



ADVANCING KNOWLEDGE FOR ACTION ON GLOBAL ENVIRONMENTAL CHANGE

REFLECTING ON PROGRESS AND STRATEGIZING FOR THE FUTURE



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*START is the Global Change **Sys**TeM for **A**nalysis, **R**esearch, and **T**raining. In 2014, we celebrated 22 years of **building capacity, fostering networks, and mobilizing resources** to inspire action on global environmental change.*



START: PAST, PRESENT AND FUTURE

A Message from Hassan Virji, Executive Director & Gordon McBean, Board Chair

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Chair, Board of Directors,
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All countries need robust scientific capabilities to effectively motivate and inform societal action to manage risks and address opportunities of global environmental change and sustainable development. Developing and connecting existing institutions, training the next generation of scientists, and providing them with better access to data, research, and communication skills is essential for developing responses critical global challenges.

Building and enhancing capacities to generate, interpret, and share knowledge about climatic and other global environmental change risks requires significant and well-targeted investments that strengthen research capacity through education and training and through engaging researchers with practitioner and policy communities in identifying strategies for action. This is precisely the mission of the global change SysTEM for Analysis Research and Training (START), founded in 1992 to promote research-driven capacity building on global environmental change in Africa and the Asia-Pacific. The International START Secretariat is hosted in the US by the US Global Change Research Program.

During START's initial decade, we implemented a comprehensive portfolio of research-driven capacity building activities aimed at human resource development and building a critical mass of global change researchers in Africa and Asia. START's original focus was compelled by recognition of the urgent need to develop an adequate scientific knowledge base in the developing world that could support sound national, regional and global policy and decision-making. Important milestones in START's early period include: 1) a thriving regional structure of START centers hosted by national institutions, led by dedicated individuals, and guided by regional committees committed to fostering regionally collaborative research networks; 2) programs that supported hundreds of young and early career scientists to engage in regional level research; and, 3) a growing collection of activities and tools, including workshops, training institutes, young scientists' conferences, and peer-reviewed publications that enhanced skill development in Global Environmental Change (GEC) research.

In the subsequent decade, we broadened our effort to include actions aimed at institutional strengthening; promotion of interdisciplinary, collaborative and cross-regional research;

capacity building in tertiary education; and the development of innovative communication strategies for engaging decision makers and informing policy actions. START's innovative and cutting-edge capacity building programs, such as the *Assessments of Impacts and Adaptation to Climate Change (AIACC)* and the *African Climate Change Fellowship Program (ACCFP)*, opened new vistas for vulnerability, impacts, and adaptation-related research in the developing world. These programs and others have engaged a wide array of individuals and institutions from the developing world in national and global programs of research and in development and implementation of activities related to National Adaptation Programmes of Action, the Intergovernmental Panel on Climate Change, and the UN Framework Convention on Climate Change.

We have set a dynamic and challenging agenda for the next ten years that will expand research and capacity for understanding, communicating and responding to global change in a diversity of socio-economic, cultural and political contexts. The three priorities of START's ten-year strategy are to: 1) strengthen and expand inter-disciplinary and multi-sectoral expertise in integrated research and assessment; 2) catalyze knowledge into action by promoting effective communication between communities of research, policy and practice; and, 3) support efforts by universities in Africa and Asia-Pacific to inform and engage society in creating more resilient and adaptive development trajectories.

Successfully implementing activities that advance these priorities will require that START continue to build strategic partnerships that emphasize shared interests and goals and combine complementary strengths to enable greater impact and effectiveness. This has been fundamental to START's mission from the beginning and will be an integral part of our operation in the coming decade. Given the richness of its expertise and experience, START is well positioned to be both a leader and partner in promoting capacity building within national to global initiatives, including international endeavours such as the *Integrated Research on Disaster Risk* program and the emerging Future Earth initiative on earth system sustainability. We are committed to fostering scientific capabilities in the developing world that will underpin the transformations that are necessary to enable and support sustainable and resilient societies and ecosystems.

