Strengthen Scientific Advisory Capacities for Disaster Risk Reduction

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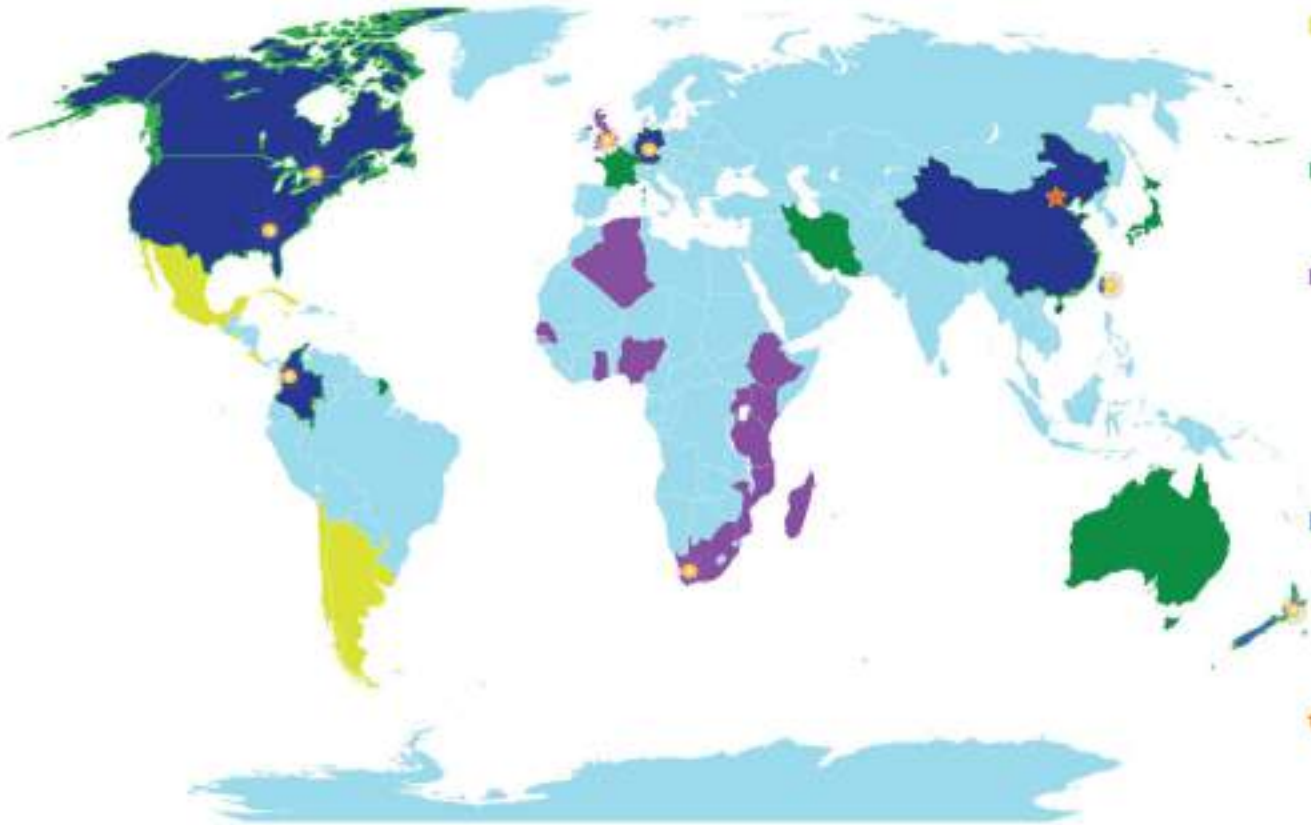
SCIENTIFIC ADVICES ON REDUCING DISASTER RISKS



- IRDR Regional Committee - Latin American and Caribbean (LAC) region
- IRDR National Committees
- IRDR International Centre(s) of Excellence (ICoE)
  * IRDR's Africa Centre of Excellence (multi-country) "REaL"
- IRDR ICoE Secretariat
- With IRDR NC & ICoE
  * IRDR NC is based in Beijing; IRDR ICoE is based in Taipei
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- IRDR International Programme Office (IPO)

