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MASS MEDIA ROLE IN PROMOTION OF EDUCATION, AWARENESS AND SUSTAINABLE PREPAREDNESS FOR TSUNAMIS AND OTHER MARINE HAZARDS

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Several mega-tsunamis in the last decade have caused unprecedented deaths and destruction in many countries bordering the Pacific and Indian Oceans. Many other areas in the Atlantic Ocean and in the Caribbean and Mediterranean Seas remain highly vulnerable to future destructive events. To this day the entire world is still feeling the effects of the great tsunamis of 2011, 2010 and 2004. The combined impacts of tsunamis and of collateral hazards have caused hundreds of thousands of deaths and billions of dollars in damages. As a result, much attention has been given to planning for future tsunamis and for the collateral impacts of landslides, fires, hazardous material spills and nuclear plant accidents. In spite of the great attention that has been given, many regions of the world still remain unprepared and are highly vulnerable if similar disasters strike again. However, mass media can play a very important role in creating continuous awareness of potential threats and in achieving effective preparedness for tsunami and other marine hazards and thus minimize future losses of lives and destruction of property. Media contributions could include frequent educational programs, as well as anniversary tributes for the thousands of victims of the recent tsunamis. Such educational and commemorative programs, if repeated with frequency, will have significant long-term benefits for all the areas devastated in the past, would help enhance to a greater extent awareness and preparedness, but would also serve as paradigms in mitigating the future impact of tsunamis and other marine disasters. A multi media approach could be used in providing products for such Tributes – perhaps to be repeated annually and to serve as constant reminders of future potential disasters and of the need for adequate preparedness. Such effort could include photojournalistic exhibitions, picture handbooks and radio documentaries on disaster management. Multi media products – when completed - should receive distribution throughout the potential vulnerable areas, but particularly in the South East Asia region. Countries that would particularly benefit from mass media efforts would include the most

vulnerable countries, specifically: Japan, Philippines, Indonesia, Thailand, India, Bangladesh, Malaysia, Myanmar, Sri Lanka, Yemen, Oman, Maldives, Kenya, Tanzania, Seychelles and South Africa. In summary, this presentation provides strategies, guidelines and integrating programs that mass media can employ to help ensure that local actions are taken that would enhance marine disaster education and of factors related to preparedness, overall resiliency and post-disaster recovery.

1. INTRODUCTION

The great destruction caused by tsunamis in the 20th Century (1946, 1952, 1957, 1960 and 1964), focused attention to the need for a Tsunami Warning System that now provides prompt warnings to the countries bordering the Pacific Ocean. However, in the last ten years of the new millennium, there has been unprecedented destruction from tsunamis in Indonesia (2004, 2005, 2006, 2007), the Solomon Islands (2007), the Kuril Islands (2006, 2007), Peru (2001, 2007), Chile (2010), Samoa (2009) and Japan (11March 2011) (PARARAS-CARAYANNIS, G., 2005AB; 2007B; THANAWOOD ET AL., 2006; O'LEMMON, M., 2013). The tsunamis and the other marine disasters resulted in the deaths and loss of almost half a million people and had tremendous social and economic consequences. Most of these disasters were reported and covered by the mass media to a varying degree, both locally and globally. The 2004 tsunami was responsible for most of the deaths and destruction in the countries bordering the Indian Ocean. Figure 1 shows the areas in Thailand that were severely impacted.

Figure 1. Areas in Thailand Affected by the 2004 Tsunami

The 26 December 2004 tsunami in the Indian Ocean was a wake-up call for IOC member states that tsunamis in the Indian Ocean can be extremely catastrophic. The 2011 tsunami in Japan was another wake-up call reminding that even countries with well-established warning systems and programs of preparedness, remain extremely vulnerable. As a result of these catastrophes, governments became more aware of the urgent need to provide additional protection to vulnerable communities, coastal resources and infrastructure from tsunamis and a variety of other natural marine hazards. Public safety became a high priority issue and tsunami and other marine, multi-hazard warning systems have been contemplated. However, to be effective, the envisioned systems need to respond effectively to both local and distant tsunamis and other marine hazard threats, by incorporating civil defense preparedness, as well as essential elements of monitoring, communications, warning, mitigation and rapid post-disaster recovery. Also, communicating and disseminating effectively and rapidly warnings and educational information requires commitment and active participation by the mass media. Although great progress has been made in involving the mass media in such cooperative efforts, much more remains to be done to achieve better public education about tsunamis and other marine disasters and to maintain sustainable programs of civil preparedness.

In this present study – and as illustrated by Figure 2 - we provide as a paradigm, a critical review of the role that mass media and educational institutions can play in making society more aware of the threat of tsunamis and of actions that must be taken to minimize future harmful impacts – particularly for the countries bordering the Indian Ocean.