ABOUT START

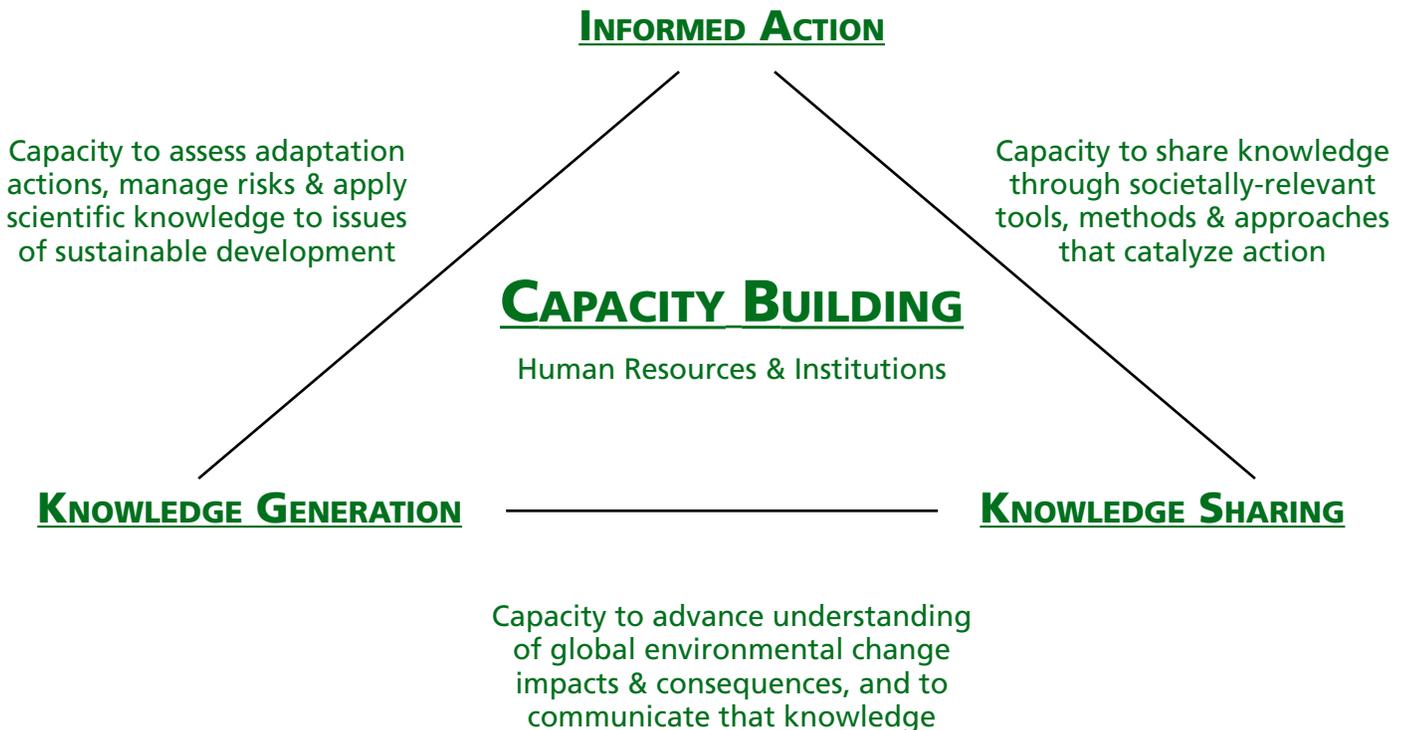
START, founded in 1992, promotes research-driven capacity building to advance knowledge on global environmental change in Africa and Asia-Pacific (Asia and Oceania). We accomplish this through programs and activities that include research grants and fellowships, curricula development, advanced training institutes, multi-stakeholder dialogues, knowledge assessment and synthesis, and place-based strategic planning for advancing global change related education and research in the developing world.

Global environmental change (GEC) is a phenomenon resulting

from the confluence of environmental transformations, driven by both human and natural processes, that influence society and its health and well-being, START initiatives address issues arising at the intersection of GEC and sustainable development, which include climate variability and change, disaster risk reduction, land-use/land-cover change, biodiversity conservation, urban development, human health, water resources management, and agriculture and food security. Our work is carried out by a system of regionally based centers and affiliated partner institutions in Africa and Asia-Pacific, together with

the International START Secretariat based in Washington, DC. This distributed structure enables START to more effectively strengthen the global knowledge systems that underpin critical decision making on GEC issues.

START's framework for capacity building is one that prioritizes development and implementation of innovative programs and activities that integrate knowledge generation with knowledge sharing in ways that can effectively inform, and be informed by, action. This approach is depicted in the figure below.



