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1st Working Group Meeting of the International Platform on Earthquake Early Warning Systems (IP-EEWS)

Coordinated by the Earth Sciences and Geohazard Risk Reduction Unit

7- 8 December 2015, UNESCO Headquarters

Meeting Report

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Earth Sciences and Geo-hazards Risk Reduction

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Location

7 December 2015: closed technical session, Room 1.1005 (Fontenoy)
8 December 2015: information session, Salle XVI (Miollis)

Participants

Member States: Azerbaijan, Chile, China, Congo, Denmark, France (Minister of Education), Japan, Kuwait, Philippines, Republic of Korea, Saudi Arabia, Serbia, Switzerland, Turkey.

Experts scientific committee: Hoshiba Mitsuyuki (Japan), Armando Cuellar (Mexico), Constantin Ionescu (Romania), Richard Allen (USA), John Clinton (Switzerland), Can Zulfikar (Turkey), Aldo Zollo (Italy), Stefano Parolai (Germany), Li Li (China), Elisa Buforn (Spain)

Others: Neil McFarlane - Chief of the Regional Programme and Disaster Risk Reduction Section (UNISDR), Jonathan Fouler (UNISDR), Janise Fabricilis (Mexican Science and Technology Representative)

UNESCO Secretariat: ADG/SC, Dir/SC/EES, Chief/SC/EES/EGR, SC/EES/EGR

For detailed name and contact information on attendees see Appendix 1.

Meeting summary report

Day 1 – Closed technical session

During the first day (7 December) of the International Platform on Earthquake Early Warning Systems (IP-EEWS), the meeting was held in a closed session between the scientific experts and the UNESCO Secretariat. Director of the Ecological and Earth Sciences Division, Han Qunli, gave opening remarks stressing the importance that earthquake early warning not only represents the forefront of scientific research in geo-hazards and disaster risk reduction, but also provide a key part in reducing casualties and economic losses, objectives that are closely in line with the Sendai Framework of Actions.

Chief of Section, Earth Sciences and Geo-Hazards Risk Reduction, Patrick McKeever presented the work at UNESCO in the field of geo-hazards under the newly reformed International Geoscience and Geoparks Programme (IGGP). Programme Specialist, Alexandros Magakarigakis, gave an overview of the various activities within the Disaster Risk Reduction (DRR) unit. Several programmes and activities within both IGGP and DRR were identified (IGCP, GGN, IPRAD, ENHANS, etc.), as to provide opportunities for highly complementary collaboration in supporting research, education, and public awareness to the on-going efforts of the scientific community in earthquake early warning and with this new IP-EEWS initiative.

Alexandros Makarigakis presented an overview of the framework of IP-EEWS, in which the creation of this international platform for collaboration aims to enhance knowledge sharing, facilitate policy interface, raise awareness, and help secure additional funding to institutions developing earthquake early waning systems (EEWS). International efforts and activities of the IP-EEWS will then directly respond to the need strengthening communities' preparedness and resilience against earthquakes in earthquake-prone regions. Partnerships and collaboration are to involve the scientific community, institutions, national agencies, local stakeholders, UNESCO Secretariat on DRR, and Member States. The main objectives are to:

1. Provide an international platform of knowledge sharing between scientists, policy makers, and engineers from public and private sectors.
2. Strengthen cooperation between active groups developing EEWS worldwide.
3. Provide assessments of the current capacities and gaps both in the technical and implementation aspects of EEWS that can be adapted to policy guidelines and inform Member States in earthquake hazards preparedness using EEWS.
4. Build scientific and technical capacities of institutions and/or agencies in strengthening reliable, accessible, transparent and coordinated EEWS for disaster reduction.
5. Assist and support the development of new EEWS in developing countries.
6. Promote and help secure additional funding to strengthen the development of EEWS at the local/regional level.
7. To develop a framework for coordinating observation systems and sharing seismic data among neighbouring countries in earthquake-prone areas.

8. To promote and coordinate public awareness activities that complement EEWS in building resilient communities to earthquake disaster.

Through the first day, the experts of the IP-EEWS working group presented in details development of earthquake early warning systems (EEWS) in their country or in collaboration with other countries. Each presentation provided the opportunity for the experts and UNESCO Secretariat to assess the various efforts and levels of development/implementation around the world in the state of art of earthquake early warning systems lead by the various institutions, agencies, and laboratories (*see minutes of presentations for additional details; Appendix 2*).