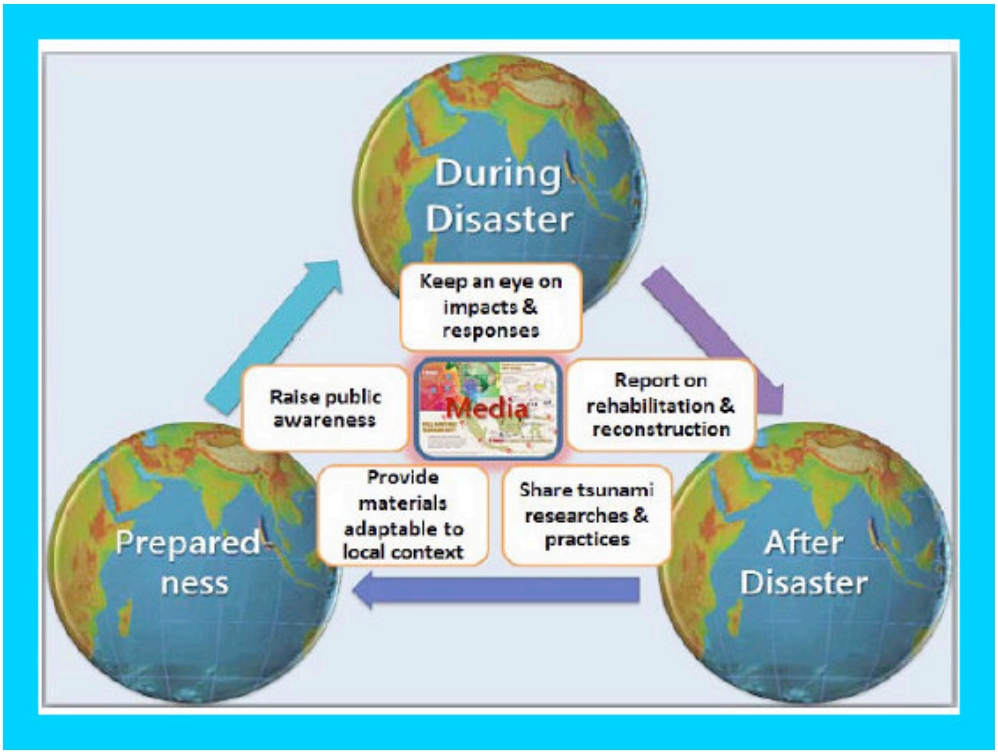


Figure 2. Media Roles in the 2004 Tsunami Disaster (Modified after NITSMER, S., 2013).

Specifically, we focus on the role of mass media during the 2004 tsunami and in the post-disaster period and concentrate on the following issues:

1. Mass media knowledge and awareness of facts and information about tsunamis prior to the 2004 disaster.
2. Media role in communicating effectively tsunami information and warnings to potentially vulnerable communities during the 2004 disaster.
3. Media role in public education and in providing solutions for rehabilitation of people in adversely impacted communities, in the post-disaster period.
4. Long-term role and effectiveness of the media in continuing to communicate information for sustainable preparedness and rehabilitation of vulnerable communities.

2. ROLE OF MASS MEDIA IN THE GREAT SUMATRA EARTHQUAKE AND TSUNAMI OF 26 DECEMBER 2004

The great Sumatra earthquake and tsunami of 26 December 2004 was one of the greatest natural disasters in human history. The tsunami devastated coastal communities bordering the Indian Ocean, killing thousands of people. Eighteen (18) countries were affected. These were: Indonesia, Thailand, India, Sri-Lanka, Malaysia, Myanmar, Bangladesh, Maldives, Reunion Island (French), Seychelles, Madagascar, Mauritius, Somalia, Tanzania, Kenya, Oman, South Africa and Australia. It was one of the deadliest natural disasters in modern history with tsunami waves ranging up to 30 m (100 ft)(PARARAS-CARAYANNIS, 2005A).

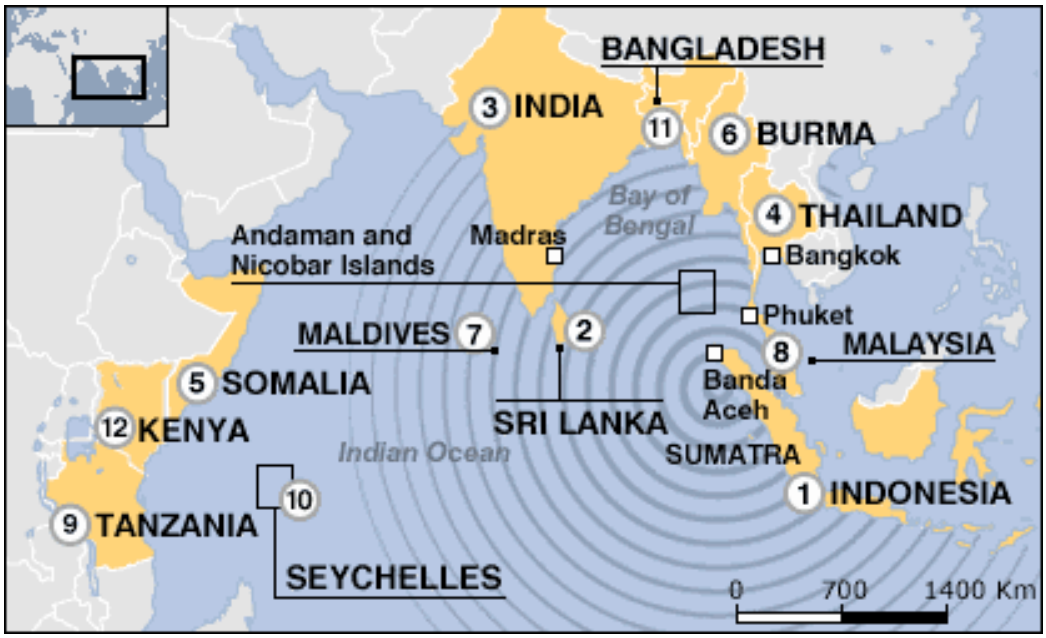


Figure 3. Countries in the Indian Ocean affected by the 26 December 2004 tsunami (source: BBC)