START's Vision

A world in which developing countries strengthen their capacities to produce and use science for sustainability.

START's Mission

To increase opportunities for research, education and training that strengthen scientific capacities in developing countries to understand, communicate and motivate action on critical global environmental change challenges.

START's Approach to Capacity Building

START values learning-by-doing experiences that enhance skills and competencies for understanding, communicating and managing global environmental change, including climate change. We view capacity strengthening as a continual process whereby START alumni are engaged and re-engaged in multiple activities that build leadership in their respective fields and regions and create opportunities for them to be key actors in strengthening their own institutions while also encouraging relevant partnership and exchange

between institutions. This iterative approach to alumni engagement and network building has allowed START to create a positive and sustainable presence in Africa and Asia-Pacific.

START helps to foster more resilient and adaptable development by targeting its activities at the interface of science, policy, and practice. Although participants in START activities have traditionally been regional scientists, we are increasingly developing programs and activities that engage policymakers, civil society representatives and other societal

decision-makers alongside scientists and educators to promote knowledge systems that are responsive and effective.

Over the last 22 years, START has made important strides in advancing capacity for addressing GEC. Reflecting on two decades of capacity building experience, we identify several key principles that we believe are critical to ensuring enduring impact.

We emphasize that capacity building should be:

- 1. Research-driven.** Nationally and regionally based scientific networks with strong capacities to investigate complex issues are an important underpinning of informed decision making.
- 2. Issue-based and place-based.** Capacity building approaches should be tuned to the issues, needs and priorities of individual countries and regions rather than being determined by a specific tool or program.
- 3. Long-term.** Building and strengthening capacity is a decades-long process that should include such actions as participation in long-term research initiatives of international science programs, and development of strong university-based learning initiatives.
- 4. Catalytic.** Capacity building should be focused on those people and systems that can multiply the impact of donor investments. Typically, this means concentrating on younger scientists and on networks of individuals and institutions.

START ACCOMPLISHMENTS

On an annual basis, START engages between 500 to 1,000 developing country scientists, policymakers, and practitioners in its research, training and communication/outreach programs. START connects these individuals and their institutions with the broader international community engaged in global environmental change research. Over time, these efforts have greatly enhanced the contributions of developing country scientists to regional and global initiatives including the Intergovernmental Panel on Climate Change, the Millennium Ecosystem Assessment, the UN Framework Convention on Climate Change and its Nairobi Work Programme on Impacts, Vulnerability, and Adaptation. The visibility and engagement of both scientists and decision-makers in national and

regional level adaptation planning and development has also increased as a result of their involvement in START's programs.

Over the past twenty years, START has organized more than 420 synthesis and training events. The spectrum of topics and issues addressed in the events varies widely; memorable foci include modeling of the Arabian Sea (1999), carbon dynamics and water in Southeast Asia (2006), biodiversity conservation and climate change in the Albertine Rift (2008, 2010), the role of universities in supporting climate change adaptation in Africa (2010) and forensic investigation of disasters (2012). Over this same period, we've also awarded 155 individual fellowships and more than 450 research and assessment grants and recognized an additional 200 young scientists in developing countries for

their research achievements.

START is widely recognized as a "can-do" organization with a proven track record for advancing place-based and research-driven capacity building. The organization's active alumni network and effective strategic partnerships are a tremendous resource as well as a testament to our abilities to inspire, influence and deliver.

START's core strengths are in **fostering innovation in research-driven capacity building; creating space for exchange and collaboration; promoting communication at the interface of science, policy and practice; and partnering with universities to develop creative learning pathways.** Examples of accomplishments under each of these categories are described in the pages that follow.



155
individual
fellowships
awarded



450
research &
assessment
grants awarded



200
young scientists in
developing countries
recognized for their
research achievements



420
workshops &
other training
events

Fostering innovation in research-driven capacity building



Above: Mapping social vulnerabilities of coastal cities at risk

START's long-term commitment to building scientific capacity through promoting multidisciplinary and multi-sectoral research and assessment activities has contributed significantly to enhancing the capabilities of individuals and institutions in Africa and Asia-Pacific to undertake GEC research. Such research-based capacity building efforts have strengthened regional scientific networks through which scientists continue to collaborate, even after direct engagement with START has ended. START's added emphasis on science-based communications – a priority that is now built into all programming – has resulted in the provision of scientifically sound, relevant information to policy-makers and other decision makers.

