



Best Practice

The joint Indonesian – German working group on risk modelling and vulnerability assessment

Bringing together scientists with the goal of disaster risk reduction for Indonesia

THE INITIATIVE

Especially the 26 December 2004 tsunami clearly revealed the catastrophic consequences when tsunamis are striking areas unexpectedly without early warning or where little or no public awareness of what a tsunami is and how to react to it exists. This disastrous event led to strong efforts to design and implement a tsunami early warning system and highlighted the urgent need to strengthen community based disaster management strategies. Central to these issues is a continuous tsunami risk and vulnerability assessment and monitoring which is an indispensable requirement for effective early warning and community level disaster management.

One major initiative aiming at tsunami disaster risk reduction is the GITEWS project (German Indonesian Tsunami Early Warning System) initiated by 14 March 2005 through the so-called Joint Declaration between Indonesia and Germany. One task of the GITEWS project is tsunami risk and vulnerability assessment conducted by the German Aerospace Center (DLR) and the United Nations University (UNU-EHS) in cooperation with Indonesian partner institutions.

It was clear from the beginning that the challenging task of tsunami risk assessment in the context of early warning and disaster management needs joint efforts between scientists from various disciplines and decision makers from the field of disaster management. Therefore a joint Indonesian-German working group on risk modelling and vulnerability assessment was established and started its work in 2006.

The working group integrated from the beginning partners of the InaTEWS (Indonesia Tsunami Early Warning System) and GITEWS consortia but was also open to other relevant institutions. It is led and coordinated by the Indonesian Institute of Sciences (LIPI) and DLR under the umbrella of the German Federal Ministry of Education and Research (BMBF) and Indonesian State Ministry of Research and Technology (RISTEK). Core members of the working group are the institutions BAKOSURTANAL,

LAPAN, BPPT, DKP and UNU-EHS besides representatives from Pilot Areas as e.g. BAPPEDA, NGOs and Universities. Regular meetings and workshops took place to foster the joint working process.

THE GOAL

The group mutually works together and assists each other to conduct a tsunami risk assessment based on a joint methodology and produces risk knowledge for tsunami early warning and disaster risk reduction. Thereby the derived risk information and products serve needs on the sub-national level and at community level within three Pilot areas. The development of guidelines and technical documentations to derive best-practices and to provide advice for disaster risk reduction as well as the integration of the results into the Tsunami Early Warning Center at BMKG in Jakarta are major goals of the working group.

WHAT HAS BEEN ACHIEVED?

The group worked out a joint framework and methodology to derive risk assessment products for tsunami disaster management. Accordingly, several risk assessment results and derived products are prepared. The risk assessment products are mainly provided in form of thematic maps and geospatial information. Therefore a joint effort was undertaken on agreed representation of the thematic risk information.

The developed tsunami risk assessment strategy addresses two main applications and levels of detail:

- Sub-national level
- Local level

The sub-national level addresses tsunami risk information to be used mainly in the fields of early warning and people's response capabilities to tsunami early warning.

At this level, tsunami risk information is available for the entire coast of Sumatra, Java and Bali facing the Sunda Trench. Respective risk products are presented at a map

scale of 1 : 100 000 covering the tsunami endangered areas in Indonesia.

The produced tsunami risk maps come along with explanatory texts and respective technical notes.

Additionally, dedicated tsunami risk information at sub-national level has been provided and integrated into the Decision Support System (DSS) of the Tsunami Early Warning Center at BMKG (Jakarta) for use in an early warning and emergency relief case. The joint working group has coordinated as well with BNPB and its sub bodies as the main disaster management authority in Indonesia.

At local level, tsunami risk and vulnerability information addresses specific planning needs relevant for disaster management. Hence, beside information relevant for early warning and people's response capabilities also their coping capacity and their rehabilitation and recovery potential are considered.