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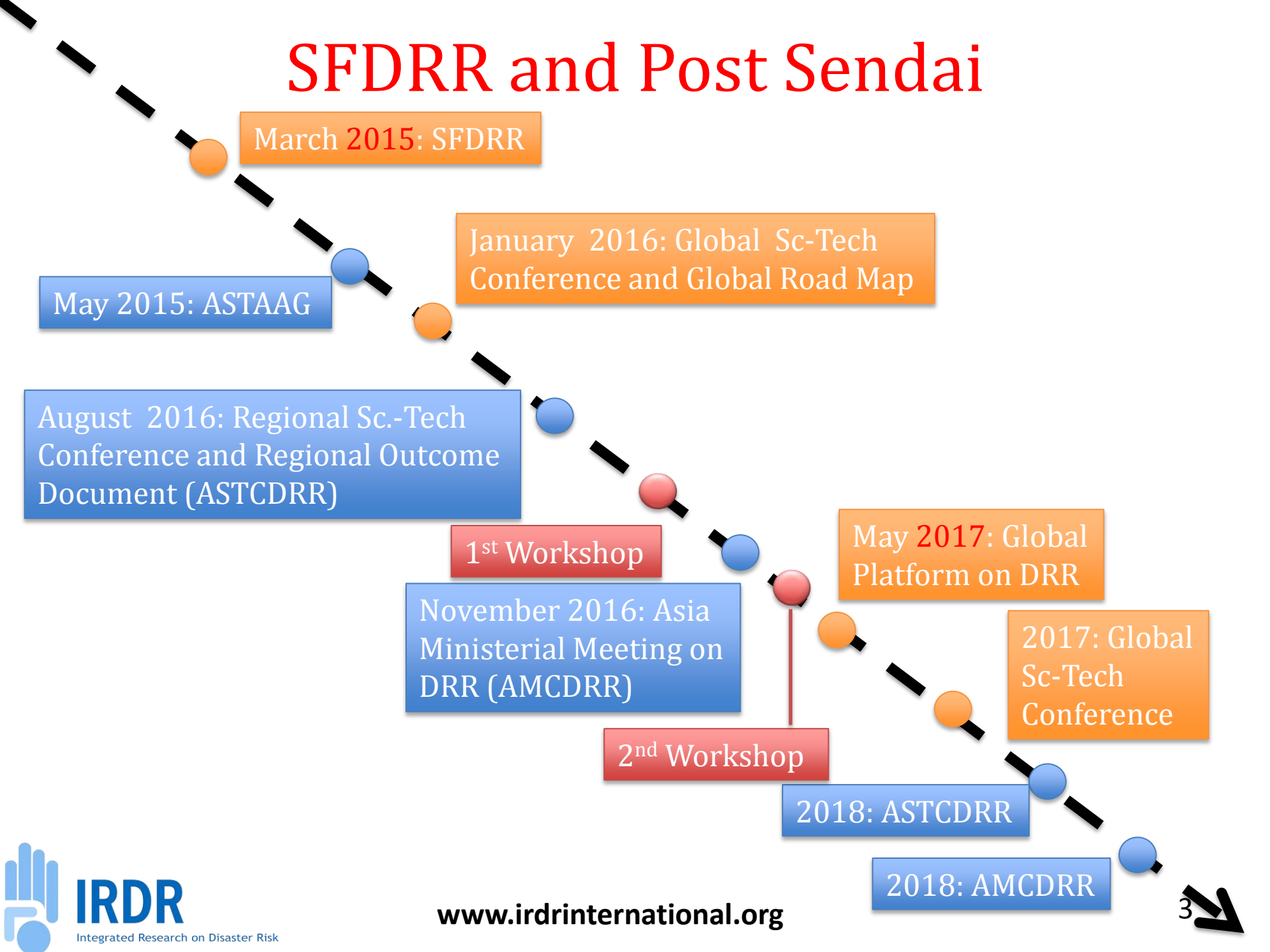

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Science and Technology Needs

- Strengthening science technology academic community: *Making research more meaningful*
  - Focus both on higher education, research, disciplinary issues in academics
- Support governments in science based decision making
  - Regional / national mapping of science and technology status
  - Monitor the progress at national level
  - Active participation in national platform
- Enhance networking among academic community and other stakeholders (civil society, private sector, media etc.)
  - Network analysis and mapping
  - Innovations

