Newsletter

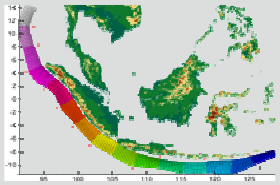
gtz IS International Services

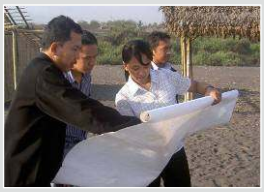
No. 04 | October-December ‘07

GTZ-GITEWS | Editorial

Capacity Building in Local Communities

German-Indonesian Cooperation for Tsunami Early Warning System





Editorial

Understanding tsunami hazard and the assessment of possible impacts to their community are preconditions for local decision makers and other stakeholder to initiate activities and plans to get better prepared for future tsunami events. Knowledge about tsunami hazard is necessary for risk assessment, as the risk describes the interaction between vulnerabilities and hazard. Tsunami hazard maps are the basis for evacuation planning. Maps, which indicates different zoning gives the possibilities to identify priorities and plan for differentiated action. It is also the base for designing mechanism to implement Tsunami Early Warning on the local level.

Although several initiatives from Indonesian and international institutions are on the way to provide models and maps which describes the propagation of tsunami waves and their impact on land, for most Indonesian communities very little information is available right now.

Tsunami Hazard Assessment is a task, where experts and local decision makers should work hand in hand. It should be conducted using all expertise and information available. With this edition of the newsletter we are presenting several initiatives related to hazard knowledge and hazard mapping.

Best regards
Harald Spahn, Team Leader GTZ-IS.




GITEWS Capacity Building

Capacity Building

The sustainable operation of a TEWS depends not only on the establishment of the technological bases (such as earthquake detection, ocean instrumentation, modelling and earth observation data), but also on the development of the institutional and human capacities that are necessary for the nationwide implementation of the system in Indonesia.

Capacity Building in the framework of GITEWS shall contribute that organisations involved in the Tsunami Early Warning System develop the human resources and coordinating mechanisms to manage and improve the system effectively. In order to translate these long-term targets into action, the GITEWS Capacity Building Working Package is divided into three components:

(1) Higher Education (UNU-EHS) and Technical Trainings & Workshops (InWent, DLR, GFZ)

The aim is to build individual capacities in the relevant organizations and institutions in order to meet the scientific and technological needs of the TEWS. It also aims to develop management skills and build the organizations' own internal capacity-building capabilities.

Academic programmes (Postdoc and PhD programmes) are organized by UNU-EHS.

A **Capacity Building Unit (CBU)** has been established to monitor, assist, coordinate, and conduct technical training activities related to GITEWS. The CBU, supported *by InWEnt Capacity Building International*, under the umbrella of RISTEK, and with the assistance of other relevant Indonesian institutions will be responsible for the preparation, implementation, development and quality assurance of the training measures and will be a coordination and service provider for the German and Indonesian partners involved in the Tsunami Early Warning System.

(2) Institution Building & Inter-institutional Communication (BGR)

aims to strengthen the executive agencies' capacities, especially their co-operation and organizational structures at national level by

- advising institutional capacity building at national level
- analysing mandates, responsibilities of TEWS institutions
- elaborating an organisational concept for the TEW chain
- strengthening inter-institutional coordination, communication
- identifying institutional training needs, cooperate with CBU
- assisting stakeholders in implementing guidelines for TEWS

The lead agency and focal point for the "Organisational Consulting" is the Ministry of Research and Technology (RISTEK).

(3) Capacity Building in Local Communities (GTZ-IS)

This project aims to strengthen the institutional and organizational capacities of local organizations working in the fields of preparedness and early warning. In 3 Pilot Areas (Padang, southern Java and Bali) the GTZ-IS Team together with partners from local government and civil society are developing warning and disaster preparedness mechanism, which later on shall enable other communities to get better prepared as well.

More details about this component you find in this and other editions of our regularly newsletter.

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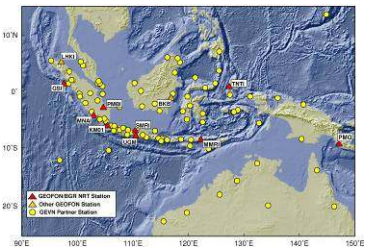


GITEWS Earthquake Monitoring System

GFZ Potsdam, Germany national research centre for geosciences

Within the GITEWS concept, the **Earthquake Monitoring System** plays a central role. The time available to warn the population in the coastal areas after a tsunami has been generated by a large earthquake in the Sunda trench is extremely short since the expected tsunami travel times are only in the order of 20-40 minutes. Therefore tsunami warnings have to be issued preferably within 5 minutes and these will primarily be based on rapidly determined earthquake parameters and pre-calculated tsunami scenarios fitting these parameters.

Other sensor data such as buoy and tide gauge data will usually not be available within such short time frame but will be needed later on to either validate a warning status or to be able to cancel it.