Enabling completion of graduate training in developing countries

In 2002, START initiated a fellowship program for outstanding young African scientists who were engaged in GEC research leading to completion of a doctoral dissertation at an African university. The fellowship awards, supported by a grant from the Norwegian Agency for Development (NORAD), provided for up to two years of study leading to completion of the Ph.D. or for the final year of graduate study combined with one-year of post-doctoral research. Awards provided for tuition, research materials, and a small living allowance. A total of 36 African researchers in 15 countries received fellowships through the five-year program. Many program alumni are now professors and assistant professors in African universities; and thus are in a position to inspire the next generation GEC researchers in Africa.

National and International Leadership for the Zambia Meteorological Department

In 2006, Joseph Kanyanga received a START/NORAD PhD Fellowship in support of his research in Environmental Management and Energy Studies of the Department of Geography at University of Johannesburg, South Africa. Joseph's innovative research provided answers about the impact of the El Nino Southern Oscillation on the movement of airborne particles from biomass burning in Southern Africa. His data, collected in both his home country of Zambia and in Botswana, was analyzed and entered into the best computer models available at the time to document atmospheric circulation patterns over southern Africa.

After completing his PhD in 2008, Joseph went back to Zambia to work in the Meteorological Department, where he is now Chief Meteorologist in charge of Zambian weather reporting and weather and climate monitoring. He is also the appointed Coordinator for International Matters.

Joseph is involved in innovative research and documentation of atmospheric changes. He serves as the chief liaison for Zambia to the World Meteorological Organization (WMO). In 2012-13, he served as a reviewer for the 5th Assessment Report of the Intergovernmental Panel on Climate Change. As a START alumnus with a high quality Africa-based education, Joseph is now providing a service not only to his home country, but also to all of Africa and the larger community climate change scientists.

Promoting partnership & exchange to advance adaptation knowledge in Africa

The *African Climate Change Fellowship Program (ACCFP)* is strengthening the foundation for a growing Pan-African knowledge network on adaptation to climate change. The ACCFP supports African researchers, professionals, educators and graduate students to carry out scientific and policy-oriented research, curriculum development and teaching. Having engaged 94 Fellows and over 100 institutions, to date, the program is recognized as a major platform for education, training and capacity building in Africa.

ACCFP Fellows are matched with universities, research centers and other Host Institutions across Africa where they collaborate with mentors to implement individually designed projects that, for example, assess and prioritize climate risks, investigate current practices for designing and implementing adaptation actions and/or consider approaches for integrating adaptation with planning and practice. All ACCFP Fellows also participate in periodic program workshops and seminars that include targeted training sessions designed to add value to the research experience. Some such exercises challenge Fellows to integrate deliberate outreach efforts and innovative communication strategies and tools into their work. Others emphasize the importance of creating and sustaining partnerships between academic and non-academic communities. Workshops and seminars are often organized in conjunction with relevant international events in order to

expose Fellows to the extensive range of expertise, interests and debates that exists within climate change communities in Africa and abroad.

ACCFP Fellows often become ambassadors who link their Home and Host Institutions, catalyzing knowledge sharing, interaction and exchange that extends beyond

the duration of a single fellowship period. Many program participants continue to collaborate even after their initial ACCFP engagements, further advancing the program's goal of creating an active and engaged community of individuals and institutions that are dedicated to building scientific capacity in Africa to manage climate change.

Stepping stones for success: Building on the ACCFP experience



In 2008, Chipu Mubaya was a PhD student conducting research on how farmers adapt to climate variability in Zimbabwe and Zambia. Receiving a Doctoral Research Fellowship from START's African Climate Change Fellowship Program proved to be a turning point in her career. Of her ACCFP experience, Mubaya says, "In addition to contributing to the successful completion of my PhD, START has afforded me a high level of exposure that has enabled me to mix with both junior and senior researchers from different backgrounds... [I have] been invited to publish academic work and this enabled me to contribute to the global sustainability issues debate and improved my writing and communication skills."

