> | <p><b>Rating</b></p>  | <p><b>Strongly Agree</b></p> | <p><b>Agree</b></p>      | <p><b>Don't know</b></p> | <p><b>Disagree</b></p>   | <p><b>Strongly Disagree</b></p> |                          |
|   | <p><input type="radio"/> I am able to find more business and employment opportunities</p>   | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        | <input type="checkbox"/> |
|   | <p><input type="radio"/> I am able to buy/sell products online</p>  | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        | <input type="checkbox"/> |
|   | <p><input type="radio"/> I am able to save more money</p>   | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        | <input type="checkbox"/> |
|   |   | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        | <input type="checkbox"/> |

|                       |  |                          |                          |                          |                          |                          |
|-----------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>and crises if:</b> | ○ I am able to obtain loans  |                          |                          |                          |                          |                          |
|                       | ○ I am able to manage my money better  | <input type="checkbox"/> |
|                       | ○ I am able to obtain government benefits (e.g., cash assistance, disaster relief) | <input type="checkbox"/> |
|                       | ○ I am able to voice my concerns to local government                               | <input type="checkbox"/> |
|                       | ○ I have better access to health information and services                          | <input type="checkbox"/> |
|                       | ○ I have better access to education service and learning opportunities             | <input type="checkbox"/> |
|                       | ○ I have better access to agricultural information and services                    | <input type="checkbox"/> |
|                       | ○ I have better access to water resources  | <input type="checkbox"/> |
|                       | ○ I have training on how to prepare for disasters                                  | <input type="checkbox"/> |
|                       | ○ I am able to strengthen the  |                          |                          |                          |                          |                          |

|                                     |  |                          |                          |                          |                          |                          |
|-------------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                     | <p>structure of my house</p> <ul style="list-style-type: none"> <li>○ I am able to receive disaster alerts in a timely manner</li> <li>○ I am able to evacuate in a timely manner</li> <li>○ My community include women and LGBTI in community decisions</li> <li>○ My community include persons with disabilities in community decisions</li> <li>○ My community work together to better protect women, LGBTI and persons with disabilities during disasters</li> <li>○ My community work together to better protect our environmental resources (e.g., forests, rivers, coasts)</li> <li>○ Others (please specify)</li> </ul> <p>_____</p> | <input type="checkbox"/> |
| <p>13. What is your main way of</p> | <ul style="list-style-type: none"> <li><input type="checkbox"/> TV</li> <li><input type="checkbox"/> Radio</li> <li><input type="checkbox"/> Google</li> </ul>   |                          |                          |                          |                          |                          |

|   |   |  |  |  |  |  |
|---|---|--|--|--|--|--|
| <p>getting information about the weather and disasters? (tick all that applies)</p>     | <input type="checkbox"/> Newspaper<br><input type="checkbox"/> SMS<br><input type="checkbox"/> Phone call<br><input type="checkbox"/> Barangay notice or announcements<br><input type="checkbox"/> Others (please specify) _____<br><input type="checkbox"/> None of the above, I do not have access to information about disasters and weather |  |  |  |  |  |
| <p>14. How would you prefer to receive weather and disaster alerts?</p>                 | <input type="checkbox"/> TV<br><input type="checkbox"/> Radio<br><input type="checkbox"/> SMS<br><input type="checkbox"/> Phone call<br><input type="checkbox"/> Facebook<br><input type="checkbox"/> Twitter<br><input type="checkbox"/> Viber<br><input type="checkbox"/> WhatsApp<br><input type="checkbox"/> Others (please specify) _____  |  |  |  |  |  |
| <p>15. Which online services have you used and how would you rate their usefulness?</p> |   | <b>Extremely useless</b>                                     | <b>Somewhat useless</b>                                      | <b>No opinion</b>  | <b>Somewhat useful</b>                                       | <b>Extremely useful</b>                                      |
|   | <input type="checkbox"/> GeoRiskPH (HazardHunterPH, etc.)<br><input type="checkbox"/> Project NOAH<br><input type="checkbox"/> Agos (Rappler)<br><input type="checkbox"/> IMReady (GMA)<br><input type="checkbox"/> NDRRMC website<br><input type="checkbox"/> PAGASA website<br><input type="checkbox"/> Others specify _____<br>_____         | <input type="checkbox"/><br><br><br><br><br><br><br><br><br> |
| <p>16. Does your barangay</p>   | <input type="checkbox"/> Yes<br><input type="checkbox"/> No   |  |  |  |  |  |