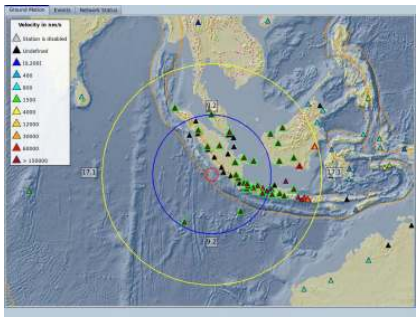
The rapid determination of seismic parameters requires a dense seismic network with many stations as close to the source region as possible. On the other hand, standard seismic equipment will be saturated if too close. Therefore GITEWS and other seismic stations in Indonesia are equipped with normal broadband seismometers as well as with strong motion accelerographs. A private VSAT system using the Indonesian Telkom-2 satellite is used for data transfer from the GITEWS stations to the warning center at BMG in Jakarta.

But even with a sophisticated seismic network and reliable VSAT communication the determination of correct information on earthquake location, depth and size within 5 minutes remains a challenge.

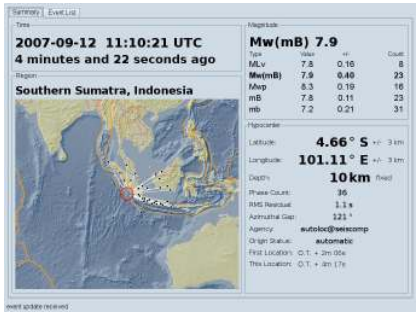
A special software package **SeisComP 3.0** is under development for fulfilling this task. A prototype version of SeisComP 3.0 was installed at BMG for testing in early May 2007. A first trainings course for the BMG seismic analysts was carried out May 7-11. An updated version of the SeisComP3 software for routine service became available in early September, just before the Bengkulu earthquake sequence.

Bengkulu Earthquake 12.09.2007

It was possible to obtain for the first and most tsunamogenic quake on September 12 (final moment magnitude 8.4) a first "heads-up" alert after just less than 2 minutes and a first estimate of location, depth range and magnitude after 2:30 minutes.



A stable solution estimating a moment magnitude of 7.9 based on 25 stations was available after 4:20 minutes leading to the first tsunami alert ever issued by BMG in less than 5 minutes.



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SeisComP 3.0 Software

The special software package SeisComP 3.0 combines data acquisition and transfer as well as automatic procedures to determine location, depth, magnitudes and rupture. Acoustic and optical alert tools are implemented to guarantee the attention of the seismic experts in the BMG warning center. Although 24/7 operation is mandatory at BMG, the basic parameter calculation is at first carried out fully automatic, but visual supervision is provided at each stage. They can interfere any time and correct automatic results and can also accelerate the automatic processing if desired.

Since this system processes already the real-time data of a quite big virtual seismic network, about 100 stations within and around Indonesia it was possible to achieve already an almost perfect timing for the real-time data analysis for the Bengkulu Earthquake.

The excellent performance is on one hand owed to the efficient professional software design, but also to newly developed algorithms for the estimation the final moment magnitude from the very first signals recorded. Future developments will provide additional seismic parameters such as rupture direction and length, but will also allow to link the central system in Jakarta to other SeisComP installations at regional centers in Indonesia but also to other GITEWS partners institutions in the Indian Ocean area.

Locations of the new sirens in Padang set up by the Local Government

News from Pilot Areas

Padang

New warning dissemination technologies are now getting installed in Padang to disseminate Tsunami Early Warnings in the shortest time possible.

The 3rd National Exhibition on Disaster Preparedness

took place in Padang on 8th to 9th December 2007 on Taman Budaya, right by the beach of Padang City. The event was organized by LIPI, Compress and PEMKO Padang and opened by the Governor of West Sumatra. During the two days thousands of local visitors had the opportunity to learn about preparedness initiatives presented by various stakeholders from all over West Sumatra Province.

Beside the provincial SATKORLAK and SATLAK divisions other disaster management actors like like RAPI, PMI, KOGAMI, Pramuka, Tagana and others were participating in this event. GTZ-IS shared a stand with RAPI and 2WCOM. During the exhibition the first public test of the FM-RDS technology in Padang was done successfully.

FM-RDS has arrived in Padang

Since November 29th, 2007 Padang can count on an additional channel to receive Tsunami Early Warning from BMG. The FM-RDS technology, which is sponsored by RISTEK, BMBF and the German company 2WCOM was installed during November and tested successfully during various occasions. All in all 30 selected public and private institutions, like the Police, Army / TNI, and SATKORLAK Province, are now connected directly to BMG via this technology. The principal selection criterion was the capability of the institution to forward the warning message to the community at risk (Padang people) in the shortest possible time. Receivers were distributed during a training session, which was opened by Indra Catri. GTZ-IS advisor Aim Zein explained how the system works, how to operate the equipment and about the testing procedures. After the testing the system will stay on air and get activated in case of tsunami warnings by BMG Jakarta.