Fully operational EEWS are being implemented in Japan, Mexico, Romania, Turkey, and Taiwan capable to provide alerts in real time. Japan and Mexico both provide EEWS to the public and private end-users. Romania, Turkey and Taiwan do not provide EEWS to the general public at the moment, but are capable to send alerts to the emergency services, gas pipelines, sensitive industries, railways, and transportation services. Japan is currently the most advanced in implementing EEWS, with proven success in generating early warnings for multiple earthquakes and great public support, particularly following the Tohoku 2011 earthquake. Taiwan is presumably also at an advanced stage of EEWS, but no experts at the meeting were directly involved with the Taiwanese efforts in EEWS.

In California, its EEWS has proven to successfully detect and send alerts in real time, but at the moment its system still remains under testing with private end-users. The local railway system of San Francisco Bay Area (BART) is the only active end-user utilizing the alert to implement an automatic shutdown. In Switzerland and Southern Italy, their EEWS have proven to be capable and accurate in testing modes, but with no current end-users. In China, there is a nationwide major undertaking to create one the densest instrumental seismic network in the world within a fully operational EEWS in the next few years, but at the moment its development remains in testing mode.

In southern Spain and southern Portugal, initial developments are underway to create a regional and cross border Iberian-Maghreb EEWS. Other areas where EEWS is being developed are in New Zealand, Israel, Greece, Iceland, Pacific Northwest USA (Oregon and Washington), British Columbia, and Central Asia (Kyrgyzstan, Kazakhstan). In Africa and Central America, there are some efforts underway to conduct feasibility studies and build up the local instrumental seismic networks.

In terms of the technical aspects, improvements in EEWS are still needed to reduce the number of false alerts, and to reduce the potential mismatch between predicted and observed intensity for particularly large earthquakes. Mobile application technology is anticipated to provide major breakthrough in delivering a low cost earthquake early warning to the public, and to regions where dense seismic network is not available. In the application aspects, consensus of the some of the major challenges and unresolved questions to move EEWS forward in many countries are issues related to reliability and trust of the systems; legal responsibility to whom provide earthquake early warnings to the public; lack of international collaboration and data exchange; insecurity of political support and agenda; and most of foremost lack of funding.

Day 2 – Information session with Member States

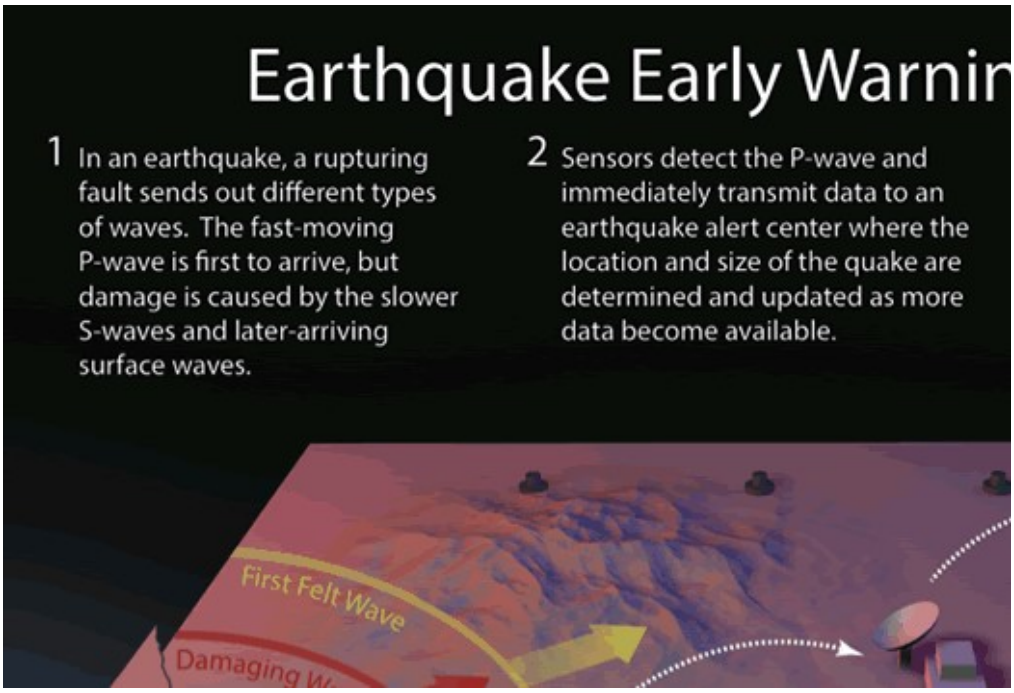
During the second day (8 December), the meeting was held in two parts, first as an information session to the Member States, and second with panel sessions discussing the way forward of IP-EEWS, to define its overarching mandates, objectives, and key priorities.