ASIA
Science Technology Status For Disaster Risk Reduction

2016

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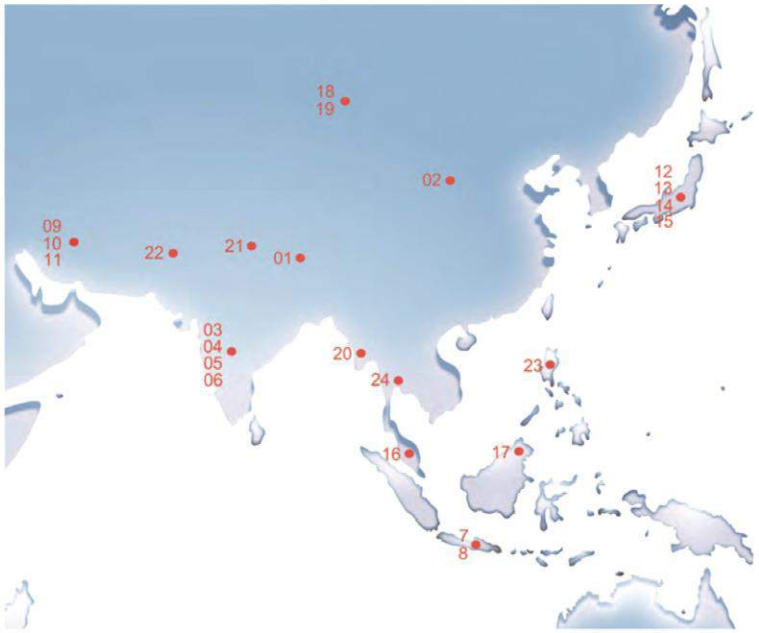
futureearth
research for global sustainability

CASE STUDIES

Science and Technology for Disaster Risk Reduction



25. Case Study: Cross Boundary Flood Risk Management
26. Case Study: Digital Radio
27. Case Study: Disaster Resilient House and Schools
28. Case Study: Ecosystem

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1. PROFILE / CONTEXT*

JAPAN

Japan is vulnerable to different types of natural hazards, due to its crucial location in the Pacific Rim of Fire. Science and Technology has contributed significantly in reducing the risk to natural disasters. Science Council of Japan is the premium science body, which provides advice to the national government in terms of disasters. Japan also has a yearly Grant-in-Aid program for conducting research in the university and research institutions, apart from special grant programs after major disasters. A few previous disasters have changed the course of disaster research in Japan: 1923 Kanto Earthquake, 1959 Isewan Typhoon, 1995 Great Hanshin Awaji Earthquake, and 2011 Great East Japan Earthquake and tsunami. Several of these disasters have urged new direction of implication of science into decision making, early warning systems and science policy dialogue.

2. STATUS

	Attributes of Science and Technology to Disaster Risk Reduction (DRR)	1	2	3	4	5
1	**Science and Technology in decision making**					
1.1	Presence of Science and Technology advisory group to DRR nodal ministry and or/related ministries				■	
1.2	Presence of Science and Technology group in DRR national platform				■	
1.3	Existence of inter-ministerial discussion/dialogue on science related issues			■		
1.4	Implementation of risk, needs and damage assessment with involvement of Science and Technology group					■
1.5	Existence of early warning system and mechanism with Science and Technology knowledge and tools				■	
1.6	Availability of disaster data/statistics on damage and impacts and its data collection mechanism				■	
1.7	Involvement of Science and Technology group in infrastructure design					■
1.8	Scientific revision/updating of regulations, policies and guidelines for DRR including building codes, disaster response and preparedness plan etc.					■
2	**Investment in Science and Technology**					
2.1	Existence of grant support by the national government to researchers in disaster related topics that focus on Science and Technology				■	
2.2	Establishment of disaster related courses in higher-education			■		
2.3	Presence of national research institutes and organizations for disasters				■	
2.4	Investment/support by the national government in national/international conferences and events on disasters for knowledge sharing				■	
2.5	Support to collaboration with academia and the private sector for developing innovative technical solutions				■	
2.6	Support to collaboration with academia and civil society for developing innovative social solutions			■		
3	**Link of Science and Technology to people**					
3.1	Availability of a hazard map to people, developed based on scientific knowledge				■	
3.2	Scientific validation of indigenous knowledge		■			
3.3	Involvement of Science and Technology group in developing program for evacuation drills				■	
3.4	Availability and participation of Science and Technology group in community discussion as facilitator or advisor/commentator			■		
3.5	Dissemination of science based early warning and forecast to people				■	
3.6	Involvement of Science and Technology group in developing disaster related education curriculum			■		
3.7	Existence of facilities such as museum and events such as expo to disseminate disaster knowledge and deepen understanding on disasters among citizens				■	