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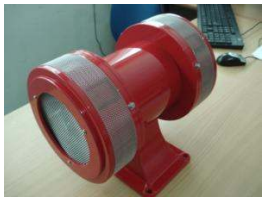
LOCAL TEWS – SIREN SYSTEM

The Local Government of Padang has set up and installed a siren system in the city, based on a proposal from the Padang Communication Group. The first 9 sirenes are located on strategic areas near the beach. 7 of them were set up in public places and 2 at government offices. They will be triggered from the local emergency control center Pusdalops PB Kota Padang. The system will add the collection of Padang Local TEWS was tested on December 17th. 2007 together with the West Sumatra Tsunami Drill. On that event all siren systems in Padang and other 6 located along the coast of West Sumatra were activated and tested.



Next steps in Padang

The first meeting of the Padang Consultative Group is scheduled for the 12th and 13th of January 2008. The Padang Consultative Group was recently established by the Local Government as a forum for international and Indonesian scientists as well as local decision maker and stakeholder to discuss and develop recommendations for tsunami hazard preparedness strategies based on the latest results of hazard and inundation mapping.

Tsunami awareness trainings in Bali

Bali
To improve basic knowledge and awareness about tsunami hazard and preparedness is still a big challenge in all Pilot Areas. Multiplier, like teacher, NGO worker or women groups can play a very important role here. A short training module for these target groups is still under development. First applications of the module were run in Bali during the last quarter of 2007 in cooperation with PPLH.

Bali TEW Working Group

During October – December the Bali Working Group TEWS on province level met every month advancing on warning chain and SOP development.

During the last technical meeting of the working group it was agreed to establish smaller task forces on certain issues (mapping, warning chain, SOP, socialization, PERDA) to enhance dynamism in the working process.

Representatives from Badung district and province level working groups participated in one of GTZ-IS trainings in the Pilot Area Java. As a result Public Works and BAPPEDA will strengthen their activities for tsunami hazard mapping and include it in their working plans for 2008.

Since October 2007 GTZ-IS GITEWS has a Bali office in Kesbanglinmas:

GTZ-IS GITEWS office in Bali

c/o. Badan KESBANGLINMASDA Provinsi Bali, Jl. D. I. Panjaitan No. 6, Renon, DENPASAR

Audience Visit

As a follow-up of the seminar on Hindu Religion, Balinese Custom and Cultural Perspectives on Tsunami Early Warning on 21st September 2007 and with the intention to involve other key stakeholder GTZ-IS met with the Association of the Hindu Leaders (PHDI).

The possibility to connect the cultural village (banjar) to the TEWS was discussed. Professor Sirtha agreed to inform the council of the cultural village (Majelis Agung Desa Pekraman) on the issue and promised to look after the possibility of a brief informational session with the district council.

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Tsunami awareness trainings for teacher, NGO worker and woman group

GTZ-IS supported the Centre for Environment Education (PPLH - Pusat Pendidikan Lingkungan Hidup) to organize and hold several tsunami awareness and basic knowledge trainings in Bali.

Target groups were teachers, NGO workers and a women group. Participants learnt the basic concepts related to tsunami hazard, basics of disaster risk reduction, tsunami preparedness and tsunami early warning. They also discussed about future preparedness and awareness rising activities, recognizing their roles as protector not only for their own lives but as educators for the young generation and neighborhood in saving lives through tsunami preparedness.

The trainings were accompanied by the GTZ-IS GITEWS team to draw lessons learnt from the training experiences in order to consolidate a training module for tsunami preparedness.

Next steps in Bali
Province level task forces on hazard mapping, warning chain and SOP development and local legal regulations will start their activities in early 2008. Cooperation mechanism with Badung District will be revised and discussed with our local partners. Bali will also host the next GITEWS Workshop for "Capacity Building in Local Communities" at the end of January.

Mr. H. Bambang Tujiono, Assistant III opened Workshop IV in Cilacap

Mr. Sukardiono, Asistant I, opened the Workshop V in Bantul

Java
During the last quarter of 2007, the base maps and the drafts of the warning chain schemes for Bantul, Kebumen and Cilacap Districts were finalized in a participatory manner. Local partners are also ready to install radio communication to strengthen network in and between the districts.

Base Maps

The 3 Working Groups have been continuing intensive work on the development of base maps for their respective districts. An inter-institutional advisory group - comprising of DKP (Abdul Muhari), PSBA / the Geography Faculty of UGM (Estuning Tyas Wulan Mei and Raffli Noor) and GTZ (Harald Spahn, Michael Hoppe and Benny Usdianto) - closely accompanied the process by providing full technical support, related data & information and the methodology.

Later, the base maps were improved through a series of discussions and manual drawing during the last 3 workshops in Cilacap, Bantul and Kebumen in Nov- Dec '07 and verification by field visits.

The manual and the digital base maps will be completed by the end of December 07, with the assistance of the Geography Faculty of UGM.