In the information session, the UNESCO Assistant Director-General to the Natural Sciences, Flavia Schlegel, provided opening remarks. She highlighted that Disaster Risk Reduction is valued as an extremely high priority at the international level. In New York, with the 2030 Agenda for Sustainable Development adopted by the Member Sates, one of the 17 goals specifically addresses the need to make cities inclusive, safe, resilient and sustainable. In Sendai, the Sendai Framework for Disaster Risk Reduction called for holistic disaster risk management at all levels. Hence she strongly believes that through the work of UNESCO Disaster Risk Reduction (DRR) activities and international collaboration, this IP-EEWS working group can be a successful and powerful catalyst to promote earthquake early warning as a major scientifically and technological breakthrough, as well as playing a key part to respond to the demand of the Member States.

The information session was then chaired by the Chief of Section, Earth Sciences and Geo-Hazards Risk Reduction, Patrick McKeever, which was followed by a series of presentations from the scientific experts on EEWS, and interventions from UNISDR representatives and the Member States during open floor discussions. Neil McFarlane, Chief of the Regional Programme and Disaster Risk Reduction Section (UNISDR) provided some remarks on behalf on Margareta Wahlstrom, UN Special Representative of the Secretary-General (SRSG) for Disaster Risk Reduction, supporting this important initiative on EEWS aimed to save lives which builds on the past extensive work of UNESCO in Disaster Risk Reduction for many years. Neil McFarlane reminded that early warnings against natural hazards were specifically noted and approved by the Member States as an important priority in science and technology within the Sendai Framework of Actions. UNISDR confirmed its strong support to the efforts of this initiative to improve earthquake early warning, which is dependent on the access to high quality data (the UN system can play a key role in the quality standards and reliability); rapid communication technology to provide alerts quickly to people on the ground; and finally to have multi-hazard applications in early warning (i.e. tsunamis, landslides).

Concept of EEWS

Prof. Richard Allen, Director of the Berkeley Seismological Lab at the University of California – Berkeley, USA, provided the first presentation, with an overview of the concept of earthquake early warning, and its effectiveness, but also its limitation. Earthquake early warning is not prediction, but consist of providing a warning as soon as the earthquake occurs, to give an alert to communities located away from the epicentre. Utilizing sensors located close to the source, and analysing the initial seismic signals, to determine whether a large earthquake is occurring, an earthquake early warning system (EEWS) then rapidly send an alert given a certain threshold to target city. Warning can be from seconds to 10's of seconds, to a few minutes, depending how far the initial earthquakes epicentre occurs from the target warning locations.



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Current developments and/or implementations of EEWS worldwide

- ***USA***
  Prof. Richard Allen then gave a brief overview of the EEWS in Western USA, and particularly of the system ShakeAlert in California, which is currently not a public system, but only in testing phase. The earthquake early warning system utilizes mainly Elarms (P-wave based point source algorithm), which is a proven technology with alerts generated as quickly as 3 seconds after the earthquake is first detected. For instance during the 2014 Napa earthquake, ShakeAlert successfully generated an alert to the San Francisco Bay Area. However, alerts are only sent out to private users at the moment, such as local railway

transportation system (BART), emergency services, petroleum industry (i.e. British Petroleum), and local major industries. A mobile application (MyShake) of EEWS is also being developed and tested, and is expected in the next few years to provide a low cost and effective method to send alerts to the public, particularly for a region where dense seismic network is not available.

