



**Asia-Pacific
Economic Cooperation**

2016/SOM3/CSA/003

Agenda Item: 3

Developing Human Capital: Investment in Scientists Related to Risk Management and Climate Change

Purpose: Information

Submitted by: CSAE Co-Chair



**Fourth APEC Chief Science Advisors and
Equivalents Meeting
Lima, Peru
18-19 August 2016**

Developing Human Capital: Investment in scientists related to risk management and climate change

Background discussion paper for the **4th meeting of the APEC Economies' Chief Science**

Advisors and Equivalents

18 August 2016

Lima, Peru

The Asia-Pacific region is the most susceptible to physical phenomena and associated disasters in the world. The presence of the Pacific Ring of Fire makes it one of the areas with more seismic and volcanic activities in the planet. As a result, almost all APEC economies are at risk of suffering the effects of a volcanic eruption or a large magnitude earthquake. In 1991, for instance, the Philippines suffered one of the most significant volcanic eruptions in history, Mount Pinatubo's. Scientists determined that this eruption impacted on global climate^{1,2}. In 2011, a magnitude 9.0 earthquake hit Japan off the Pacific coast of Tōhoku and generated a tsunami alert in all APEC members.

There is also the climate variability El Niño Southern Oscillation, whose warm phase El Niño has several strong ecosystem, social and economic impacts on the APEC Economies. A strong El Niño can be devastating in economies like Peru, which in 1982-83 and 1997-98 suffered great economic loss due to associated extreme events such as high temperatures, heavy rain and droughts, as well as mass movements and floods. El Niño seems to have stronger effects on the eastern Pacific economies, but to better predict its intensity, duration and impact; we need collaborative work of scientists from all APEC economies.

In the context of climate change, this is a global phenomenon with different regional and local effects on ecosystems, societies and economies that we do not yet fully know or understand. Here, interdisciplinary, interinstitutional and cross-border studies are needed to increase and improve research, scientific articles and most of all scientists specialized in the physics of and adaptation to climate change. The vulnerability of economies like Peru, characterized by a complex geography, altitudinal gradient due to the presence of the Andes, its location near the equator, and its coastal upwelling system, demands increasing even more research efforts.

All these phenomena must be studied considering different approaches: science, infrastructure, modeling, forecasting, technological development and monitoring, as well as socioeconomic impact and decision-making. Research institutes, universities and governmental institutions can carry out this mission. However, to do science, we need not only equipment and infrastructure, but especially human capital and its ability to work as a group. Therefore, the limiting factor is the critical mass of scientists that could do basic and applied research, which in turn will result in technological innovations necessary in the face of disaster risks and climate change. The need for risk management and climate change scientists as high priority or indispensable is highlighted in Peru's 'National Program for Environmental Science and Technology – CINTyA'. Therefore, rapid or slow scientific progress related to risk management and climate change will depend on the amount of highly qualified professionals, men and women, who will lead specific lines of research in these fields.

Peru has a history of collaborating with APEC Economies. For instance, 'INDECI (the National Civil Defense Institute)' has received support from the Japan International Cooperation Agency

and the Office of U.S. Foreign Disaster Assistance (OFDA) through equipment and internships, and from China to construct a new Emergency Operations Center (COEN). These institutions, such as INDECI and CENEPRED in Peru (the 'National Center for Disaster Risk Estimation, Prevention and Reduction'), whose mission is linked to disaster risk management, require professionals that can reach people with simple, everyday language. Conversely, research institutes and universities that carry out disaster risk and climate change studies are expected to lead lines of research, but the limited amount of highly qualified researchers are not enough for this scientific development that a highly vulnerable economy to disasters and climate change like Peru requires.

As we know, science, as source of knowledge, plays a fundamental role in an economy's development and its people well-being. Further knowledge will allow us to improve our response capacity in the face of environmental challenges at social, economic and ecosystem levels. Therefore, an economy that invests in building scientific capacity is prioritizing its own productive and economic development.

Finally, Early Warning Systems developed in APEC economies such as Japan's tsunami system have saved many lives. In 2011, despite the heavy casualties, this system most likely saved many more thousands of people. The buoys in the Pacific Ocean detected the tsunami and sent the alert to several economies. However, not all APEC economies have that technology or specialized scientists and technicians that will be able to use it or apply it. This technical subject however could be the basis for synergic, concrete and objective collaboration and cooperation between the APEC economies.

1. Hansen, J., Lacis, A., Ruedy, R. & Sato, M. Potential climate impact of Mount Pinatubo eruption. *Geophys. Res. Lett.* **19**, 215–218 (1992).
2. Hansen, J. *et al.* Climate forcings in Goddard Institute for Space Studies SI2000 simulations. *J. Geophys. Res. Atmospheres* **107**, 4347 (2002).