Warning Chains

At the same time, the Working Groups and GTZ team reviewed the existing district warning chain schemes. The reviewed topics covered the roles and the responsibilities of the '24 hours' assigned office in the districts, the shortest dissemination of warnings from BMG to the population in tsunami risk areas, the communication equipment used, and the expected reactions of various levels in the community.

This exercise intends to find appropriately improved models for future implementation in the districts. The process was carried out through consultations with BMG in Jogjakarta and Jakarta and the documentation by a Consultant of Circle-Coops (Sinta Dewi). The three districts intend to complete the improved scheme designs in Jan. '07.

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Communication Network in three districts

Fast information flow from local decision makers to the individual population in risk areas is critical to anticipate local tsunami. For this reason, GTZ-IS supports the initiatives of its local partners SAR, RAPI, ORARI and Kesbanglinmas) to strengthen the communication network between communities in Bantul, Kebumen and Cilacap.

The communication network will enable direct link to communicate critical information among various player, e.g. BMG, Kesbanglinmas, decision makers, media and the individual communities within a district and between the districts.

Presently, the required radio communication equipment for Bantul and Kebumen has been made available to be distributed to and be installed by the partners in Jan. '08.

Road maps for Java

During the Workshop IV in Cilacap (8-9 Nov 07), the Working Groups and GTZ agreed on roadmaps for 2008. Thus, topics of training and/or implementation of activities in 2008 will be stemmed from the roadmaps.

Next steps in Java
The completed district base maps will be used to further develop into hazard maps. Following the finalisation of the improved warning chain schemes, they will be presented to the local decision makers for approval. Evacuation Planning and development of Standard Operating Procedure shall become the topics for the next trainings.

DKP
Developing safer fisherman houses

Referring to the Integrated Coastal Management concept, which considers disaster mitigation as one of the components, the **Ministry of Marine Affairs and Fisheries (DKP)** has started the identification and assessment of coastal disaster potential already in 2002. Activities such tsunami hazard mapping and vulnerability assessment were implemented as well as public awareness and education programs using cultural approaches such as *wayang* (Indonesian traditional puppets), *dangdut* (typical Indonesian music) and *tabligh akbar* (religious activity). Other activities are related to the development of green belt areas and fisherman houses retrofitting in several districts in Pacitan, Bengkulu and West Nusa Tenggara. Other districts will follow next year.

When disasters like earthquake, tsunami and tidal wave occur, lots of structures (buildings, houses and other facilities) are damaged. Beside the huge energy that hits the structures, the lack of a 'disaster resistance' design for buildings and houses makes the conditions even worse.

The house was moved from its original location due to the tsunami hydraulic force in Muko muko, Bengkulu

Along with the quick development of global architecture and home design, we are getting trapped by adopting the modern style and leaving the traditional concept of house architecture behind. Looking from our disaster experience perspective, the traditional design is more resistance to typical disaster in each particular place in Indonesia such as *Omo hada* in Nias, *Jineng* in Bali or the traditional houses in Toraja, Aceh and so on.

Starting from that point, Ministry of Marine Affairs and Fisheries has tried to develop a safer fisherman house.

Omo hada – the traditional house in Nias
(Source: National Geographic Magazine)

The house is designed by raising its platform at least 2 meters above the ground (stage house) to reduce the area which will face the hydraulic force of either a tsunami or a tidal wave. The base floor remains empty, so the water can keep flowing. The column foundation reaches 1.5 meters below the surface to minimize the scouring effect of flooding. The diameter of the columns are 30 centimeters. This will reduce the impact of direct collision caused by tsunami debris. The roof and wall are using light materials to reduce total weight of house.

Along with the implementation of the concept, Ministry of Marine Affairs and Fisheries currently establishes a building code for the design so it could be applied either by national and also local institution.

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Hazard mapping activities at district level

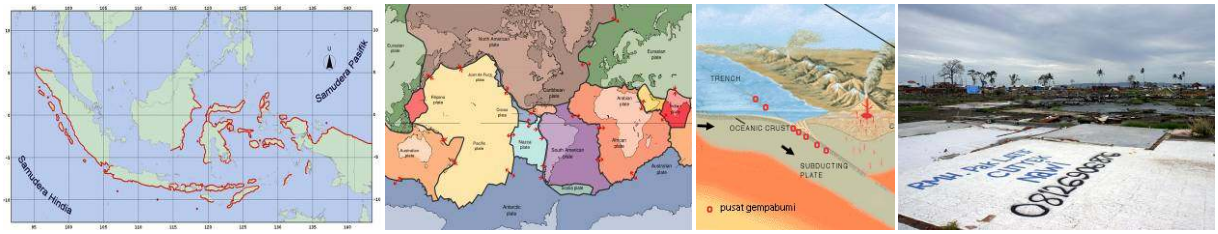
In order to develop local capacities to assess local tsunami hazard characteristics, Ministry of Marine Affairs and Fisheries cooperates with GTZ-IS to develop and conduct a pilot project on community based tsunami hazard mapping. The method is based on the analysis of eco-geomorphologic features.

