Submission by the Inter-American Institute for Global Change Research (IAI)

In response to the invitation by SBSTA to provide lessons learned and good practices for knowledge and research capacity-building, in particular in developing countries, considering information presented at past research dialogues and workshops, the Inter-American Institute for Global Change Research (IAI) presents in this submission some examples, from an institutional perspective and conclusions from a few of its investigators.

IAI's collaborative research networks involve investigators and institutions in four or more countries in the Americas. As part of these networked multi-national interdisciplinary projects, the IAI provides fellowships, research opportunities and training to students and professionals from many countries of the Americas. In 2014 alone, 26 projects involved 334 students, 152 of those received scholarships and 395 students participated in training activities and workshops funded by these projects. These capacity-building activities promoted by IAI's research networks are open to students in academic programs at undergraduate and post-graduate levels. Recipients of academic grants from projects benefit from exposure to cross-disciplinary scientific environments and from opportunities to link their degree studies with current research activities through field work and laboratory experiments in other countries, and through the exchange of scientific data and knowledge with other investigators within IAI networks.

Young researchers are also provided opportunities to develop and lead small projects funded by the IAI. These projects provide young researchers with experiential learning by allowing them the opportunity to coordinate inter- and transdisciplinary teamwork. Outstanding young investigators then have the opportunity to present their IAI projects and findings at international meetings. These experiences have proven rewarding to recipients and have helped foster interdisciplinarity within the next generation of researchers.

Some of the lessons learned and good practices for knowledge generation and capacity building, reported by IAI investigators who have participated in UNFCCC Research Dialogues are:

Argentine investigator Alberto Piola has organized and c-organized courses attended by students from Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Peru, Uruguay, Venezuela and the USA. The participation of students from diverse regions not only transfers specific knowledge and tools required to tackle climate change problems, it also creates links between students with otherwise limited opportunity for participation in international research. Such links at an early stage of their careers build mutual trust, open opportunities for future collaborations and foster productive research across a region. Piola acknowledges that capacity-building must recognize that the distribution of human resources is not uniform and that activities must lead to improved capacities of less developed regions:

> "*Over twenty years of research and teaching marine science in South America indicate that some countries in the region are in continuous development of generations of highly-skilled young scientists, both in the human and natural sciences. In contrast, other countries have very limited training capacities. The uneven ability to generate skilled scientists is frequently associated with quite distinct economic scenarios... it is very difficult for prospective students from less advanced regions to compete for funds to participate in international and regional capacity building activities. The problem also manifests itself as strongly uneven capacities to compete for research funds, which again, further hampers the development of skilled human resources. Leveling this heterogeneity is a crucial challenge that requires specific actions."*

Investigators have mentioned that the collaborative environment created by the IAI has stimulated students to be pro-active and propose activities, hunt for new funds, establish new collaboration within the context of the projects. IAI fellowships also allowed students to spend part of their training time in

different countries, allowing them to become real bridges between institutions and academic cultures. Argentine investigator Esteban Jobbagy started his involvement in IAI as a student in a project that led to his current research network in Argentina, Paraguay, Uruguay and the United States. Jobbagy observes that IAI fellowships have been start-up opportunities covering gaps in national fellowships:

> "*Students change the culture of doing science in Latin America more than lead investigators. Openness in funding systems like the IAI gives room to students to think in more revolutionary ways the kind of science that they do. Developing collaborative databases is encouraged by IAI with its policy of free and open data exchange and encouraging communication of science in Spanish and for broader audiences are critical for IAI. With time, this way of working becomes common practice and students want to continue it and question the traditional ways of doing science. There has been a strong change in what is considered "good" science among my project students, and this is percolating into the broader community of environmental researchers*".

Costa Rican investigator Arturo Sanchez-Azofeifa's experience with IAI projects and involvement in the UNFCCC process have helped him to confirm his belief that transfer of scientific knowledge into the decision-making realm is probably one of the most challenging aspects for scientists interested in contributing to decision making:

> "*Scientific papers have little or no impact on the decision-making community unless a parallel effort is undertaken to convert peer-reviewed knowledge into tangible products that can be integrated into local, regional and national policies. I believe that any research-capacity building initiative must be a two prong process: scientific per se, and translational in nature. The scientific process must be a rigorous one; making emphasis on building sound research foundations, including the avoidance of plagiarism that undermines scientific research. The translational process must be parallel to the research capacity building, by integrating into the capacity building process individuals specifically trained to translate scientific knowledge into the policy domain. In my opinion many processes associated to capacity building are currently failing because of lack of these kinds of interdisciplinary teams.*"

Canadian investigator Brian Luckman's projects have supported over 1,000 students in the form of scholarships, salaries, funding to cover field or laboratory expenses or to attend specialized courses. They made a significant contribution to research on the hydrologic cycle and climate change. His studies included research on climate and climate impacts on human activities; dendroarchaeology in the South American Altiplano; the relationships between climate anomalies and epidemics in South America and Mexico; climate influences on forest dynamics; dendrochronological investigation of volcanic eruptions, debris flows, snow avalanches and other natural hazards in the Patagonian Andes including modeling of a moraine failure and glacier lake outburst flood; the development of lichenometric techniques to date glacier fluctuations; the dating and conservation of old trees and studies of the influence of land use change on erosion, sedimentation and physical conditions of riparian species in Mexico. His projects - like other IAI projects - also created opportunities for Canadian and American scientists to collaborate with Latin American scientists, and to make important contributions to research and training. Luckman observes that:

> *"National grants generally do not fund international cooperation and more IAI-type trans-national interdisciplinary funding for international research is needed. The IAI funding has had significant impact on capacity building and training of students at all levels, providing project support and enhancing the capacity of individual researchers to leverage funds from other agencies for critical elements of the research program.*"

IAI projects have provided training and knowledge to local stakeholders. They have used short publications with digests from scientific reports. Guatemalan investigator Edwin Castellanos has worked closely with farmers in Guatemala, Mexico, Honduras and Costa Rica to study how climate change impacts on the environment have affected coffee producers. From the knowledge gained, researchers realized the need to supplement their social research with more biophysical studies to have a better idea of the magnitude of climatic and ecosystemic changes that are occurring, and of what farmers may face in the future. Researchers must know how to communicate with a non-scientific audience. Castellanos notes that:

> "*Researchers in the project had to approach the questions with a very open mind, ready to "go back to the classroom" and learn even the basics of other disciplines and be ready to communicate findings to a non-scientific audience. Overall, for scientists from developing countries, sharing with peers from developed countries in a long-term research project is a crucial way to increase our training in general science skills, particularly in generating scientific publications"*.

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