Although many seismic networks recorded the massive earthquake, there was no warning system operating in the Indian Ocean and no data was available from tide gauges or other wave sensors to provide confirmation as to whether a tsunami had been generated and thus issue a warning. Even though the first tsunami wave after the earthquake struck Sumatra in 10 minutes, Thailand in 1 hour, Sri Lanka in 2 hours, India in 2 hours and East Africa in about 7 hours, there was no established communications network or organizational infrastructure to pass effectively a warning of any kind directly or through the mass media – the latter only reported subsequently on the impact of the tsunami. Most of the victims in Sumatra who felt the strong ground motions of the earthquake, did not even realize there was a threat of a tsunami and did not run to higher ground because there had been no program of public education related to the hazard by the authorities or by the mass media. However – and as documented in subsequent sections of this report - the mass media assumed subsequently a major role in the post-tsunami rehabilitation efforts. Furthermore, through effective and essential communication, the media helped inform and educate people about the tsunami hazard - thus enhancing their awareness and the need for disaster preparedness.

2.1 Mass media knowledge and awareness of facts and information about tsunamis prior to the 2004 disaster.

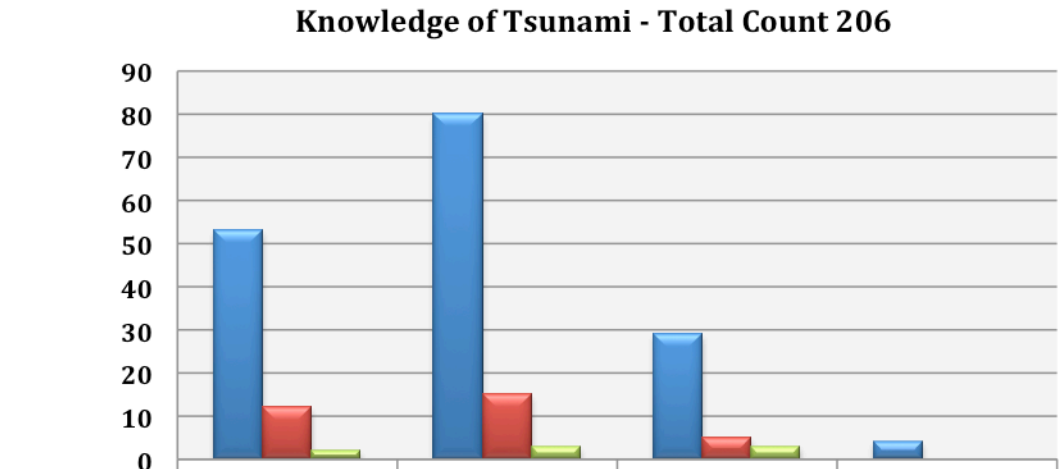
Apparently, none of the broadcasters of the local media in the affected countries bordering the Indian Ocean had sufficient knowledge and awareness of facts and information related to tsunamis prior to the 26 December 2004 disaster. The main reason for this lack of understanding was that up to that time, tsunamis were not believed to pose a serious threat in the Indian Ocean region. However in the post-disaster period, the media assumed an important role in helping with education, rehabilitation and recovery. We will now review briefly this role in reporting the 2004 tsunami impact, by focusing on Thailand and in bringing attention to the extent of damage, disorder and confusion it caused to local residents and visiting tourists in Phangnga and Phuket – the worse impacted provinces (Fig. 1). Also, we will briefly review the mass media's role during the post-disaster period for certain areas in Indonesia, India and Sri-Lanka and the benefits that resulted from the extensive coverage.

2.2 Media role in communicating effectively tsunami information and warnings to potentially vulnerable communities during the 2004 disaster.

In Thailand, as stated, the first tsunami wave took about one hour to cross the Andaman Sea and reach the offshore islands and the coasts of Phang Nga and Phuket provinces. In spite of the fact that Thailand is an IOC member of the Pacific Tsunami Warning System, there was no standard operating plan for this part of the country along the Andaman Sea to disseminate a tsunami warning and no timely information was provided by the local or global media. Subsequent, media coverage was not sufficient or specific to warn and save lives. Furthermore, there was not established program of public education to familiarize local people or visiting tourists about what to do if a tsunami occurred. Media and private video and eyewitness reports demonstrated this ignorance of the tsunami threat. A subsequent survey in Khao Lak indicated low level of understanding among the Thai residents, but a

much better understanding among the Europeans and other Westerners vacationing in this region. Most foreigners and Thais did not think the Andaman Coast was dangerous in terms of natural disasters.

Most of the resident victims did not have even a fundamental understanding, did not react quickly when the water begun to withdraw along the beaches, were not aware of the imminent danger and became quickly disoriented and overwhelmed as the disaster unfolded. However, some videos and eyewitness testimony also revealed that some degree of order could be found – even in the midst of chaos – by some of the people that possessed knowledge of the tsunami threat (Fig. 4) (O'LEMMON, M., 2013).



	High Knowledge	Medium Knowledge	Low Knowledge	No Knowledge
Euro/West	53	80	29	4
Thai	12	15	5	
Other Asian	2	3	3	

Figure 4. Survey results of tsunami understanding in Khao Lac (after O'LEMMON, M., 2013).

2.3 Media role in public education and in providing solutions for rehabilitation of people in adversely impacted communities, in the post-disaster period.