|  |   |
|--|---|
| <p>have an operational community-based early warning system?</p>                             | <p><input type="checkbox"/> Not sure</p>  |
| <p>17. If yes, are you able to understand the early warning message and act accordingly?</p> | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No<br/> <input type="checkbox"/> Not sure</p>                                 |
| <p>18. Are you able to evacuate in a timely manner?</p>                                      | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No, because (please explain) _____<br/> <input type="checkbox"/> Not sure</p> |
| <p>19. Are you able to access the evacuation centre when disaster strikes?</p>               | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No, because (please explain) _____<br/> <input type="checkbox"/> Not sure</p> |
| <p>20. Are you able to participate in planning and programming of DRR-CCA activities</p>     | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No, because (please explain) _____<br/> <input type="checkbox"/> Not sure</p> |

|  |   |
|--|---|
| <p>in your community?</p>  |   |
| <p>21. Have you attended any training or awareness programs related to disaster risk reduction or climate change adaptation? Yes/No</p>    | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No, because (please explain) _____<br/> <input type="checkbox"/> Not sure</p>   |
| <p>22. Have you been invited to participate in planning of activities related to disaster risk reduction or climate change adaptation?</p> | <p><input type="checkbox"/> Yes<br/> <input type="checkbox"/> No, because (please explain) _____<br/> <input type="checkbox"/> Not sure</p>   |
| <p>23. What factors would help you participate in these types of activities?</p>   | <p><input type="checkbox"/> Cash incentive<br/> <input type="checkbox"/> If required by law<br/> <input type="checkbox"/> If all members of family can attend<br/> <input type="checkbox"/> If it is done online<br/> <input type="checkbox"/> Others (Specify) _____</p> |
| <p><b>Access and Use</b></p>   |   |

|  |  |                          |                             |                              |                              |                          |
|--|--|--------------------------|-----------------------------|------------------------------|------------------------------|--------------------------|
| 24. Which of the following devices do you have <b>access</b> to and <b>own</b> ? (tick all that applies) | <b>Device</b>  | <b>Have Access</b>       |                             | <b>Own</b>                   |                              |                          |
|  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Radio</li> <li><input type="checkbox"/> TV</li> <li><input type="checkbox"/> Telephone</li> <li><input type="checkbox"/> Cellular phone (call and text only)</li> <li><input type="checkbox"/> Smart phone</li> <li><input type="checkbox"/> Laptop or desktop computer</li> <li><input type="checkbox"/> Touch screen tablet</li> <li><input type="checkbox"/> Personal assistive devices (e.g., hearing aid, mobility aid, screen reader)</li> <li><input type="checkbox"/> Others (please specify)<br/>_____</li> </ul> | <input type="checkbox"/> | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/>     | <input type="checkbox"/> |
| 25. Where do you access these devices? Tick all that apply.  | <b>Device</b>  | <b>Home</b>              | <b>Work</b>                 | <b>School</b>                | <b>Others (Specify)</b>      |                          |
|  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Radio</li> <li><input type="checkbox"/> TV</li> <li><input type="checkbox"/> Telephone</li> <li><input type="checkbox"/> Cellular phone (call and text only)</li> <li><input type="checkbox"/> Smart phone</li> <li><input type="checkbox"/> Laptop or desktop computer</li> <li><input type="checkbox"/> Touch screen tablet</li> <li><input type="checkbox"/> Personal assistive devices (e.g., hearing aid, mobility aid, screen reader)</li> <li><input type="checkbox"/> Others (please specify)<br/>_____</li> </ul> | <input type="checkbox"/> | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/>     | <input type="checkbox"/> |
| 26. How often do you use the devices   |  | <b>Once a day</b>        | <b>At least once a week</b> | <b>At least once a month</b> | <b>Once every few months</b> | <b>Never</b>             |