Her relationship with START and its ACCFP partners at the Institute of Resource Assessment at the University of Dar es Salaam (IRA-U DSM) also extended beyond her fellowship. Mubaya was hosted by IRA-U DSM for her ACCFP experience and later joined the ACCFP Secretariat at IRA-U DSM as the Senior Program Officer responsible for managing program activities in Africa. In 2013, Mubaya took the next step in her career when she accepted the position of Deputy Director for Research and Resource Mobilization and Senior Research Fellow at Chinhoyi University of Technology in Zimbabwe.

"START has played a key role in advancing capacity building activities in climate change adaptation by partnering with IRA and many other African institutions to collaboratively implement a number of regional projects that target young researchers, practitioners and educators. I know that START remains committed to the ACCFP program and continues to strengthen it in various ways." Mubaya notes that for this, she and many other young researchers, some yet to come, remain grateful.

Mobilizing collaborative research teams to advance and communicate knowledge on global environmental change

The *Grants for GEC Research in Africa* program strengthens the capacity of African scientists to advance understanding of the drivers of and potential responses to global and environmental change in Africa. The program was initiated in 2003 and awards one-year grants that support collaborative and experiential research projects implemented by interdisciplinary teams of scientists. All projects integrate both natural and social science perspectives and prioritize

communication of research results to support policy and decision-making. Since its inception, the *Grants for GEC Research in Africa* program has supported 107 research grants in approximately 24 countries in Africa.

The program's annual Call for Proposals targets a specific theme or themes. In 2011 and 2012, for instance, GEC grants supported research for advancing understanding of issues related to climate change, agriculture and food security with an emphasis on the

sustainability of ecosystem services. In 2012, long-standing support for the GEC Grants program from the US National Science Foundation (through the US Global Change Research Program) was leveraged to secure additional program support from the Climate and Development Knowledge Network. Expanded support for the program enabled the number of grants awarded to more than double, and for the first time, all program grantees came together at the end of their project periods in a *Learning Forum* to share their results, identify remaining knowledge needs and plan for future research and communication activities.

START also partners with the Asia Pacific Network for Global Change Research (APN) to support research and related capacity building activities in the Asia-Pacific region. From 2010 to 2013, START provided collateral support for two APN grant programs - the Annual Regional Call for Proposals (ARCP) program and the Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE) program. Both programs encourage and promote global change research in the region in order to improve understanding of GEC and its implications in the Asia-Pacific. In doing so, supported research contributes to the establishment of a sound scientific basis for relevant policy-making. A total of 26 collaborative research grants have supported by way of this START-APN partnership.

MaghLag: A portal for collaboration and exchange

From 2011 to 2012, Maria Snoussi from Morocco and colleagues from Algeria, Tunisia, and France completed a research project on the sensitivity of North African coastal lagoons to climate and related global changes. The project involved a close collaboration across



Researchers in North Africa document changes in fisheries productivity.

countries to develop a lagoonal vulnerability index and related database.

A primary result of the project was the formation of the Maghrebian Lagoon Network (MaghLag) as a platform to maintain relationships amongst scientists. The network seeks to encourage sharing of data and development of multi-country research proposals. MaghLag workshops funded by the original START GEC grant brought together additional researchers from the project countries, with additional experts from Italy, France, and Norway to create a collaboration between European and North African scientists.

"This collaboration fostered regional science and networking and provided a major portal for North- South exchange, dialogue and capacity building," says Snoussi.

Creating opportunities to promote effective research design & implementation

START periodically offers Advanced Institutes that provide training opportunities for researchers on new tools and methodologies in their fields. These intensive, one to three-week-long training events bring international and regional experts together with competitively selected, early career researchers to delve deeply into a set of issues around a particular theme. START Advanced Institutes (AIs) include educational modules, hands-on interactive exercises, group work and field visits. Many times, START awards small “seed grants” to AI participants that allow them to incorporate and apply their newfound knowledge and skills into research, assessment or communication activities back at their home institutions.

START AIs are characterized by a shared and participatory experience that produces a strong foundation for follow-on participant collaboration and partnership. Sometimes a single training event can spawn a more in-depth, longer term program of action, as was the case with *Cities at Risk* — a START program whose roots can be traced back, at least in part, to the 2003 *Advanced Institute on Urbanization, Emissions and the Global Carbon Cycle*.