In the post-disaster period and as information begun coming in from the disaster zones, both the international and local mass media begun to reconcile it with technical analysis provided by interviewed experts. As stated and although commendable, such media reporting and coverage came a little too late to be of value in saving lives from the actual disaster. However, immediately following the disaster, mass media coverage and reporting improved considerably and was constantly checked against objective scientific scrutiny, thus it provided clarity in the midst of chaos and contributed significantly to a greater degree of evolving order. Continuous media coverage contributed significantly to public education and to post-disaster rehabilitation of the people in the adversely

impacted communities of all the countries bordering the Indian Ocean. Furthermore, media analysis of the disaster was instrumental in alleviating anxieties of survivors and of those who lost friends and relatives. Also, it was important in creating a greater degree of awareness and understanding of earthquake-generated tsunamis when a subsequent event occurred near Padang, in Sumatra on March 28, 2005 (PARARAS-CARAYANNIS, 2005B).

In India, after the 2004 tsunami struck, television programs played a major role in communicating information for tsunami rehabilitation (PARARAS-CARAYANNIS, 2007A). For example, surveys on media effectiveness reported that 83% of respondents found that news bulletins were particularly helpful during and after the tsunami struck, by constantly updating needed information. In the state of Tamil Nadu, one of the worse affected provinces of India, people faced many problems due to lack of information and of awareness about available resources. Their lifestyles had been totally altered by losses of relatives, of their homes and properties and by the disruption of their daily life activities. To alleviate the problem, government authorities in Tamil Nadu and elsewhere coordinated with the media for the dissemination of useful information. The national television channel "Doordharsan", as well as certain local regional channels, specifically telecasted documentary material about tsunami-related issues and a special program of tsunami rehabilitation. Thus, the mass media became the main and essential form of communication for such people who were in search of survivors and for ways to meet their basic needs for food, shelter and safety. By assuming this additional responsibility, the media played a major role by communicating to the public information about tsunami hazards and of ways to mitigate their impact with better understanding and preparedness. Through its superior ability to communicate effectively information, the media became the role model in helping people make decisions for their own welfare (JOTHI & NEELAMALAR, 2011). Furthermore, it assisted with the creation of the fast tracked Self Help Groups (SHGs) and the manipulation in membership in different groups and their accommodation in temporary shelters. The media revealed that such shortcomings existed and emphasized the need for government, policy-level changes and improvements to correct inequities of discrimination and particularly to improve conditions for the victimized women (JOTHI & NEELAMALAR, 2011).

During and after the 2004 tsunami disaster, a similar role was assumed by the media in other impacted countries bordering the Indian Ocean by providing support and by contributing vital information for disaster relief. The mainstream media's role and responsibilities expanded in helping the victims by communicating essential information pertaining to the tsunami hazard. The media provided good coverage of issues and of specific problems in each impacted region - thus influencing government and non-governmental organizations to act promptly to help improve the economic status of people victimized by the tsunami. As a result of media help and of government financial support, people in the impacted communities were able to cope with the hardships, improve their lives and enjoy closer family relationships. However, as we will further comment in the following section, there is still room for changes that policy-makers must act upon to improve further the conditions for groups of people victimized by disasters – in general - and to improve on sustainable tsunami preparedness.

2.4 Media role and its long-term effectiveness in continuing to communicate information for sustainable preparedness and rehabilitation of vulnerable communities.

In subsequent years following the 2004 disaster, media coverage continued to play even a more significant role in reducing anxiety levels of people in the impacted regions. Such coverage provided public education, which turned a crisis event into a learning experience for the affected communities. Technical experts explaining what previously had been for most people in the region an enigmatic and mysterious natural disaster substituted the initial, generic and random newsfeeds with more informed and measured reports. The lower anxiety levels, coupled with the higher levels of knowledge about tsunamis made the threat more understandable and credible, but also provided instructions on how communities could mitigate future impact.

Also, mass media played a significant role in the perception of modernization and helped significantly by including messages on job opportunities. In fact, because of such exposure to the media many respondents got jobs or other economic help from Government and NGOs. Finally, the media coverage of humanitarian crises influenced charitable giving after the disaster. Using Internet donations after the 2004 tsunami as a case study shows that the media coverage of the disaster had a dramatic impact on donations to relief agencies. (BROWN AND MINTY, 2004).

3. STRATEGIES, GUIDELINES AND INTEGRATION OF MASS MEDIA PROGRAMS IN SUPPORT OF ENHANCING MARINE DISASTER EDUCATION, PREPAREDNESS, OVERALL RESILIENCY AND POST-DISASTER RECOVERY.

Although the occurrence of an earthquake and ensuing tsunami cannot be prevented, the magnitude of catastrophic impacts in terms of loss of life and livelihoods, destruction of property and environmental damage can be kept within reasonable limits through an integrated approach to disaster management and public education, which must also include active mass media participation.

3.1 Implementation of Tsunami Management Strategies

The progress made after 2004 in planning for future tsunami disasters has been described in several published articles including those in Tsunami Society International's journal "Science of Tsunami Hazards" and reported at recent Symposiums of the Society in Toronto (2010) and Ispra, Italy (2012) (THANAWOOD ET AL., 2006; JOTHI & NEELAMALAR, 2011; MUHARI ET. AL., 2012; WEERASINGHE ET AL., 2012; LUBKOWSKI ET AL., 2009; CLERVEAUX ET AL., 2008). Review of this and other literature after the 2004 disaster, indicates that the implemented planning and strategies varied from country to country but encompassed four different but related aspects, specifically: mitigation or prevention, preparedness, response and recovery.