|   |   |  |  |  |  |  |
|---|---|--|--|--|--|--|
| <p>to do the following activities?</p>                                  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Make/receive calls</li> <li><input type="checkbox"/> Send/receive SMS</li> <li><input type="checkbox"/> Send/receive email</li> <li><input type="checkbox"/> Find information related to my work</li> <li><input type="checkbox"/> Find information related to weather and disaster alerts</li> <li><input type="checkbox"/> Find information related to my learning</li> <li><input type="checkbox"/> Find information related to my health</li> <li><input type="checkbox"/> Find information about government services</li> <li><input type="checkbox"/> Use mobile money to send/receive money</li> <li><input type="checkbox"/> Use online banking app</li> <li><input type="checkbox"/> Read news online</li> <li><input type="checkbox"/> Post blogs or vlogs</li> <li><input type="checkbox"/> Use social media (e.g., Facebook, Twitter)</li> <li><input type="checkbox"/> Use chat apps (e.g., Facebook Messenger, Viber, WhatsApp)</li> <li><input type="checkbox"/> Use online shopping app (e.g., Lazada, Shopee)</li> <li><input type="checkbox"/> Watch videos and movies (e.g., YouTube, Netflix)</li> <li><input type="checkbox"/> Listen to radio and music</li> <li><input type="checkbox"/> Play games</li> <li><input type="checkbox"/> Others (please specify)</li> <li>_____</li> <li>_____</li> </ul> |  |  |  |  |  |
| <p>27. Where do you normally connect to the Internet? For instance,</p> | <ul style="list-style-type: none"> <li><input type="checkbox"/> I have access to internet anywhere using mobile data</li> <li><input type="checkbox"/> At home</li> <li><input type="checkbox"/> At work</li> <li><input type="checkbox"/> At school</li> <li><input type="checkbox"/> At community centers (Shopping malls, cafes, restaurants, barangay hall, offices, etc.)</li> <li><input type="checkbox"/> Other (please specify) _____</li> </ul>  |  |  |  |  |  |

|   |  |
|---|--|
| <p>you may use the internet to access Facebook, YouTube, Instagram and TikTok (tick all that applies)</p>                               |  |
| <p>28. How often do you typically use online services (e.g., Facebook, YouTube, Lazada)?</p>  | <p><input type="checkbox"/> Daily<br/> <input type="checkbox"/> Several times a week<br/> <input type="checkbox"/> Once a week<br/> <input type="checkbox"/> Several times a month<br/> <input type="checkbox"/> Once a month or less</p>  |
| <p>29. If you do not connect to the Internet or use online services regularly, please indicate your reasons (tick all that applies)</p> | <p><input type="checkbox"/> There is no network connection where I live<br/> <input type="checkbox"/> There are no free Wi-Fi sites in my area<br/> <input type="checkbox"/> The connection is too slow<br/> <input type="checkbox"/> Devices are too expensive<br/> <input type="checkbox"/> I have difficulty charging the battery on my device<br/> <input type="checkbox"/> Data and broadband plans are too expensive<br/> <input type="checkbox"/> I don't know how to connect to the Internet<br/> <input type="checkbox"/> I am not interested in using online services<br/> <input type="checkbox"/> Many of the online services are in a language that I don't understand<br/> <input type="checkbox"/> Many of the online services are difficult to use<br/> <input type="checkbox"/> I am afraid of online scams and security risks.<br/> <input type="checkbox"/> I am not allowed to use online services<br/> <input type="checkbox"/> I need to ask for permission to use online services<br/> <input type="checkbox"/> Others (please specify) _____</p> |
| <b>Affordability</b>  |  |
| <p>30. In accessing the Internet,</p>   | <p><input type="radio"/> Mobile phone data _____<br/> <input type="radio"/> Home Wi-Fi/broadband/DSL cost _____<br/> <input type="radio"/> Computer rental _____</p>   |