Continued engagement engenders greater impact



Dr. Francisco Meza first encountered START over ten years ago when he participated in a three-week START Advanced Institute on “Climate Variability and Food Security”. Meza was exposed to challenging questions, asked to prepare research proposals, and invited to collaborate with peers. He recalls, “For a young scientist this was a very stimulating environment.” The small research grant he received from START following completion of the AI allowed him to purchase equipment, hire a grad student, participate in a conference, and publish his research.

Over the years, Meza continued to interact with START through its Young Scientist Conferences. “START has strongly influenced my career and offered me opportunities and mentoring to advance it,” says Meza. He currently serves as a Professor in the College of Agriculture and Director of the Global Change Center at the Pontifical Catholic University of Chile. Meza is also a Principal Investigator for the Inter-American Institute for Global Change and a member of the IPCC and the Council of Climate Change of the Chilean Ministry of Agriculture. “The organization and mentoring offered by START was incredible and changed my perspective of international collaboration and scientific training. In addition, it offered me a network in which to interact with world class scientists and introduced me the concept of Global Environmental Change, which has been the main area of my research since then.”

Meza hopes to continue START’s legacy of mentoring young scientists through his own work as a professor. “Through my academic work, [START’s] vision is being spread out to touch all the graduates and colleagues that work with me.”

| Year | Topic |
|------|---------------------------------------------------|
| 2002 | Climate Variability & Food Security |
| 2003 | Urbanization, Emissions & the Global Carbon Cycle |
| 2004 | Vulnerability to Global Environmental Change |
| 2007 | Vulnerability of Water Resources |
| 2008 | Asian Monsoon |
| 2012 | Forensic Investigations of Disasters |
| 2012 | Data for Coastal Cities at Risk |

Supporting regional investigations of climate change vulnerability, impacts, and adaptation

Strengthening the capacity of developing country scientists to undertake interdisciplinary, multi-sector research and assessments was a key motivator behind the START-led *Assessments of Impacts and Adaptation to Climate Change (AIACC)* project. Under AIACC, project teams from 46 developing countries across Africa, Asia, Latin America and Small Island States collaborated to implement 24 sub-regional climate change studies. The initiative involved over 300 scientists, experts and students and produced more than 200 publications that provided critical input to the 4th Assessment Report of the Intergovernmental Panel on Climate Change.

AIACC assessments investigated a wide range of topics including biodiversity conservation and ecosystem resiliency, water resources, agriculture, food security and rural

livelihoods, human health and tourism. By collaborating with others from diverse backgrounds and areas of expertise to advance research activities, AIACC participants gained essential skills for conducting integrated assessments that included recognizing and accounting for cross-system interactions and feedbacks, integrating results across multiple sectors and scales, and synthesizing

findings in a manner relevant to the needs of societal stakeholder groups engaged in adaptation planning. The AIACC experience combined these research efforts with multiple capacity building activities, including south-south training events in which assessment teams would provide targeted training to other teams in the AIACC network.



AIACC Project acknowledged as “jumpstart” for scientific career

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Facilitating integration of research across regions and disciplines

The *Monsoon Asia Integrated Regional Study (MAIRS)* is a consortium of East Asian organizations dedicated to the integrated study of earth system processes in the Asia Monsoon Region. MAIRS focuses on the coupled human-monsoon system with aims to understand to what extent human activities modulate the Asia monsoon climate and how the changed monsoon climate will impact further the social and economic development of the region. MAIRS supports regional studies that combine field experiments, process studies and modeling components and has implemented regional research programs on climate-ecosystem modeling and intercomparison, land use, aerosols and urban air pollution. Networks of regional and international scientists collaborate to carry out the work. MAIRS was originally implemented



by START on behalf of the Earth System Science Partnership and its GEC program partners. MAIRS is now guided by a Scientific Steering Committee and managed by an international project office that is

adjoined to the Temperate East Asia START Regional Research Center (TEA-START RRC) located at the Institute of Atmospheric Physics of the Chinese Academy of Sciences in Beijing.