With a continuous and directional discussion, a 'small gap' between scientific based and community based approaches could be eliminated (we call it 'low-tech' methodology).

It is still an ongoing development in the three participating districts. At the end we hope we can produce a general method that can be well applied at local level.

Workshop's opening ceremony in Kebumen

Mapping exercise in Kebumen



Tsunami hazard figures/images: tsunami prone coastlines of Indonesia, tectonic plates, subduction zone, tsunami impact ("ground zero" in Banda Aceh)

Tsunami Hazard Knowledge

Knowledge about tsunami hazard, tsunami causes, its characteristics and potential impact creates awareness and contributes to better tsunami preparedness. GTZ-IS is currently developing a reader and a training module about tsunami hazard. Both products are designed for local decision-makers, planners, NGOs, the media and other institutions and individuals who are involved in tsunami preparedness – or simply want to know more!

'*Tsunami Essentials*' – a Reader on Tsunami Hazard Knowledge

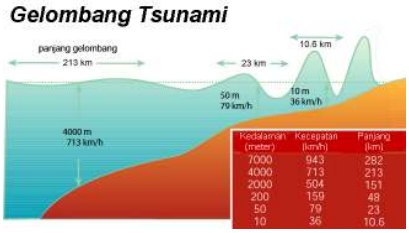
There are several good resources for information materials on tsunami hazard in Indonesia. These resources include the many publications of the GITEWS partners (some can be found on the website of the Jakarta Tsunami Information Centre www.jtic.org). The upcoming knowledge reader expands upon this collection by providing knowledge designed to specifically address the nature of tsunami hazard in Indonesia and its implications for early warning and preparedness.

Tailor made for the particulars of the threat by local tsunamis and the requirements of the Indonesian TEWS the reader recognizes the needs of local stakeholders who face the challenge of limited time for decision making and reaction.

'*Tsunami Essentials*' aims at providing hazard knowledge to governmental as well as non-governmental actors at local level who need further information themselves and are in a key position to "spread the word". It uses non-academic language and is a document that presents complicated issues in a plain and concise manner with examples and figures.

The content at a glance:

I. Introduction: tsunami – what is it?
II. Tsunami trigger mechanisms – what causes a tsunami?
III. Characteristics of tsunamis
IV. Impact on land
V. Uncertainty and its implications for preparedness
VI. Hazard assessment and mapping
VII. Further reading and materials



In a brief introduction the reader outlines the nature of the phenomenon and provides historic examples from Indonesia and elsewhere. It explains tsunami causes and presents terms and definitions, offers 'rules of the thumb' that summarize the main characteristics of tsunami hazard and explains potential impacts on land.

Providing essential knowledge for practitioners the reader discusses the difficulties that arise from the uncertainty regarding tsunami forecasting and impact, how that uncertainty affects local decision makers and offers guidance for approaching the problem.

This discussion is continued in the section about tsunami hazard assessment and concludes with a summary of a tsunami hazard mapping methodology (see feature on Tsunami Hazard Mapping in this volume).

Finally, the reader's annex provides links and further reading. '*Tsunami Essentials*' is scheduled for publication (in English and Indonesian) in first quarter of 2008.

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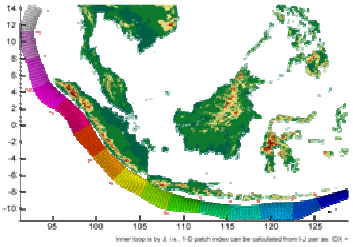
A Training Module on Tsunami Hazard Knowledge

The training module follows the content of the reader '*Tsunami Essentials*' and targets a similar audience. For the module the hazard knowledge is translated into teaching materials that address key local level actors.

The module is one part of a training course that covers various aspects of tsunami disaster preparedness in addition to tsunami hazard knowledge. It gives a general introduction to disaster preparedness, an explanation of the concepts and components of early warning as well as basic knowledge of evacuation and contingency planning.

GTZ IS together with the Indonesian NGO PPLH (*Pusat Pendidikan Lingkungan Hidup*) has tested a first version of the complete training course during a teacher training in Denpasar, Bali (see News from Pilot Area Bali in this volume). The materials are currently being revised and further developed.

The objective is to translate the training modules into a course for Training-of-Trainers and educate multipliers who will continue raising awareness.



Inundation modeling

The last - and most relevant - mile of simulation

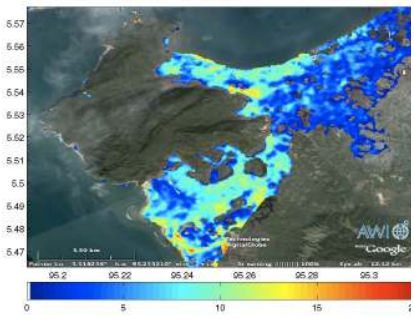
Inundation Modeling

In order to assess tsunami hazards, simulation plays an important role. While it is not possible to *predict* a concrete tsunami event, it is possible to *run* diverse tsunami *scenarios*, in order to assess possible effects to infrastructure, economy and settlements, by using mathematical modeling and computer simulations.