|  |  |
|--|--|
| how much do you spend per month?                           | <input type="radio"/> Other expenses related to the Internet (Specify)<br>_____  |
| 31. How would you describe the charges for these services? | <input type="checkbox"/> Cheap<br><input type="checkbox"/> Fair<br><input type="checkbox"/> Too expensive<br><input type="checkbox"/> No comment   |
| <b>Respondent Profile</b>                                  |  |
| <b>Name (Optional):</b>                                    |  |
| 32. Location (Island group)                                | <input type="checkbox"/> Luzon<br><input type="checkbox"/> Visayas<br><input type="checkbox"/> Mindanao  |
| 33. Age  | <input type="checkbox"/> 0-14 years<br><input type="checkbox"/> 15-24 years<br><input type="checkbox"/> 25-54 years<br><input type="checkbox"/> 55-64 years<br><input type="checkbox"/> 65 years and over  |
| 34. To which Gender do you most identify                   | <input type="checkbox"/> Male<br><input type="checkbox"/> Female<br><input type="checkbox"/> Transgender Male<br><input type="checkbox"/> Transgender Female<br><input type="checkbox"/> Non-Binary<br><input type="checkbox"/> Prefer to self-describe as _____<br><input type="checkbox"/> Prefer not say  |
| 35. Educational Attainment                                 | <input type="checkbox"/> No grade completed<br><input type="checkbox"/> Elementary undergraduate<br><input type="checkbox"/> Elementary graduate<br><input type="checkbox"/> Junior High School undergraduate<br><input type="checkbox"/> Junior High School graduate<br><input type="checkbox"/> Senior High School undergraduate<br><input type="checkbox"/> Senior High School graduate<br><input type="checkbox"/> College undergraduate<br><input type="checkbox"/> College graduate<br><input type="checkbox"/> Vocational |
| 36. Occupation   | <input type="checkbox"/> <i>Managers (Officials of government and special-interest organizations, corporate executives, managers, managing proprietors and supervisors)</i>  |

|                              |  |
|------------------------------|--|
|                              | <input type="checkbox"/> <i>Professionals (Teachers, lawyers, doctors, accountants, engineers, etc.)</i><br><input type="checkbox"/> <i>Technicians and associate professionals (Technicians and associate professionals)</i><br><input type="checkbox"/> <i>Clerical support workers (Clerks)</i><br><input type="checkbox"/> <i>Service and sales workers (Service workers and shop and market sales workers)</i><br><input type="checkbox"/> <i>Skilled agricultural, forestry and fishery workers (<b>Farmers, forestry workers and fisherfolk</b>)</i><br><input type="checkbox"/> <i>Craft and related trades workers (Trades and related workers)</i><br><input type="checkbox"/> <i>Plant and machine operators and assemblers (Plant and machine operators and assemblers)</i><br><input type="checkbox"/> <i>Elementary occupations (Laborers and unskilled workers)</i><br><input type="checkbox"/> <i>Armed forces occupations (Special occupations)</i> |
| 37. Monthly Income           | <input type="checkbox"/> Less than 10,000<br><input type="checkbox"/> 10,000 to 20,000 PHP<br><input type="checkbox"/> 20,000 PHP to 40,000 PHP<br><input type="checkbox"/> 40,000 PHP to 60,000 PHP<br><input type="checkbox"/> 60,000 PHP to 80,000 PHP<br><input type="checkbox"/> 80,000 PHP to 100,000 PHP<br><input type="checkbox"/> 100,000 PHP to 120,000 PHP<br><input type="checkbox"/> 120,000 PHP to 140,000 PHP<br><input type="checkbox"/> Above 140,000 PHP  |
| 38. Household Monthly Income | <input type="checkbox"/> Less than 10,957 PHP (Poor)<br><input type="checkbox"/> 10,957 to 21,914 PHP (Low Income)<br><input type="checkbox"/> 21,914 PHP to 43,828 PHP (Lower Middle)<br><input type="checkbox"/> 43,828 PHP to 76,669 PHP (Middle)<br><input type="checkbox"/> 73,669 PHP to 131,484 PHP (Upper Middle)<br><input type="checkbox"/> 131,484 PHP to 219,140 PHP (Upper Middle but not Rich)<br><input type="checkbox"/> 219,140 PHP and above (Rich)  |
| 39. Languages spoken         | <input type="checkbox"/> Bikol<br><input type="checkbox"/> Cebuano<br><input type="checkbox"/> Hiligaynon (Ilonggo)<br><input type="checkbox"/> Ilocano<br><input type="checkbox"/> Kampampangan<br><input type="checkbox"/> Pangasinan<br><input type="checkbox"/> Tagalog<br><input type="checkbox"/> Waray-waray<br><input type="checkbox"/> English<br><input type="checkbox"/> Other _____  |