To use again Thailand as a paradigm, the government established the National Disaster Warning Center to receive, monitor, process and relay information pertaining to natural disasters and issue a warning in such an event (UN, 2006). The preparedness program incorporates extensively the

help of the mass media and the Internet, in disseminating advisory and warning information to the public (Fig. 5). Furthermore, the government adopted and implemented vulnerability reduction programs primarily in two areas: disaster mitigation of an area's susceptibility to the impact of tsunami hazards and preparedness to build tsunami resilient communities. The implemented programs include primarily:

1. Land use planning - with emphasis on protecting critical facilities such as schools, hospital, hotels or high occupancy buildings or relocating existing tourism facilities, shrimp farms and aquaculture infrastructure located in areas at risk.
2. Incentive packages and attractive livelihood opportunities to encourage coastal communities to abandon settling in vulnerable locations, particularly along low-lying areas of the coast.
3. Maintenance of environmental and ecological stability of the coastal areas through the enrichment of mangrove and beach forests to act as the first line of defense from tsunami waves and rehabilitation of lost and degraded coral reefs and sea grass beds to help stabilize the coastline and prevent beach erosion.
4. Reconstructing coastal dunes to act as barriers against tsunamis and storm waves, creating buffer zones to protect coastal communities and establishing buffer strips planted with mixed vegetation.

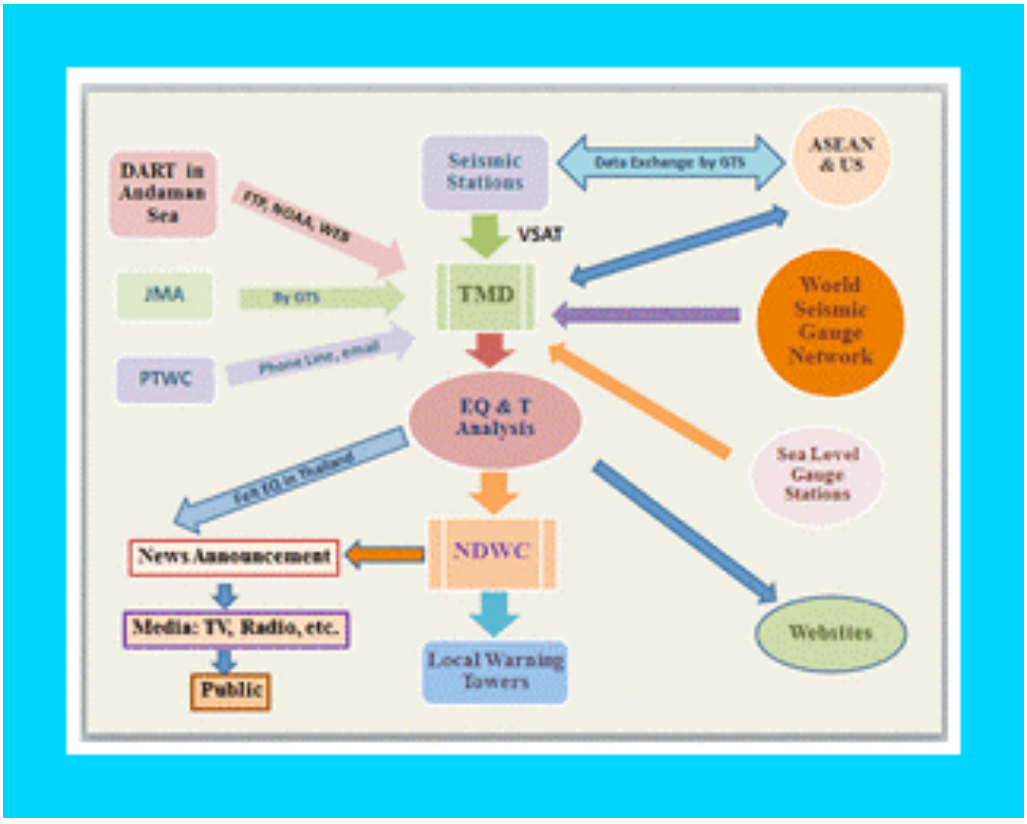


Figure 5. Tsunami preparedness in Thailand, which includes active role of the media, and the Internet in the dissemination of tsunami advisories and warnings

Additional measures of tsunami preparedness included the installation of a local tsunami warning system, which incorporated siren towers at popular and crowded beaches and offshore tsunami warning sensors in the most vulnerable provinces along the Andaman coastline. Also included were school and university education programs for vulnerable coastal communities about the tsunami hazard and detailed plans for drills and emergency evacuation. The tsunami preparedness program includes publishing and distribution of brochures, posters and calendars, as well as recommendations to radio and television media for announcements to raise public awareness (Fig. 5). Finally considered was the construction of a tsunami memorial to commemorate areas devastated by the 2004 tsunami.

Additionally important for tsunami and other marine disaster mitigation is the building and maintenance of protective coastal structures such as seawalls and frequent testing of the efficiency of the information dissemination system and of the population's willingness to promptly evacuate to safer areas when a threat is imminent. Therefore, the goal of sustainable tsunami disaster mitigation is to encourage coastal residents to evacuate quickly through the provision of disaster education and the relay of disaster information in a manner comprehendible by all groups - which can be effectively accomplished only with the help and cooperation of the mass media.