Even with sophisticated visualization it needs expert's knowledge to interpret simulation results appropriately.

Computations are very sensitive to the input data available. Main inputs to a tsunami model are the *source* (earth crust elevation due to the earthquake), *bathymetry and topography* data (terrain elevation), and *land use* data (bottom friction). Even with low quality input data, simulation results may look reasonable.

However, a realistic assessment of tsunami risk is only possible with accurate data. In order to demonstrate this statement, figures 1 and 2 shows inundation maps for the 2004 Boxing Day tsunami in Banda Aceh.



Uncorrected bathymetry / topography → underestimated inundation (Fig.1)

The inundation map in Fig.1 represents uncorrected SRTM digital elevation data, whereas Fig.2 shows corrected digital terrain data. The latter results in realistic inundation areas, while the uncorrected data yield misleadingly little inundation.

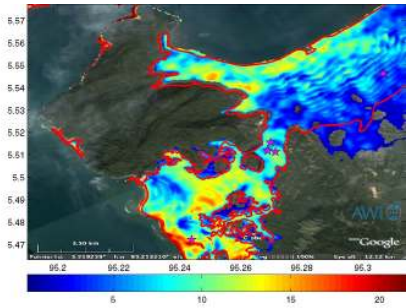


Fig.2 Corrected terrain data → realistic inundation results (red line)

Another important issue in numerical simulations is the resolution. Mathematical simulations are computed on computational meshes, with each mesh cell representing an averaged value. If a mesh cell is about 100x100 m (which is already high resolution), then a single water level, or velocity value is computed for a whole block of houses. Roads, aquifers, parks, etc. cannot be resolved by this mesh. This has to be taken into account when using inundation maps from computer models.

Interpreted correctly, inundation modeling is of great help – and is in fact the basis – for risk assessment and preparedness planning. But – never trust a model alone.

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RuptGen / TsunAWI

The GITEWS tsunami and inundation modeling is based on several new developments as well as available commercial software. Among the new software systems are the source generator *RuptGen*, developed by GFZ Potsdam, and the unstructured mesh finite element tsunami model *TsunAWI*, developed at AWI.

RuptGen computes the initial bottom elevation on a given set of nodes, using an advanced technique based on micro-plates of the earth crust. Each of these micro-plates (2250 in the current configuration for the Sunda trench) is moved according to knowledge about the geological structure to form an overall bottom deformation corresponding to given earthquake parameters.

TsunAWI uses these initial conditions for tsunami propagation and inundation modeling. TsunAWI is based on a sophisticated finite element numerical method, appropriate for highly irregular grids. This allows for very high local resolution near shore (down to approx. 90 m in priority areas), while saving computational cost in coarse deep ocean areas.

For very high resolution local inundation modeling, MIKE21, a commercially available coastal engineering application, is used. This work package is lead by GKSS Research Center and simulations are performed partly by DHI. These simulations take wave input from TsunAWI and simulate the impact along the coast with down to 30 m grid resolution in priority areas.

www.awi.de/en/go/tsunami

Photos taken during Tsunami Hazard Mapping Exercise in the districts of Bantul, Kebumen and Cilacap – pilot area Java (1st - 5th October)

Where is the safe area?

A proposal for a Tsunami Hazard Mapping Methodology

Understanding tsunami hazard and the potential impact for communities in tsunami prone areas is a prerequisite for local decision makers and other stakeholders to get prepared. However, for most Indonesian communities very little information is available right now. In cooperation with national experts, representatives from district governments and local organizations GTZ IS-GITEWS developed a general approach for tsunami hazard mapping that can be applied at district level.

With the **objective** of designing a simple and low-tech but sufficient and adequate tsunami hazard mapping methodology an inter-institutional team from the Ministry of Marine Affairs and Fisheries (DKP), the Gajah Mada University of Yogyakarta (UGM), the Meteorological and Geophysical Agency in Yogyakarta (BMG-DIY) and GTZ IS-GITEWS conducted a mapping exercise in the districts of Bantul, Kebumen and Cilacap. The team worked jointly with local stakeholders in order to optimize the approach and adjust it to local capacities. The experiences and lessons were evaluated on a daily basis and fed into the final methodology.

Methodological steps:

1) An **introductory meeting** among experts and local stakeholders confirms objectives and logistics, explains the methodology and compiles data.