|                       |  |
|-----------------------|--|
| 40. Disability Status | <ul style="list-style-type: none"> <li>❑ <b>Psychosocial disability</b> – Includes bipolar disorder, depression, ADHD, epilepsy, and other long-term and recurring mental or behavioral issues</li> <li>❑ <b>Disability resulting from a chronic illness</b> – Includes orthopedic disability due to cancer, blindness due to diabetes, and other disabilities due to a chronic disease</li> <li>❑ <b>Learning disability</b> – e.g., Dysgraphia, Dyslexia</li> <li>❑ <b>Visual disability</b> – Simple poor eyesight doesn't automatically qualify a person for a PWD ID unless the visual impairment can't be corrected.</li> <li>❑ <b>Orthopedic (Musculoskeletal), physical disability</b> – Includes people with dwarfism and amputated hands or feet, scoliosis.</li> <li>❑ <b>Mental disability (illness or disorder)</b> - e.g., schizophrenia</li> <li>❑ <b>Intellectual disability</b> - Slow progress in mental development</li> <li>❑ <b>Hearing disability</b> - Deaf or hard of hearing</li> <li>❑ <b>Speech, language impairment</b> - Includes developmental language disorder, language delay, or developmental dysphasia; communication disorder that adversely affects a person's ability to talk, understand, read, and write; trouble producing certain sounds accurately.</li> <li>❑ <b>Multiple disabilities</b></li> </ul> |
|-----------------------|--|

### **Appendix 3: List of organizations/agencies included in data-gathering<sup>55</sup>**

ADHD Society of the Philippines

AKAP-Pinoy

Ateneo Innovation Center- Ateneo de Manila University

CARE Philippines

Cancer Registry and Research (CARE-PH)

Center for Disaster Preparedness

Coastal Core

Department of Psychology-Ateneo de Manila University

Disaster Risk Reduction Network Philippines

Environmental Science for Social Change- Ateneo de Manila University

Life Haven CIL

New Voice Association of the Philippines

Office of Civil Defense

Oscar M. Lopez Center

People's Disaster Risk Reduction Network

Philippine Disaster Resilience Foundation

PWD AKKAP-PASIG

UN WOMEN

UNDRR

UP Resilience Institute

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<sup>55</sup> Since the study involves rapid mapping of different groups, purposive sampling was based on the availability of these organizations.

**Appendix 4. Interface between updated NDRRM Plan 2020-2030 and components of the Maturity Model**

| <b><i>NDRRM Plan outcomes</i></b>   | <b><i>Pillar and Key Result Area</i></b>                        | <b><i>Maturity Model Component</i></b>   | <b><i>Key Questions</i></b>   | <b><i>FGD synthesis<sup>56</sup></i></b>  |
|---|---|--|---|---|
| Outcome 1: Improved access, understanding, and use of updated risk information and research | Prevention and Mitigation/<br>KRA 1 Disaster Risk and Reduction | Component 1: Shared data resources and access<br><br>Component 4: ICT Infrastructure | <i>What are the barriers vulnerable groups face in access to and use of ICTs (affordability, poor-quality connectivity, lack of awareness, lack of literacy and digital skills, lack of relevant content, privacy and security issues, socio-cultural constraints)?</i><br><br><i>What are the opportunities and solutions to overcome these barriers that vulnerable groups face in accessing ICT to better understand and use updated risk information?</i> | There is a need for open data/democratization of data. Access to data still a major issue. Although some technologies are present, accessing still is bureaucratic.<br><br>Issues raised: Data availability, lack of data, insufficiency of data, need for reliable data especially for PWDs and other vulnerable groups.<br><br>There is a problem in consistency, some barangays collect disaggregated data, while some do not, others also do not share data. The digital solutions could aid in assisting barangay LGUs to collect disaggregated data.<br><br>Data sharing, access and disaggregation is a recurring theme<br><br>There is a need to establish a national exposure data base is important |

