



Innovative and participatory mapping methodology for Disaster Preparedness and Response

Hazard risk mapping is a tool generally used to identify risks, vulnerabilities and local Disaster Risk Management capacities. Under this initiative, hazard risk mapping provided the necessary basis for developing Disaster Risk Reduction (DRR) plans at the different administrative levels of commune (or ward in cities), district and province.

National Red Cross and Red Crescent Societies have a long tradition of providing technical support to this process through the promotion of community engagement and inclusiveness. In a rural context, hazard risk maps are usually hand-drawn during community meetings. In an urban context, however, the information contained such hand-drawn maps is often questionable as they can fail to represent local complexity which limits their relevance for Disaster Risk Reduction planning and more specifically for Disaster Preparedness and Response and their potential use in support of socio-economic development planning.

Thus, an innovative and participatory mapping methodology was developed and piloted in three countries (Cambodia, the Philippines and Viet Nam) to enable local government and communities to improve their preparedness and response plans. Multi-hazard maps were developed using Quantum Geographical Information System (QGIS) in 19 urban areas and tested through simulation exercises. These maps are accessible and easily interpreted by local authorities and people as (i) they provide geo-referenced information on hazard risks and vulnerability with attention to the most vulnerable groups; (ii) they provide information on district capacity in Disaster Risk Management including early warning coverage, evacuation sites and routes; and (iii) they can be updated by local staff with limited GIS mapping capacity.

INTERNATIONAL



FEDERATION



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Step by step process

STEP 01

Development of base map using free QGIS software

- Develop a base map of the urban area (boundaries, main streets and main buildings) from an open street map or Google Earth
- Print out the base map for information to verify information with local authorities

STEP 02

Participatory information collection and synthesis

- Meet with various stakeholders including people with disabilities, children and representatives of local authorities to collect further detailed information on vulnerabilities and capacities
- Cross-check and collect geo-referenced information through smart phones
- Synthesise information into database
- List and map the most vulnerable groups to prioritise for early warning and evacuation

STEP 03

Participatory development of QGIS Multi-Hazard maps

- Transfer information from paper into digital maps
- Verify QGIS map information with local authorities
- Finalise the QGIS map and handover to local authority representatives

STEP 04

Share the QGIS multi-hazard maps and update information annually

- Distribute the map and database with relevant stakeholders including local residents, local, regional and national authorities in charge of Disaster Preparedness and Response; and with National Red Cross and Red Crescent Societies
- Update QGIS multi-hazard maps annually

STEP 05

Using QGIS multi-hazard maps as main inputs to Disaster Preparedness and Response Plan of community level

- Develop and test Disaster Preparedness and Response Plan through multi-hazard drill exercises
- Integrate QGIS multi-hazard maps as a supporting tool in damage and needs assessment after disasters

Building Urban Resilience in Southeast Asia

The Building Urban Resilience in Southeast Asia initiative, funded by the European Commission for Civil Protection and Humanitarian Aid Operations (ECHO), enables Red Cross and Red Crescent Movement partners in Cambodia, Lao PDR, the Philippines and Viet Nam to build the capacities of National Societies, local government, school teachers and children, Red Cross Youth and Volunteers through a coherent regional strategy drawing on good practice and innovation. The action emphasizes gender equity and social inclusion of poor, vulnerable people, including people with disabilities and older people.

The International Federation of Red Cross and Red Crescent Societies (IFRC), in partnership with Finnish Red Cross, German Red Cross, Spanish Red Cross Lao Red Cross, Cambodian Red Cross, Viet Nam Red Cross, and Philippine Red Cross, bring to the project extensive experience in school safety, public awareness and public education, and risk mapping, with strength in peer to peer support and learning.

Success story

“The new methodology makes planning for Disaster Preparedness and Response more efficient than in the past. It allows us to collect geo-referenced and accurate information on multiple hazards, risk exposure, and vulnerability. Before, the Disaster Preparedness and Response (DPR) plans at ward level were very general and difficult to put into action when disasters struck. With the new methodology, the most vulnerable people are listed in a database and geo-referenced on the ward maps, so this provides an excellent foundation for developing a realistic and actionable DPR plan.”