Since 2004, some of the vulnerable countries bordering the Indian Ocean have made considerable progress in achieving higher levels of cooperation with the media in disaster education and strategic planning. However, other vulnerable countries have fallen behind in such efforts. For example, in Sri Lanka, the majority of post-disaster villages/settlements and projects are apparently lacking behind the needed safety measures and adequate procedures of evacuation. For example, many coastal villages in Indonesia, India (Fig. 6), Sri-Lanka (Fig. 6), Malaysia, Myanmar, Bangladesh, Maldives, Reunion Island, Seychelles, Madagascar, Mauritius, Oman Somalia, Tanzania and Kenya, are inadequately prepared and remain highly vulnerable to future tsunamis. Sustainable tsunami and other marine disaster preparedness require a more active role and participation by the mass media. Therefore, it is important that proper safety measures be emphasized by the authorities and the media in order to mitigate the impact of future tsunami hazards.

Additionally, safety measures that must be emphasized and promulgated to the public by the local governments and the media include better assessments of risks, better land use management policies, development of safer building codes and improved evacuation measures when a warning is issued. Such measures through land use planning strategies could be applied more easily at the local community level, and then expanded. In addition to the strategic development methods of functional networks of evacuation routes and shelters the local topographies must be examined for each potentially vulnerable community – perhaps through the use of GIS and remote satellite technology.

Comprehensive land use planning must address the overall and long-term issues of the community and establish an overall framework for the physical development of a region, municipality, city or village. Comprehensive planning is defined as a process that incorporates land use and physical planning which has been recommended for Sri Lanka (Fig. 7) (WEERASINGHE ET AL., 2012) but not yet implemented.

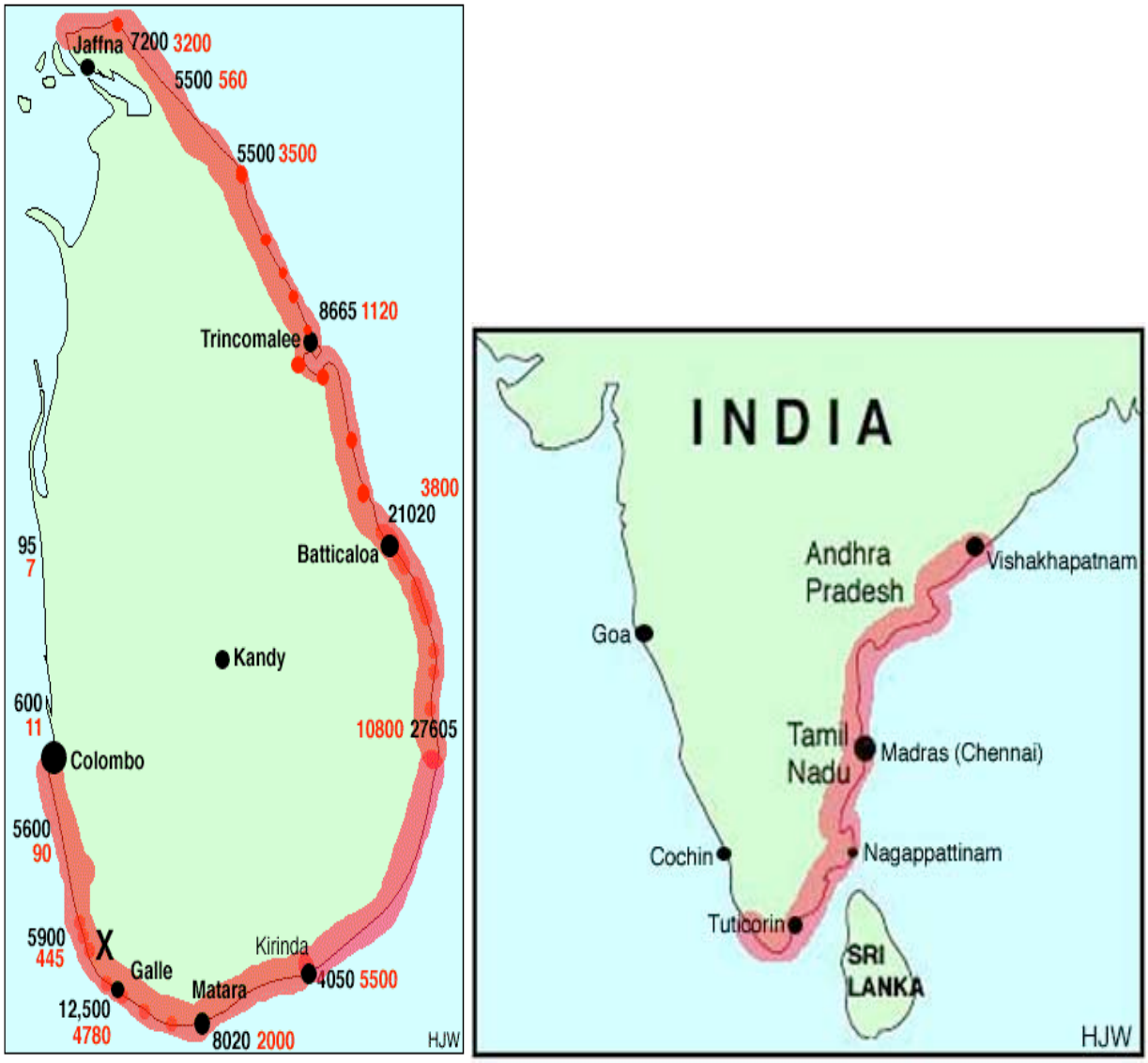


Figure 6. Coastal Areas of Sri Lanka and India still vulnerable to future tsunamis and in need of help for media dissemination of warnings and programming that will help with sustainable tsunami and other marine disaster preparedness.