<sup>56</sup> See Annex XX for detailed FGD results

|  |   |  |  |   |
|--|---|--|--|---|
| <p>Outcome 2: Implemented risk-centered, national, sub-national, and sectoral policies, plans, and budget</p>                        | <p>Prevention and Mitigation/ KRA 1 Disaster Risk and Reduction</p> | <p>Component 7: Policies, Standards, Guidelines and Best Practices</p> | <p><i>Do they specifically mention vulnerable groups (e.g., are there guidelines to ensure applications are accessible to persons with disabilities?</i></p> <p><i>If yes, are the policies being put into practice?</i></p>   | <p>There are still gaps in the inclusion of PWDs in DRRM Plans especially in accessing information for EWS</p> <p>Policies with regard to PWD IDs are being carried out</p>   |
| <p>Outcome 4: Institutionalized, timely, responsive, context and culture-specific early warning systems, reaching the last mile.</p> | <p>Prevention and Mitigation/ KRA 1 Disaster Risk and Reduction</p> | <p>Component 2: Digital Applications and Services</p>                  | <p><i>How can Early Warning Systems (EWS) be improved and institutionalized to be more timely, responsive, context and culture specific so that no one is left behind?</i></p> <p><i>What are the gaps and opportunities for developing <b>digital applications and services</b> that directly build the resilience of vulnerable groups, or provide</i></p> | <p>There is no support given to PWDs in accessing information. EWS should be customized for the specific needs of specific disabilities. Existing EWS designed only for those without disabilities</p> <p>Digital solutions are based on market demands and there should be a platform for this to grow and be sustainable. However, there are no platforms for PWDs of the digital solutions to anchor to.</p> <p>Platforms for digital solutions should be more personalized, be in the local dialect and language.</p> |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  | <p><i>information about the most vulnerable and their needs to ensure policymakers, planners, responders, etc. can make informed decisions that leave no one behind?</i></p> | <p>Digital solutions should be task focused –pre-identify an actual need, sector inclusive (targets different groups) and narrative driven.</p> <p>Digital solutions should not be implemented piecemeal but should be holistic that would include employment, livelihood, education</p> <p>Digital literacy must be first ensured. Tools should be user friendly</p> <p>Data privacy should be considered. Ensure the protection of these vulnerable groups when accessing these data and digital platform solutions</p> <p>Digital solutions should consider far flung areas where there is no connection.</p> <p>Digital solutions that involves creating a data base should be maintained and sustained.</p> <p>Technology and platform are available but can still be improved. There is a need to lower the cost of using technologies</p> <p>Digital solutions including technologies and data should be openly available and accessible to everyone.</p> <p>Reduced income and higher spending is a barrier for digital solutions since vulnerable groups cannot invest in gadgets</p> |
|--|--|--|--|--|

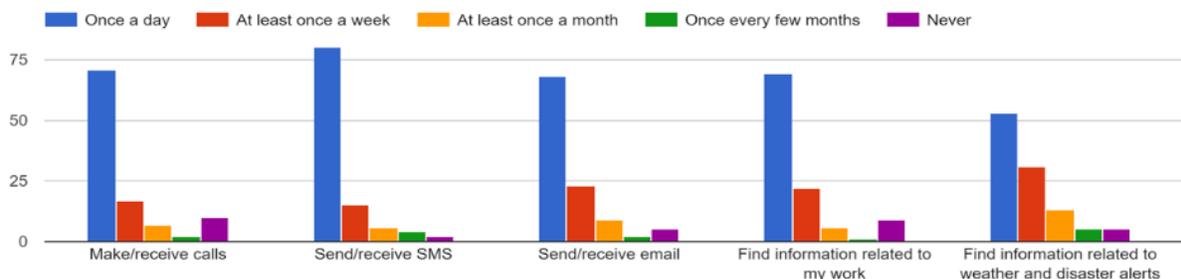
|   |   |  |  |   |
|---|---|--|--|---|
|   |   |  |  | <p>Digital solutions should link all available tools and data in providing risk-informed solutions</p> <p>Interoperability is very important in using these digital solutions</p> <p>There is a need to identify problems of users and providers in order to provide appropriate digital solutions</p> <p>There is a need for a clear framework to address all these gaps in terms of Disaster response</p>   |
| Outcome 9: Enhanced risk awareness and risk-informed decisions and actions of governments and communities | Preparedness/ KRA 2 Preparedness and Response | Component 5: Stakeholder/User Competencies | <i>What are the gaps and opportunities to build DRR and CCA capacity of vulnerable groups (e.g., to prepare for disaster and climate risks; to receive, understand and act on early warning messages), and of DRR policymakers, planners, responders, etc. to engage with vulnerable groups?</i> | <p>Increase capacity and capabilities of PWDs to help rescue themselves by providing support</p> <p>There is a need to consider people with double-triple marginalization (e.g. women + IP + disabled) and those with multiple disabilities and their families</p> <p>Stakeholders should be involved in the validation as well be given the data themselves. Make data be public domain and be available for download (GIS information). Provide trainings on how to use these data.</p> |
| Outcome 11: Strengthened  | Preparedness/ KRA 2                           | Component 3: DRR                           | <i>To what extent does DRR coordination</i>  | Most of the organizations are active in the field of CCA-DRR in their own respective communities.   |