Mr Nguyễn Ngọc Trinh, member of the Technical Support Group of Hải Cảng ward, Quy Nhon city, Viet Nam.

“The risk mapping process was very useful. Community members in both the villages and sangkats (communes) are now more aware of their vulnerabilities and their own resources. We can use these maps to develop preparedness planning at the community level. I will use this methodology in our existing projects in three target districts and nine sangkats.”

Mr. Leam La, 35 years old, Provincial Disaster Management Committee, Bantey Meanchey Province, Cambodia.

“The new maps help our barangay a lot as we can update and produce new ones which have more detail. Although it was difficult at the beginning, we could manage it along the way. We also utilize the map for Disaster Risk Reduction planning such as identifying evacuation routes, hazards, vulnerabilities and risks. It has become a useful tool in prioritizing the programs of the barangay.”

Mr. Alexis Reynaldo G Santos, 38 years old, Community leader and Kagawad/Disaster Risk Reduction focal in Barangay Tatalon, Quezon City, Philippines



After training in innovative and participatory mapping methodologies for Disaster Preparedness and Response in urban and peri-urban contexts in March 2017, staff from Cambodia, the Philippines, and Viet Nam Red Cross conducted similar trainings for local authorities and National Society officer in charge of Disaster Preparedness and Response.

As a result, 19 multi-hazard maps were developed and used in the development of local Disaster Preparedness and Response plans with special attention given to the most vulnerable groups for early warning and evacuation purposes. The maps also provide geo-referenced and easy-to-understand information for local authorities and the public. This new mapping methodology and the plans produced have been tested through multi-hazard simulation exercises to enhance local government capacity in Disaster Preparedness and Response. Using free software, the methodology has also been adapted for staff with limited computer skills.

In Viet Nam, the multi-hazard maps of five wards in Quy Nhon city have been uploaded on the Disaster Management Policy and Technology Centre's database under the Viet Nam Disaster Management Authority system. These maps have been printed and displayed on various government and public buildings. Following the request of the Quy Nhon City and Binh Dinh province authorities, the new multi-hazard mapping methodology was scaled up and replicated with ten other ward authorities.

In Cambodia, the project provided the first opportunity for the Provincial Disaster Management Committee (PCDM) and the Cambodian Red Cross to implement a risk mapping process using digital technology. The PCDM now seeks to replicate the methodology in other projects in Bantey Meanchey province and include it in its 2018 operational plan. Likewise, Cambodian Red Cross plans to integrate the methodology into the community resilience projects in the provinces of Tboung Khmom, Kampong Cham, Kampong Tom, and Kampong Chhnang.

In the Philippines, the QGIS methodology reached not only Quezon City Disaster Risk Reduction Management Council (QCDRMC) but also the Philippine Red Cross. The project has been a good opportunity to roll out QGIS mapping at the community level, through which they can disseminate additional tools to facilitate the updating of hazards and capacities in their barangays. Thus, it contributes to better Disaster Risk Reduction Management planning. The QCRRM and the Philippine Red Cross plan to replicate this methodology in other barangays.

Lessons learnt

- Peer-to-peer learning and opportunities to share experiences among the four National Societies to pilot and adopt the new approach to harmonize the methodology to engage with the community.
- The methodology proved to be well engaged and various stakeholders were involved as part of the implementation including vulnerable groups.
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- The methodology proved to be well suited for adaptation to the capacities and needs of local government staff.

Challenges

- Effective QGIS mapping requires a longer timeframe to implement than traditional hand drawing mapping used in part of Vulnerability and Capacity Assessments (VCA).
- Expert technical support is required to enable the National Society and the local government to take full ownership of the methodology.
- Scaling up the implementation of this methodology will require allocation of significant financial and human resources.

Ways forward

- Develop an online training course to reach more National Red Cross and Red Crescent Societies and local government staff.
- National Societies should be encouraged to apply the innovative and participatory mapping methodology for Disaster Preparedness and Response in urban and peri-urban contexts. This could become part of the Vulnerability and Capacity Assessment (VCA) practice.
- Advocate for the allocation of additional resources to replicate the training with other National Societies and Branches.
- Develop partnerships with academia.



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