For most countries bordering the Indian Ocean vulnerable to the tsunami hazard, there are still numerous remaining problems. To use Sri Lanka as an example, the use of zoning in proposed warning levels could be more systematic (WEERASINGHE ET AL., 2012). Furthermore, there is a need to designate evacuation routes, establish shelters and to identify existing tsunami resistant buildings where vertical evacuation may be possible.

Figure 7. Introduction of Village/Community Level Strategic Land-use Planning for Coastal Communities in Sri Lanka (after WEERASINGHE ET AL., 2012).

3.1.1 Formulation of mitigation concept in Pacitan Town, Sumatra

In order to strengthen the capacity of local governments in developing a sustainable, multi-level approach in tsunami preparedness and mitigation after the 2004 disaster, the German Indonesian Cooperation on Tsunami Early Warning System (GITEWS) begun a project in the town of Pacitan, in Indonesia named "Project for Training, Education and Consulting of Tsunami Early Warning System" (PROTECTS). Figure 8, illustrates the standard operating plan that must be used to achieve these goals. Although the project shows the need for awareness of the tsunami hazard and risks and outlines a plan for warning and evacuation of the population at risk, unfortunately, does not include any reference to the significant role that the media can play in such multi-level preparedness efforts.

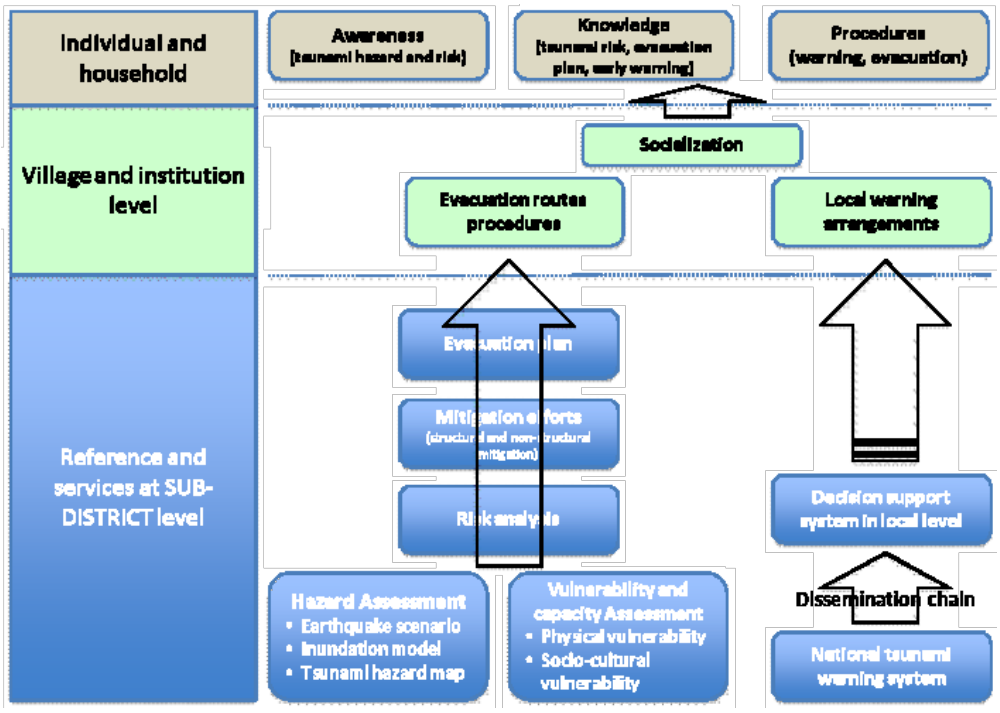


Figure 8. Multi-level approach to strengthen tsunami preparedness (modified from GIZ-IS, 2010)

Apparently in Thailand - as illustrated by Figure 9 – the institutional roles and responsibility for early warning, disaster risk reduction and sustainable recovery, includes an active role by the media.

Figure 9: Institutional Roles and Responsibility in the Thailand EWS (UNDP (2009) Institutional and Legislative Systems for Early Warning and Disaster Risk Reduction: Thailand, Regional Program on Capacity Building for Sustainable Recovery and Risk Reduction.

3.1 Media Participation in Tsunami Management Strategies

Generally, tsunami disaster management and strategies - in all impacted countries bordering the Indian Ocean - focused primarily on emergency period response and on post-impact recovery but without sufficient emphasis on the role that the media can play in achieving public education, compliance with warnings and long-term, sustainable tsunami preparedness. Following the 2004 tsunami disaster, it became apparent that a limited disaster management approach is not sufficient to cope with the threat from a tsunami catastrophe in the future. Much greater emphasis must be given to mitigation, to long-term preparedness and to the needed co-operation with mass media to expand its role by including additional programming. In the future, the mass media have key roles to play in enhancing these goals and the overall resiliency and post-disaster recovery when a tsunami or other marine disasters strike. This role became clearly evident in Japan when the 2011 earthquake struck the Island of Honshu – a region presumably well prepared for tsunamis. Because of the higher awareness of the tsunami threat in Japan – due to media coverage - immediately after the earthquake, school

children evacuated to higher ground, with middle school students leading the younger ones to safety. However, many people also died because they did not take the warnings seriously and delayed evacuating. There were many other lessons learned from the 2011 tsunami disaster in Japan. Following the disaster and based on video data, NHK television began studying why and where people did not evacuate. The video showed footage broadcast at the time of the tsunami, from the moment when coverage of a session of parliament was interrupted by the announcement of the earthquake, to the first tsunami warning four minutes later and calls made to viewers in affected areas to evacuate to higher ground. Good television coverage helped identify problems in preparedness and in warning responses.