|  |                                  |  |   |   |
|--|----------------------------------|--|---|---|
| <p>partnerships and coordination among all key actors and stakeholders</p> | <p>Preparedness and Response</p> | <p>Coordination and Collaboration</p> <p>Component 6: Partnership programs</p> | <p><i>and collaboration involve civil society and consider the needs of vulnerable groups?</i></p> <p><i>What are gaps and opportunities in partnering with ICT and other companies that can facilitate digital information collection, analysis and dissemination to vulnerable groups?</i></p> <p><i>What are the gaps and potential solutions to improve coordination and collaboration, to ensure that the voices of vulnerable groups are heard, to engage vulnerable groups in the co-design and monitoring of interventions?</i></p> | <p>Partnerships and linkages exist between and among these organizations.</p> <p>Interoperability of the template or tools that are provided (including online and office tools) of different agencies should complement each other and provide the broadest possible data collection approach. Data requirements should be consistent with one another.</p> <p>There is a need for real planning for PWDs coming from the national government and cascaded into local government. Not everyone is aware of the plight of PWDs and other vulnerable groups</p> <p>Raise level of scientific discourse to community level. Provide support to local universities for this and capacitate them to become data collectors in their area.</p> |
|--|----------------------------------|--|---|---|

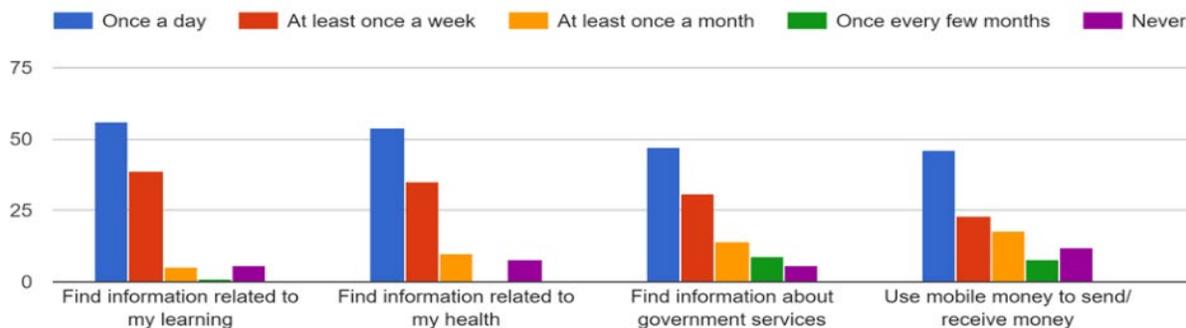
|  |   |   |   |   |
|--|---|---|---|---|
| <p>Outcome 15:<br/>Accurate, reliable, and timely information management</p> | <p>Response and Early Recovery/ KRA 2 Preparedness and Response</p> | <p>Component 1:<br/>Shared data resources and access</p> <p>Component 4:<br/>ICT Infrastructure</p> | <p><i>What are ways to improve data collection system from the local to the national level that is disability inclusive, gender sensitive, and addresses the need for the vulnerable sector to have direct and indirect access to various digital services for DRR?</i></p> | <p>Need to democratize access of open access data.</p> <p>Make the PWD data reliable. Increase DOH database from 300k to half million and then to one million.</p> <p>Disaggregate data by geographical spread, age/age bracket to determine those needed employment and livelihood programs; those with mild disabilities etc.</p> <p>Populate real database of DOH by encouraging everyone to get PWD ID. Transmit these data to DOH database.</p> <p>Data from community based monitoring systems must complement data from Philippine Statistics Authority</p> <p>Create a consortia of research organizations, libraries and data collectors. Negotiate for licenses of journal sites.</p> |
|--|---|---|---|---|