- ***Spain, Maghreb region***
  Prof. Elisa Buforn from the Universidad Complutenses Madrid, Spain, presented the on-going efforts to develop a regional Iberico-Maghreb EEWS, given the close proximity of seismically active areas of southern Spain, southern Portugal, and northern Africa. Many devastating earthquakes have occurred in these areas, both in modern times and recorded history, many of which were the source of significant tsunamis affecting touristic and economic important regions of the western Mediterranean. Main challenge is the difficulty to collaborate with the Algerian and Moroccan scientists to be able to share data, and the need to improve international collaboration between Southern Spain and Northern African institutions.

- ***Central Asia***
  Dr. Stefano Parolai, from the GeoForschungsZentrum (GFZ), Potsdam, Germany, presented about the regional efforts in Central Asia to develop EEWS and increase the seismic network coverage, particularly for Kyrgyzstan and Kazakhstan. Many large earthquakes have occurred in historic times (late 1800 and early 1900) in these areas, including Bishkek and Almaty, but at that time the population were much smaller. Similar earthquakes today would be devastating for those cities. Central Asia countries are characterized by very high seismic hazards, in which the major challenge is the poor seismic network coverage inhibiting the capacity to develop EEWS. Current projects at GFZ are focused in Kyrgyzstan to able to provide some level of EEWS, or at least to provide rapid information about size and rupture information quickly to emergency services for rapid response. Efforts next year will extend to the Kazakhstan to also develop EEWS for Almaty. There are interests to develop EEWS to other Central Asian countries (Turkmenistan, Tajikistan, and Uzbekistan), but the main challenges are the difficulty to improve the international collaborations between those neighbouring countries.

- ***Mexico***
  Dr. Armando Cuellar, from Centro de Instrumentación y Registro Sísmico (CIRES), Mexico, presented the current implementation of SASMEX, the EEWS for Mexico City, Oaxaca, and neighbouring urban areas. SAMEX is a fully operational EEWS, delivering alert to the public via the TV, radio, and 95 000 receiver warning stations located mostly near schools. Some of the main challenges are the lack of rapid communication infrastructure (fast internet) causing delay between the detection and alerts heard by the people on the ground; the need to deliver early warning to the public more effectively (mobile technology); the lack of public awareness and education about EEWS; and constant battle with the administration to convince the significance and importance of EEWS to sustain funding.

- ***Switzerland, Europe, New Zealand, Israel***
  Dr. John Clinton, Director of Seismological Laboratory, ETH Zurich, Switzerland, presented EEWS in Switzerland, as well as other countries in Europe, California, and New Zealand. In Switzerland, the country has a current operating EEWS, but with no current active user. EEWS has been distributed to the nuclear power plants and railway systems, but they do not actively use it. Given the limited interest and lack of strong recent seismic activity in Switzerland, ETH Zurich has been more recently involved in adapting their open-source algorithms in joint collaboration with several other institutions in California, New Zealand, Turkey, Romania, Greece, Israel, and Iceland to achieve successful earthquake early warnings both in testing and operating phases. ETH Zurich is also recently involved in a feasibility study for a potential development of EEWS in Nicaragua. In the technical aspect, the main challenge is the EEWS algorithm operating software, which works in some level for some areas where seismic network is sufficient, but in areas where the seismic network is not designed for EEWS or not dense enough, EEWS does not provide enough warning time for majority of moderate earthquakes that cause damages. In the implementation aspect, major challenges in which UNESCO can help are the need for added support for institutions developing EEWS; reassurance to local governments about the importance of EEWS to ensure continue funding; and to improve the open sharing of data between countries.

- ***Italy***
  Prof. Aldo Zollo, from the Department of Physics, University of Naples Federico II, Italy, presented of the work on PRESTo, the EEWS developed in southern Italy. Currently PRESTo has only been used in testing mode. Although the system has proven to be capable to deliver EEWS with limited cases of false alerts, its reliability as full proof system is a concern before making the system public. The lack of trust in the public and in the government following the 2009 Aquila earthquake trials caused major step backs in the progress of an EEWS in southern Italy. However, the legal responsibility is by far the main challenge to overcome before implementing an EEWS in Italy, and an organization such as UNESCO would be key to provide guidance and facilitate resolving this issue. Prof. Zollo also presented the work of the REAKT project (EU project), which carried earthquake early warning drills across schools in Naples to improve education and public awareness on earthquakes and EEWS.