There are three pilot areas in the GITEWS project (Padang, Cilacap and Bali) for which detailed tsunami risk and vulnerability products are developed, addressing specific planning needs within the disaster management at community level. Hence, the provided information can be used in the fields of:

- Community awareness
- Early warning chain planning
- Evacuation planning
- Contingency / emergency relief planning
- Reconstruction / recovery planning

Last but not least, national and local level guidelines in the field of tsunami risk assessment have been elaborated and contributed to e.g. UNESCO IOC and BNPB (Indonesian Disaster Management Authority).

Early Warning and Response Phases	Preparedness Measures	Topics for Tsunami Risk Assessment
1 Warning Decision	Hazard Assessment	What is the potential tsunami impact on land?
2 Warning Decision	Exposure estimation	Are there exposed people and critical infra.?
3 Warning Dissemination	Warning chain development	Do people receive and understand a warning?
4 Anticipated Response	Awareness / sensitization	Do people respond to warnings and evacuate?
5 Evacuation	Evacuation strategy	Who & how many people are able to reach a safe place?
6 Emergency Relief	Contingency planning	Who & how many people need relief assistance?
7 Sustainable Recovery	Recovery planning	Who is able to recover from the impacts?

Figure 1: Joint Risk and Vulnerability Assessment Framework

LESSONS LEARNED & POTENTIAL FOR REPLICATION

Bringing together people from science and practice in the field of tsunami risk assessment in Indonesia and the elaboration of a harmonized methodology, common understanding on which risk information is needed together with the sharing of information is essential to work out risk knowledge. This work was mainly driven by the scientific community, and it also integrates colleagues from the implementation and decision making level. The transfer of created risk knowledge driven by the science community towards implementation and practical use in decision making and resource allocation for disaster risk reduction was successful. Furthermore, it needs a long-term strategy and perspective. Attached to this is the apparent need of continuous human resources development. Based on the jointly developed methodology considering right from the beginning the applicability, reproducibility and user needs of the risk assessment products and information, the transferability to other tsunami endangered regions is given. The approach and framework was laid out to allow its adaptation for multi-hazard risk assessment, e.g. in the field of climate change and hydrological extreme events.

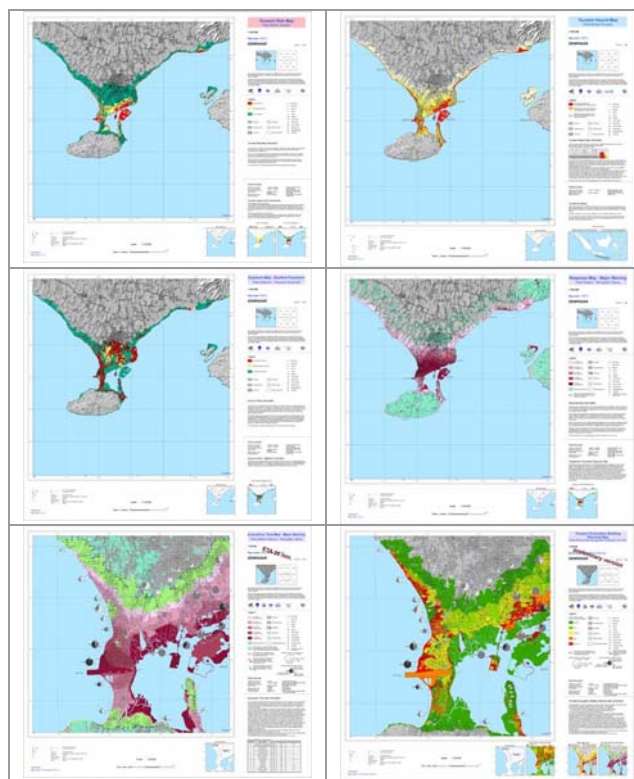


Figure 2: Examples of risk maps available at a scale of 1:100 000 (entire coast) as Tsunami Risk Map (top left), Hazard Map (top right), Exposure Map (middle left), Response Map (middle right), and at a scale of 1:25 000 in Pilot areas as Evacuation Time Map (lower left) and Evacuation Building Map (lower right)

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