### Appendix 5. Chart Frequency of use of specific devices for specified activities

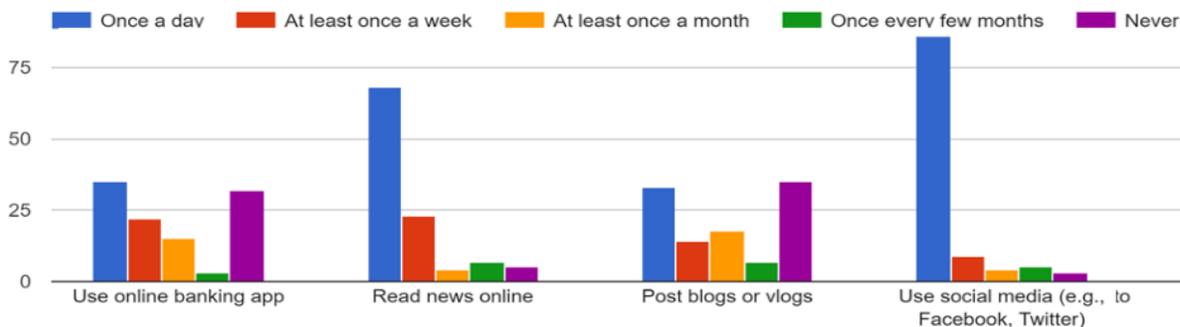
How often do you use the devices to do the following activities?



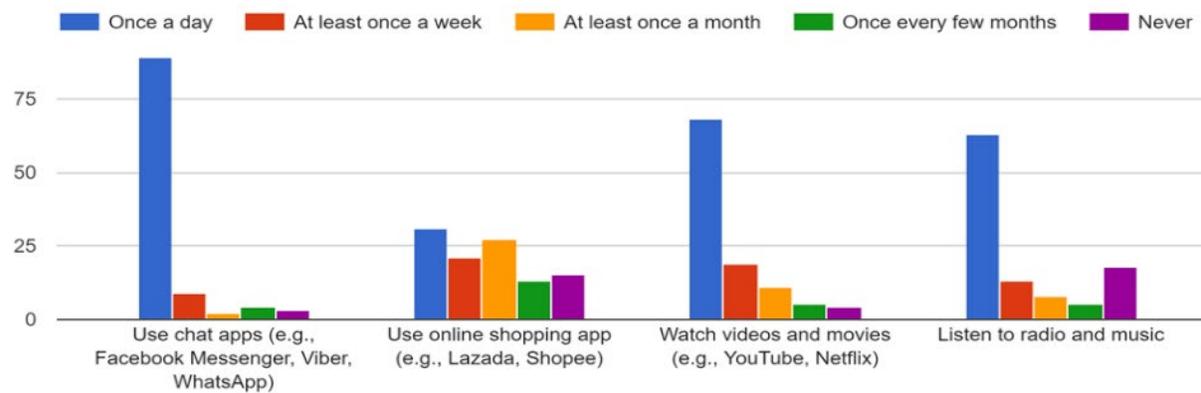
How often do you use the devices to do the following activities?



How often do you use the devices to do the following activities?



How often do you use the devices to do the following activities?





For more information, please contact:

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Rajadamnern Nok Avenue, Bangkok 10200, Thailand  
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[ASIA-PACIFIC.UNDP.ORG](http://ASIA-PACIFIC.UNDP.ORG)