- ***Romania***
  Dr. Constantin Ionescu, from the National Institute for Earth and Physics (INFP), Romania, presented the current implementation of REWS, the national EEWS for Romania, focusing particularly for the capital city of Bucharest. Romania is characterized by one of the most seismically active region of Europe. The Vancrea seismic zone has been the source multiple moderate to large size earthquakes in historic times, and particularly during the 20th century with significant damages and casualties in Bucharest. The seismic risk is also equally applicable to neighbouring Bulgaria, Serbia, Moldavia, and even Ukraine. REWS developed by the INFP provides real-time earthquake early warnings, sending

out alerts to the local administration authority, which then dispatches the alerts to private users primarily in Bucharest such as the gas lines companies, nuclear power plants, railways, and transportation system.

- ***Turkey***
  Prof. Can Zulfikar, from Kandili Observatory and Earthquake Research Institute, Boğaziçi University, Turkey, presented the regional and national efforts for Turkey. The Anatolian Fault has been the source of multiple large earthquakes throughout the 20th century, many of which caused significant casualties and damages. Fault ruptures and earthquakes have progressively progressed from east to west. For the city of Istanbul and surrounding region, the seismic risk is very high, as the Istanbul fault segment is the last remaining segment that has not yet ruptured in recent historic times. The local authorities fully realized the threat, and given the pressing need to develop an EEWS, the country has made nationwide investments in the instrumentation network, and focusing at the moment in the testing and implementation of an EEWS for Istanbul. The EEWS for Istanbul has proven capable to generate alerts with dedicated end users such as the emergency services, gas pipelines, critical facilities, and transportation services. One of the key implementation is an automatic shut down of the gas pipelines once an alert is dispatched. The main challenge for Turkey at the moment is the lack of regulation on who will take responsibility to disseminate a public alert. The technology and system are in place and ready, but there is need for legal framework, in which UNESCO can provide assistance.

- ***China***
  Prof. Li Li, from the Institute of Geophysics, China Earthquake Administration, presented the national efforts for China to develop EEWS. The country is faced with multiple areas of high seismic risks across its territory. Many of those areas have repeatedly been the source of large earthquakes with devastating damages and casualties throughout historic and modern times. The Chinese government is very interested to tackle this problem, and has recently dedicated as a national effort with major funds to provide very dense instrumentation seismic networks and to implement regional EEWS in the coming years. Local authorities strongly support the increase density of the seismic network to provide major improvement in more accurate and rapid information of intensity reports right after an earthquake for emergency response services. Currently China has many capable softwares and algorithms, but given the diversity of the different seismic and population areas, the country is currently in testing modes to refine its EEWS both for at the local and regional implementation.

- ***Japan***
  Dr. Mitsuyuki Hoshiba, Seismology and Tsunami Research Department, Japan Meteorological Agency, Japan, presented the implementation of its regional EEWS for the country of Japan. EEWS in Japan has been operating since 2008, and proven successful in generating public wide alerts for multiple earthquakes. For Instance, during the 2011 Tohoku earthquake, the system was able to provide an effective warning throughout the many telecommunication services with distinctive alerts and instructions to take cover on the phones and TV. Other

major implementation of early warning included high-speed trains engaged in automatic shut downs, and manufacturing industries received an alert to stop hazardous operations. EEWS in Japan receives very good public support with a strong awareness of the benefits in such system. Strong public awareness has shown to be highly effective in providing added mental preparedness for an effective EEWS. Improvements to EEWS are still needed, as although necessary precautions measures were taken during the 2011 Tohoku earthquake, the EEWS had underestimated the size and intensity of shaking of the earthquake.

Questions and issues during open floor discussion

- ***EEWS in Africa***
  A concern was raised for the apparent lack of efforts in EEWS in Africa (Delegate of Congo). However, responses by the experts and UNESCO Secretariat pointed that there are limited infrastructures and specialized seismological institutions in most of Africa, except for partly North African countries. However, the work of Prof. Buforn currently aims to involve Morocco and Algeria into the regional Iberico-Maghreb EEWS, but a major challenge has been the lack of legal framework for cooperation. In Sub-Saharan Africa, some initial work is also on going in Congo and Rwanda by the European Centre for Geodynamics and Seismology (ECGS) in Luxembourg (Dr. Adrien Oth from ECGS could not attend the meeting), involving the installation of regional networks of seismic stations. UNESCO is also currently supporting a 4-year project funded by the Swedish International Development Agency (SIDA), to create the African Network of Earth Science Institutes, to help answer this need in strengthening local expertise and collaboration across the African continent.