Infusing science into operational decision-making

Climate Prediction and Agriculture (CLIMAG) was an interdisciplinary project implemented in Africa, Asia, Latin America and North America with the goal of demonstrating the practical utility of climate forecasts for agricultural decision-making. Initiated in 1998, the project was unique in its approach to integrating a number of what were, at the time, novel advances in the science of climate forecasting, downscaling large area climate forecasts to local applications, and integration of climate

forecasts into operational crop models. The project enhanced the skills of regional researchers in these areas of expertise and promoted application of those skills in the

development of alternative scenarios for operational decision-making. CLIMAG advanced understanding of how climate knowledge and prediction capacity at seasonal time scales can contribute to adaptive management and resilience within agricultural systems and therefore enhance food and livelihood security. Climate information and prediction information generated by the CLIMAG project also provided important inputs into agricultural planning in several developing countries.



Creating spaces for exchange and collaboration



Above: Mary Ama Kudom Agyemang, a journalist from Ghana, and Pascal Yaka, a researcher from Burkina Faso, discuss meningitis and climate change.

START is known for its ability to bring together diverse groups of individuals who do not normally sit at the same table—removing them from day-to-day responsibilities and demands in order to create spaces and opportunities for meaningful exchange and collaboration. In such spaces, START staff and partners facilitate exercises and experiences that stimulate dialogue and debate, tease out answers to challenging questions and shepherd participatory processes of investigation, discovery and reflection. Activities are also designed to arm participants with the knowledge, tools and support required to apply relevant ideas when returning to their institutions and communities. These shared experiences form a strong foundation for follow-on collaboration and partnership that outlive the START-led activity.

Encouraging shared exploration of climate information needs for managing climate-sensitive diseases

Exploration of potential junctures where climate and health communities could join forces in managing climate-sensitive diseases in Africa was the focus of a June 2012 workshop in Ouagadougou, Burkina Faso convened by START, the ICSU Regional Office for Africa, the University of Cape Town's Climate Systems Analysis Group, and the African Center for Meteorological Applications for Development (ACMAD). The workshop drew participants from 12 African countries, and featured a range of expertise including climatology, meteorology, disease epidemiology, public health management, and mass media/communications. The workshop encouraged shared exploration between the climate

and health communities on climate information needs for managing such diseases as malaria, meningitis, and Rift Valley fever. A major theme running through the workshop concerned the need to reduce communication barriers and capacity gaps that exist between providers and potential users of climate information such that climate information can be derived and presented in a way that is relevant and actionable for decision making. In addition to discussing scientific and technical concerns, the workshop participants also explored the decision-making context in which disease

management occurs, and through this process identified specific areas where political will, institutional flexibility, enabling policies, and capacity building are needed to advance the integration of climate information into effective disease management.

Anopheles mosquito breeding ground in Ghana



Developing a strategic direction for education, capacity building and climate change in Africa

START, with support from the Open Society Foundation, convened a forum in 2010 to explore the role of African universities in promoting education on climate change adaptation. Forum sessions examined opportunities for new approaches to curriculum design, innovative ways to integrate climate change concepts into existing curriculum, and questions regarding how to more fully engage civil society on adaptation through education aimed outside of the university. Institutional capacity needs, specifically related

to teacher training and support, emerged as clear priorities for action.

The forum brought together over 150 participants from 40 African countries. At the Forum, university Vice Chancellors partnered with representatives from rural community-based organizations, development aid workers partnered with forecasters from meteorological agencies, and graduate students partnered with university faculty to develop near, medium and long-term actions on education, research and outreach for adaptation in Africa.

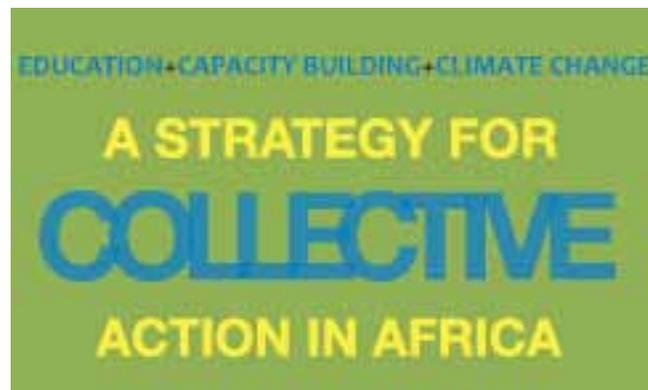
A strategy document produced by forum participants details numerous ideas for curriculum and staff development as well as partnerships and collaborations that mainstream climate change across disciplines and advance creative educational tools and pathways for bridging science and society and supporting adaptation efforts. Several of these ideas have been piloted by participants, and many have become anchors of START's evolving portfolio of work on GEC education in Africa.