*This report is prepared by Rajib Shaw and Takako Izumi, ASTAAG members from Japan based on their knowledge, interpretation and interviews with Professor Takashi Onishi, President, Japan Science Council; Professor Kaoru Takara, Director, DPRI, Kyoto University and Professor Fumihiko Imamura, Director, IRIDES, Tohoku University.

3. SCIENCE AND TECHNOLOGY IN DECISION MAKING

Japan scientists are included as members of the Central Disaster Mitigation Council on DRR, which is the key policy support body to the national government. Their inputs are often applied for policy and decision making processes, however, not always. It is a major progress in Japan that such a mechanism and system exists to reflect the opinions and voices of scientists into practical decision making. Not only being included as members of the Council, but also there is a direct route to reach the Prime Minister if it is urgent and most important. On the other hand, more practitioners need to be included as the members to implement the policies and regulations.

In addition, under the Central Disaster Mitigation Council on DRR, it is possible to convene the Expert Examination Committee in various disaster areas when further detailed research is needed for a specific topic. Various assessments are conducted by the Committee.

At the local level, the province/ city governments request national/ local / private university professors and researchers to serve in the decision support committees to develop hazard map, early warning system, disaster resilient planning etc.

The area, which needs improvement of science linkage to decision making, is the modeling of unprecedented event (low/high probability, high consequence events), especially focusing on flood and volcanic disasters.

In case of damage estimation, scientific decision / tools are used for making government assets, however, it is also important to use the same methods for assessing private sector damages, and link it to the decision making process. Depending on municipality, the methodology and criteria of data collection is different.

4. INVESTMENT IN SCIENCE AND TECHNOLOGY

The Japanese Government has provided the generous support to science and technology researches such as Grants in aid for Scientific Research. While the amount is not fully satisfactory, such grants are very helpful and meaningful to strengthen research capacity in Japan and not many countries have such a system. There is a concern on a volcano observation capacity. The countermeasure and DRR for volcanic eruption is not sufficient.

It is necessary to establish a foundation that collects the fund from individuals and private organizations. In this way, the funds can be used for longer-term purposes. The support from the national level is rather for the short-term and it is a common procedure for the amount to be reduced after 3 years of the event.

Science – private sector relationship has been strong in the insurance sectors, where science based modeling helps in promoting insurance schemes. However, additional investment is required for developing innovative risk reduction products along with private sectors.

Investment in local government for science based risk reduction is still an area, which needs improvements. For example, out of close to 2,000 municipalities in Japan, close of 1,000+ local governments have science based flood hazard maps, and the rest needs to be developed in due course.

Science-civil society collaboration is another area, where increasing research grants are provided. These are mostly project-based involvement, which needs to be sustained over a longer period of time.

5. LINK OF SCIENCE AND TECHNOLOGY TO PEOPLE

The Japanese DRR measure focuses on major cities not local areas. How to strengthen DRR capacity for areas, for instance, where the population of elderly people is high is one of future challenges.

Detailed DRR strategy and countermeasure are not yet applied or developed. For instance, anti-seismic structure against earthquakes is popular, however, any DRR technology and measure to reduce landslides risks have not been developed yet.

Regarding at the disaster response stage, comfortableness at evacuation centers is not fully considered at the preparedness stage. It may lead to causing less-incentives of evacuation actions by citizens.

More research is required at the local level, especially focusing on social science and behavioral science, and to investigate on how the science base early warning system leads to people in safer place, well ahead of time. It is necessary for indigenous knowledge to be validated, however, due to the limitation of number of experts, it has not been done widely.

Disaster related subjects are currently included in the classes of history and geography under the current school curriculum.

Science people linkage needs to address the interface of the science base system and the people's reception. Thus, it is important to link technical and human society together. For instance, one of the challenges is how to deliver science to elderly people in a user-friendly manner. In addition, it is necessary to address the issue as a social and welfare matter not only just as a disaster related issue.