2) Developing a (zoned) base map. The tsunami hazard mapping – similar to other approaches – exploits three sources of information:

- **local historical data** from previous tsunami events,
- **modelling results** for the area, and
- **reference data** from previous tsunami events in other location (e.g. from the tsunami catalogue)

Inundation (as horizontal) and run up (as vertical component) are recorded in a matrix and documented in the topographic map as follows:

- delineation of **horizontal distances** parallel from coastline,
- mapping of **horizontal distances in rivers** (distance on land times 3),
- delineation of **horizontal distances from left and right river bank** to anticipate potential flooding, and
- mapping of **vertical lines/elevated areas**.

The topographic map provides information about **geomorphologic** and **anthropogenic features** as well as **vegetation**. The mapping team defines and delineates the relevant features (e.g. sand dunes, dams and mangroves or coastal forest) which can be cross checked with satellite images (e.g. from Google Earth) and local knowledge.

The above features are recorded in a matrix. The matrix reflects a zoning that can be directly transferred into the base map. That map is now a (zoned) base map that highlights different elevation levels combined with landscape features in accordance to their respective distance from the coastline.

Altitude (m)	Description of geomorphologic feature		Horizontal distance from the coast (m)		
			e.g. 0 - 100	e.g. 100 - 300	e.g. 300 -500
			A	B	C
0-5	e.g. Sand dunes (3-7 m above sea level)	1	A1	B1	C1
	…	2	A2	B2	C2
5-10	e.g. Sand dunes (6-10 m above sea level)	3	A3	B3	…
10-15	…	…	…	…	…
>30	…	…	…	…	…

3) Developing (multi scenario) tsunami hazard map: the final tsunami hazard map requires a scenario discussion. Input is provided by the advisory team using earthquake magnitude and potential tsunami wave heights as parameters. By using the combination matrix several scenarios are discussed and visualized in the zoned base map resulting in single scenario hazard maps. In a final step, the results of each single scenario are superimposed and transformed into one map which contains information about multiple scenarios.

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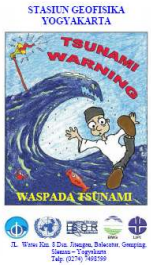
Progress and next steps: after the initial exercise in early October the mapping continued during Training V and VI.

The working groups have now finalized their base maps.

The maps are currently being verified in cooperation with UGM.

Early next year, the working process will continue with the discussion about different scenarios. It is planned to finalize the multi scenario tsunami hazard maps by February 2008. These maps will then serve as a basis for evacuation and contingency planning.



Knowledge & Awareness

GTZ-IS GITEWS has developed materials on Tsunami Early Warning and also reprinted other documents and materials developed by IOC-UNESCO and other organization which are considered as main references for Tsunami Early Warning Preparedness. The materials and documents aim to support the Pilot Areas initiatives in knowledge and awareness raising activities. In the future, hopefully those materials can be utilized by other tsunami prone areas as well.

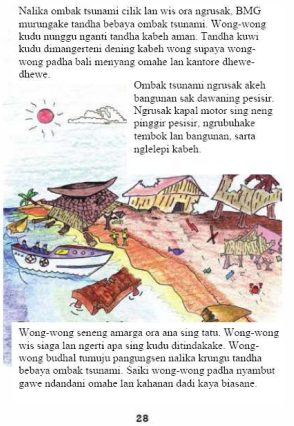
Tsunami kit

The project is developing a Tsunami Kit which shall provide sufficient information regarding Tsunami preparedness and the Early Warning System.

Five main topics are included in the Tsunami Kit: (1) general Q + A on Tsunami can be found in the form of Comic (developed by GTZ), Tsunami Glossary and Tsunami Teacher DVD (by IOC-UNESCO and ITIC). (2) monitoring & planning tools are provided in the form of Checklists. (3) public awareness tools in the form of poster, (4) experiences about local processes can be found in GITEWS Newsletter and (5) support documents including Legal Framework Assessment Report for the disaster management and Early Warning System as well as a pocket book on the Disaster Management Bill.

Tsunami Comic by GITEWS GTZ-IS

The tsunami poster produced by GTZ-IS titled "Whenever Tsunami Strike, We are Prepared" or "Kapanpun Tsunami Datang, Kita Siap Menghadapinya" has been reproduced in the form of Comic that can be used as one of tsunami knowledge references especially for students. The soft copy is available in www.jtic.org


Nalika ombak tsunami cilik lan wis ora ngrusak, BMG murungake tandha bebaya ombak tsunami. Wong-wong kudu nunggu nganti tandha kabeh aman. Tandha kuwi kudu dimangerteni dening kabeh wong supaya wong-wong padha bali menyang omahe lan kantore dhewe-dhewe.

Ombak tsunami ngrusak akeh bangunan sak dawaning pesisir. Ngrusak kapal motor sing neng pinggir pesisir, ngrubuhake tembok lan bangunan, sarta nglelepi kabeh.

Wong-wong seneng amarga ora ana sing tatu. Wong-wong wis siaga lan ngerti apa sing kudu ditindakake. Wong-wong budhal nunuju pangungsen nalika krungu tandha bebaya ombak tsunami. Saiki wong-wong padha nyambut gawe ndandani omahe lan kahanan dadi kaya biasane.