Indeed, the primary goal is the development of effective warning systems and evacuation strategies. However, in spite of progress made in tsunami preparedness in the countries bordering the Indian Ocean, a review of the literature - as discussed earlier -indicates that no sufficient inclusion in planning has been made on the greater role that mass media can play in achieving long-term goals within the context of risk information and communication. Figure 10 illustrates the synergistic cooperation for the established National Early-Warning Tsunami Alert System in Indonesia, which however, does not show a role by the media in the dissemination of the warning.

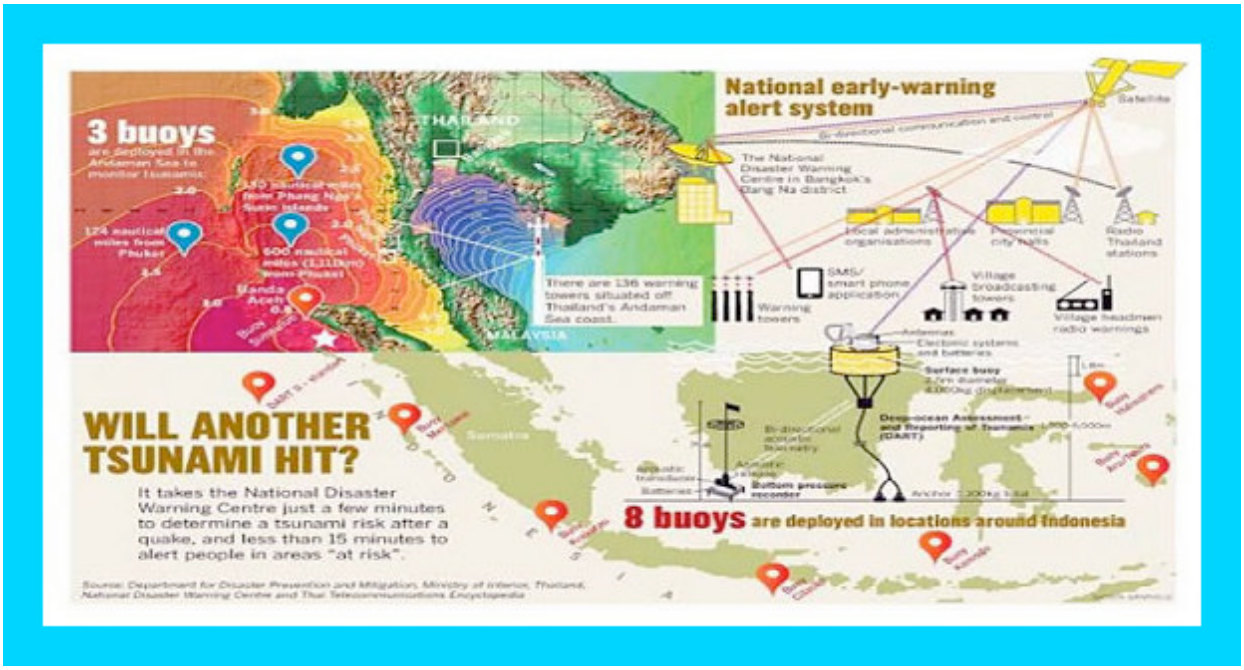


Figure 10. National Early-Warning Tsunami Alert System in Indonesia

The mass media - with its broad reach and power - played a very important role in improving the life styles of the people impacted by the 2004, 2005, 2010 and 2011 tsunamis. More important during the first, critical post-disaster week period, was the media's role in helping accelerate a more rapid response to medical emergencies (BARGEN, 2012). Similarly, mass media communications in the

countries bordering the Bay of Bengal helped somewhat reduce the number of victims from other subsequent disasters such as tropical storms, cyclones and flooding surges. However, it should be reemphasized that progress in media communications should not be limited in helping only during disaster periods but should be expanded to help improve long-term preparedness for future events. The media can assist in long-term efforts of public education by broadcasting special documentaries and visual, three-dimensional GIS presentations. Additionally, the media could establish yearly tributes for the victims of the 2004 Asian Tsunami and of victims of other marine disasters to be distributed to all the countries that were impacted. Sustainable society development with emphasis on safety from all types of disasters should be an extensive and substantial process that needs to be continuously supported by the mainstream media, by local governments and by international organizations.

4. CONCLUSIONS

Tsunami vulnerability assessment requires analysis of the underlying factors that determine the likelihood of damage and the loss of life during and after an extreme event. Risk information is a crucial precondition in the implementation of tsunami preparedness strategies for local communities. Risk knowledge within this framework specifically refers to the knowledge of probabilities of hazard distribution along a coast and the disaster's impact on infrastructure. The mass media should be included in the implementation of tsunami preparedness strategies and land-use planning for local communities, which must address both risk mitigation measures and safety evacuation procedures. Active collaboration among the disaster mitigation agencies and the mass media will result in much safer coastal communities.

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