The traditional role of universities and academia was to develop advanced technology; however, it is widely acknowledged that to address DRR issues as social problems is necessary and to develop solutions with social approach is indispensable. To reform the way of thinking of academia and universities regarding their roles is necessary.

6. LESSONS / ISSUES FROM PAST MAJOR DISASTERS

Changes in building codes, major guidelines: The most important part of lessons from past disaster includes detailed scientific investig of the failure of structure and/or system. For example, after the 1995 Great Hanshin Awaji Earthquake, the codes for RC buildings, steel structure, highways were revised, through the analysis of structural damages of buildings and infrastructures. Moreover, the school facility codes were improved by investing the functional dimension of the schools as evacuation place after the disaster. The same process was observed after the 2011 Great East Japan Earthquake and Tsunami, where the evacuation drill guidelines were revisited and updated.

From building safety to human safety: One of the key lessons from past disasters is to decide on how to safe human, rather than how to save building. This has been core to engineering discipline.

Multi-disciplinary research: A major changes in multi-disciplinary research has been observed after the 1995 Great Hanshin Awaji Earthquake, which has prompted the incorporation of social and cultural studies of people and communities to be linked to engineering and science based research to make it effective for decision making.

System resilience approach: A system based approach has been promoted after the few recent disasters, which need to investigate the most weak or vulnerable point of a system (as against a structure in the earlier practice), and proper corrective measures to overcome the problem. In urban areas, major problems and weaknesses also need to be addressed in order to strengthen resilience. This is not fully understood. It may be understood at municipalities, however, not by citizens and private sectors. It is not possible for them to understand risks and how to avoid them.

Understanding limitation of science: It is important to know the limitation of science in uncertain and complex disasters. Thus, the key lesson is to know the limitation, share it with people and link it to their actions.

7. SFDRR PRIORITY AREAS

SFDRR Priorities		Relative level of involvement of Science and Technology				
		1	2	3	4	5
1	Understanding disaster risk				■	
2	Strengthening disaster risk governance		■			
3	Investing in disaster risk reduction			■		
4	Enhancing disaster preparedness				■	

8. SHORT AND LONG-TERM GOALS (3 SPECIFIC ACTIONS FOR BOTH SHORT AND LONG-TERM GOALS)

1. Network of different academic associations to form Japan Academic Network for Disaster Reduction, under the auspices of Japan Science Council (an initiative, which started after the 2011 East Japan Earthquake and Tsunami).
2. More precise prediction and decision making of volcanic and landslide risk reduction.
3. Linking customization and implementation of scientific research based on the details needs assessment analysis.

1. Develop universal / standardized DRR system, which serves both the aged community as well as technology oriented young generation, irrespective of gender, nationality etc.
2. Enhanced preparedness for larger and complex disasters, which have possibly not been visualized in the regular disaster risk reduction scenario.
3. More synergetic approach of engineering, science and social/ behavioral sciences, which will be more need based demand driven research, rather than expertise based supply driven research.

9. HIGHER EDUCAITON STATUS

The Japanese education system is clearly divided into two categories – social sciences/liberal arts and natural science/engineering. In Japan, departments in universities are developed based on the need for job opportunities. If there is a need and request from local governments to train disaster risk reduction managers/disaster management experts, the courses/departments for disaster management can be developed. However, the area of disaster management is currently covered by generalists, therefore, there is only minimum possibility to establish a disaster management course in universities. Nonetheless, how to strengthen expertise and specialization of generalists in disaster management is a challenge. 'How to utilize existing workforces' is a major concern.

Some of the major universities are currently considering professional training program (Master course in disaster management), through a university network approach, which will target mostly professionals in Japan and abroad.

More focus on higher studies on volcanology is required.

Higher education should be accessible to common people, who are interested in the subject.

STATUS REPORT JAPAN

Science Technology in DRR

- Regional Level:
  - **Regional periodic Sc.-Tech conference**
  - Recommendations into Ministerial Conference
  - **Periodic regional mapping**
  - Collaboration with other programs like Future Earth
- National Level:
  - Strengthening national capacities
  - Pro-active participation in national platforms
  - **National Science Technology Plan**
- Local Level:
  - **Recognize Local Center of Excellence**
  - Link local resource institute to local governments
  - Local multi stakeholder DRR platforms

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