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Tsunami Warning Comic - Java Version by BMG Yogya

GTZ supported the initiative from BMG Yogya to translate the Tsunami Warning Comic into Bahasa Java. The comic was originally developed by IOC-UNESCO and ITIC. The Java version will be available by January 2008.

Training Module

GTZ has answered the need of the local stakeholder in Pilot Areas like local NGOs and other multipliers by developing a Training Module. The objective of the training is to provide basic knowledge on Tsunami Preparedness and Early Warning System. It comprises five main topics: Tsunami Hazard; Preparedness for Tsunami; TEW in Indonesia; International Cooperation; and Role of NGO. Aside from the module, the participants can learn from a support document in accordance to the above mentioned topics. The module has been applied three times in Bali with a group of teachers, a women group and local NGOs between November - December 2007.

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Padang Survey

On September 12 and 13, 2007 a series of heavy earthquakes that originated from the Sunda Trench off the coast of Sumatra struck Padang, the capital of West Sumatra Province.

At the beginning of November, GTZ-GITEWS conducted a fact finding mission in Padang in order to shed some light on the state of tsunami preparedness. The assessment focused on the experience with the first earthquake and consisted of two parts: Informal interviews were conducted with key actors and institutions and a survey that used a standardized questionnaire to conduct interviews with 200 citizens who were in the "red area" of the city of Padang at the time of the first earthquake.

Some preliminary recommendations based on the results from the survey are:

- Padang needs more channels to receive BMG warning messages
- Relevant actors have to have SOP's in place and an established decision making and communication structure.
- All involved organizations should be familiar with their exact task.
- Additional early warning dissemination devices to relay information to the community at risk are needed.

The documentation of the survey results will be available by the end of January.

Announcements

Project Review and Planning Workshop

In the framework of the German-Indonesian cooperation for the implementation of a Tsunami Early Warning System in Indonesia GITEWS, the German Technical Cooperation (GTZ-International Services) and their Indonesian Partners on the national and local level will meet for a two-day Planning-Workshop of the project **"Capacity Building in Local Communities"**.

The objectives of this workshop are:

- To review the **project strategy** and **progress** achieved so far
- Discussion of **tool development** as well as further **cooperation** with all our partners
- To provide a **forum for discussion** to address open questions regarding TEW on community level and the link to national institutions
- Outlook: **dissemination of experiences, tools** and **lessons learnt** to other communities in tsunami risk areas

Participants will come from pilot areas (Local Governments, Local NGOs and PMI), national partner institutions (RISTEK, LIPI, BMG, DKP, BAKORNAS, ITB, Home Affair) and international cooperation partners (GTZ-Germany, UNESCO, ISDR, ADPC, GRC, IFRC and GITEWS).

The workshop will take place from 28th to 29th of January 2008 in Sanur, Bali. A formal invitation will be distributed by mid January.

Third Team Building Workshop

Following the Project Review and Planning Workshop, the GTZ-IS team for Capacity Building in Local Communites will continue a team building workshop, from 30 of January to 2 of February 2008.

The first two days (30th and 31st January) will be together with our Local Partners and are dedicated to discuss the strategy and planning in the 3 Pilot Areas for 2008.

The following two days the GTZ-IS Team will internally discuss project strategy, knowledge management, road map 2008 and project support issues.

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Supporting Us:


Nurhayati (**Nur**)


Heike Balzer (**Heike**)


Sinta Dewi (**Sinta**)


Raffli Noor (**Raffli**)

Nurhayati **(Nur)**, nurhayati.nurhayati@gtz.de is working with GTZ-IS GITEWS since the beginning of December 2007 as Finance Officer. She has long years of extensive experience in administration and finance development and has been working with GTZ since 1998 in several projects all over Indonesia. In her spare time, she wants to continue her skills as an instructor of aerobic and body language.

Heike Balzer (**Heike**), heike.balzer@gtz.de Financial Controller - with a background in Business Administration - takes care of financial issues for GTZ projects in Southeast Asia and joined the GITWES project in 2006 as financial controller and since 2007 as project manager. Her main responsibility is the invoicing to the customer, budget controlling and project management in Germany.

Sinta Dewi (**Sinta**), Consultant, sintard@gmail.com. Sinta is a gender and development specialist. She is a short term consultant for GTZ assigned by CIRCLE Coops. Sinta involves in GITEWS for the documentation of the warning chain review process in Java. In her spare time, she writes gender and health related training modules and also articles that are published in national media.

Raffli Noor (**Raffli**), Consultant, afie_noor@yahoo.com has expertise in regional development. He is a short term Consultant for GITEWS, assigned by the Geography Faculty of UGM to assist Java Pilot Area to digitalise base maps and to document the process of base map development. In general, Raffli personally believes that when he gives the best he will receive the best in return.

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