- ***Collaboration with IOC***
  It was noted (Delegates of Portugal and Denmark) that this new initiative on earthquake early warning (IP-EEWS) should aim to collaborate with the International Oceanic Commission (IOC), which works on similar objectives but focused on tsunami early warning, and had to solve similar challenges in political communication in order to share data and foster international collaboration. The UNESCO Secretariat confirmed that their activities with IP-EEWS will be in close collaboration with the IOC colleagues for many reasons. IOC has demonstrated a long history of successful intergovernmental collaboration, data sharing, and raising awareness, and their experience will be key to support IP-EEWS. Although tsunami early warning operates fundamentally different than for earthquakes, efforts in earthquake early warning are also highly complementary to the effectiveness of tsunami early warning.

- ***International collaboration***
  Given the presentations by the experts, it was noted (Delegate of China) that UNESCO should focus on supporting projects involved in international collaboration and link with any potential existing research initiatives (i.e. Central Asia), establish a framework to facilitate data sharing (i.e. Iberico-Maghreb

EEWS), and provide guidance on the legal responsibility (i.e. Turkey and Italy EEWS). The UNESCO Secretariat replied that it will certainly focus to answer these needs, pointing out that the International Geoscience Programme (IGCP) can be utilized to facilitate international collaboration and data sharing for such cross-border and international projects on EEWS.

- ***Multi-hazards applications***
  A series of discussion focused on whether EEWS can have multiple applications as multi-hazards early warning systems (Neil McFarlane, UNISDR). Responses by the experts indicated that indeed EEWS can potentially operate as an effective multi-hazards early warning system (landslides, avalanches, tsunamis), but at the moment it is still an area of active research. For instance, in Swiss Alps and in mountains of Central Asia, efforts to develop EEWS are strongly linked with monitoring of landslides and slope stability. In Chile, research has also shown that utilizing an EEWS can add greater details in forecasting and shortening the delay time to generate local tsunami early warnings.

- ***Legal framework***
  Another series of discussion focused on the legal framework raised multiple times by the experts. A general view is that UNESCO or the UN would assist in establishing and implementing the legal framework, however such framework would need to incorporate inputs from the experts and local authorities on the appropriate standards and thresholds to make alerts public. For instance in Italy, this issue is being discussed that the response time is too short for an official decision. Japan provides an important example that utilizes trusted technology, in which warnings are being disseminated differently dependent on the different end-users and on the size of the earthquake. In the end, it should be an authoritative agency to deliver the warning.

- ***Link with climate change***
  In the light of the COP21 and the strong interest in the international community of climate change related issues, there a brief discussion on whether earthquake hazards have any relation to climate, which would provide added public interest to support the development of EEWS. Although direct relations are not known, the added demand of natural gas as an alternative energy resources has had major impact on the increase number of earthquake generating by gas fracking. For instance, Oklahoma, due to large number of gas fracking, the state is now more seismically active than California.

- ***Expectation of IP-EEWS***
  Some of the delegates indicated strong support for this initiative, particularly the Delegate of Turkey, but some questions were raised about the next steps and overall objectives. The UNESCO Secretariat responded that this meeting is the first meeting of its kind in the UN system, and at this stage this initiative is open for restructuring. The goals of this meeting was to hear from various experts either in research or implementing EEWS, assess some of major gaps and needs, identify how UNESCO can help to facilitate their efforts in developing and

implementing EEWS, and finally provide an opportunity to inform the Member States about the significance of EEWS, as well hear from their concerns. In the long term, UNESCO would like to see the development of new EEWS in developing countries or in regions of need.

Neil McFarlane (UNISDR) suggested that future efforts related to this initiative should target to include social scientists, communications experts, and private sector.

- ***Social Media***
  The final series of discussion of the information session was focused on the potential use of social media to disseminate a warning. Some pointed to potential problem of reliability, and whether the public or local authorities should trust such information. For instance in Mexico, given the poor public awareness about EEWS, many people do not utilize their time appropriately. In other countries, efforts are already underway to utilize social media for post-earthquakes emergency information**.** Social media was also proposed to potentially help disseminate and convince the public to get the mobile application of EEWS when it has become a trusted technology.

Panel Discussion

- **Priorities and needs to advance EEWS worldwide**
  In the afternoon session, the experts, the UNESCO Secretariat, UNISDR representatives, and a few Member States (Turkey and France) took part in a panel discussion to synthesis some of the major needs and gaps, and to identify the major action plans and mandate of IP-EEWS for the way forward. The main priorities and needs are as follows:

1. Need to improve international collaboration for data/technology sharing, and knowledge exchange. For most institutions, no dedicated funding yet exists to invite collaborating scientists/young scientists to share data from other countries and develop EEWS internationally (Zollo, Hoshiba, Cuellar, Buforn, Parolai).

2. Need to develop a platform that can facilitate international education workshops and/or summer schools to bring awareness to the public on EEWS around the world (Li, Hoshiba, Buforn, Parolai).

3. Need to raise awareness at the local government level to extend the benefit of EEWS across local communities (Ionescu, Buforn).

4. Need to create a policy document that effectively transmits the right message to the policy makers about the application of EEWS. Target concepts and implementation of an EEWS policy document should focus at the regional level, involving local government, local industry, and local stakeholder. No need of additional scientific meeting, but IP-EEWS should focus on meetings that raise

awareness to the policy makers and government officials (Clinton, Hoshiba, Allen).

5. Need guidance for regulation and responsibility for EEWS (Zulfikar).

6. Need UNESCO stamp approval to provide added value either in projects developing new EEWS (nationally or internationally), or to justify continued funding for existing EEWS operating at the national level (Parolai, Allen).

7. Need for greater efforts to disseminate the information or significance of EEWS to the rest of the scientific community so that they themselves can develop interest of EEWS in their own country (Allen).

8. Need to facilitate the link of the policy interface between scientists and local government. An intergovernmental check or international framework seems highly beneficial for this initiative of IP-EEWS to become successful (Delegate of Turkey).

9. Consider involving cellular communication partners as stakeholders in this initiative of IP-EEWS, and take part of the ITU conference to disseminate the growing interest to use mobile technology in EEWS (UNISDR).

10. Need to integrate different entities to disseminate and improve the global efforts in EEWS, such as communication scientists, social scientist, education experts, etc. (Allen, UNISDR).

- **Key points**

  In summary the priorities listed above pointed to four main areas of how UNESCO can support the development of EEWS nationally and internationally through IP-EEWS:
  - Facilitate knowledge exchange and capacity building.
  - Raise awareness to the public and local governments
  - Provide international standards, methodologies, and guidelines.
  - Provide framework to improve international cooperation

Action Items

- The Working Group agreed on the key action items for the short term (<1 year):
  - Draft a policy document that lists the major objectives following the need stated above (1-10), with agreed upon terms of reference, and overarching mandate as framework of the IP-EEWS. The document will be drafted by the UNESCO Secretariat, and then distributed for feedback and approval to the experts acting as the scientific committee on IP-EEWS, and any other current partners (UNISDR).

- Submit this policy document to the next UNESCO Executive Board (April 2016 or October 2016) to have this framework and mandate approved by the Member States.
- Plan for next IP-EEWS meeting either back in UNESCO Headquarters in Paris, or in parallel to existing scientific meetings on EEWS.

- Long term (>1 year) goals will inherently depend on the outcome of the agreed upon policy document, feedback and approval from Member States. IP-EEWS will aim, but not limited, to do the following:
  - Draft an international publication on current state of the art, methodologies, standards, and policy guidelines in EEWS.
  - Expand the multi-sectorial effort at UNESCO on IP-EEWS.
  - Increase the number of partners and stakeholders across all levels (institutions, agencies, industries, international organizations, mobile technologies).
  - Provide UNESCO stamp of approval under IP-EEWS for various research or capacity building projects.
  - Support projects developing new EEWS and/or carrying public awareness in EEWS.
  - Support visiting scientists interested in knowledge exchange and developing EEWS in their country.
  - Facilitate international collaboration between institutions to promote data exchange.