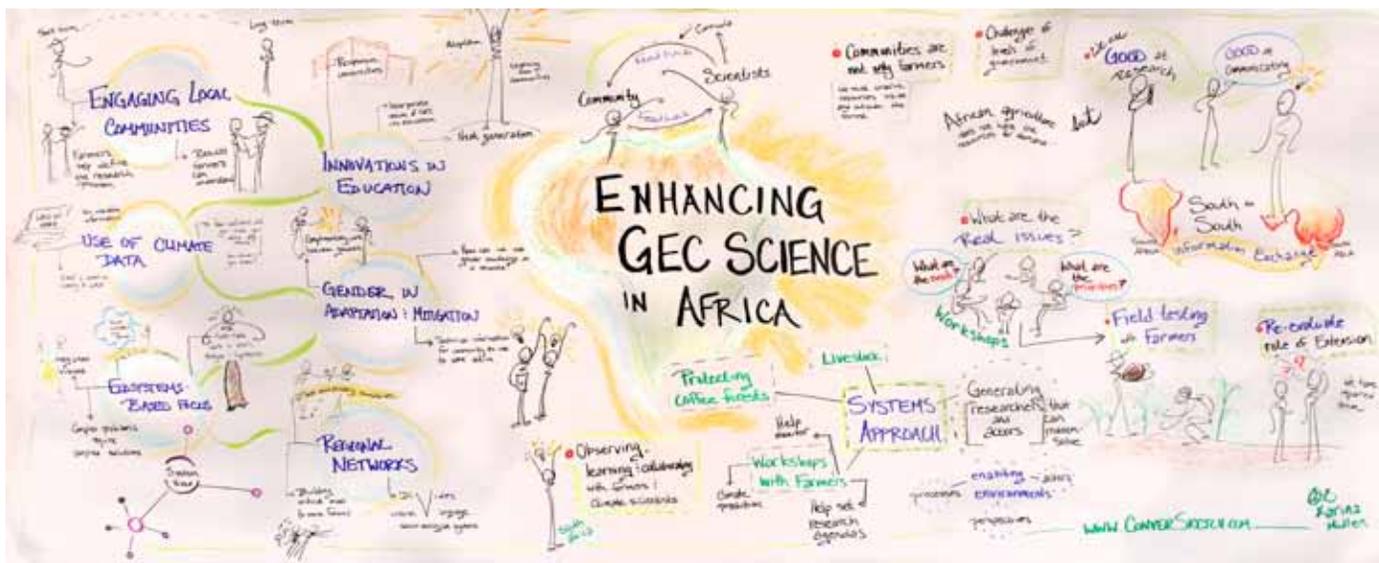


Participants envision future societies at the Forum on Education, Capacity Building and Climate Change held in July 2010 in Dar Es Salaam, Tanzania

Vision:

A world-class higher education system in Africa that effectively integrates understanding of climate and development and, in doing so, informs and supports efforts by societies in Africa to effectively respond to future challenges and opportunities.





Learning Forums: Learning from one another to advance emerging messages

Learning Forums provide opportunities for START-supported scientists to come together with other regional and international subject matter experts to share their research findings and perspectives, identify key messages for synthesis products, and develop innovative communication approaches for reaching decision makers. Often, START Learning Forums include an additional skill-building component, such as a writing workshop in which researchers improve their manuscript writing skills.

In November 2012, a group of nearly 60 researchers, educators, and development practitioners from 17 countries across Africa and abroad came together in Accra, Ghana, for the first annual GEC Research and Learning Forum. The three-day event was organized by START in partnership with local hosts at the Institute of Environment and Sanitation Studies of the University

of Ghana. The Forum provided an opportunity for recipients of the 2011–2012 round of START’s Grants for GEC Research in Africa program as well as other regional and international experts to present on climate change, agriculture, and food security in Africa. All forum participants took part in targeted training activities offered by Kenya-based Well Told Story that were designed to strengthen future research design and promote increased, more effective communication between communities of science, policy, and practice. START-facilitated exercises also enabled collaborative

synthesis of priority recommendations emerging from the 16 research teams supported by 2011–2012 grants. The Forum was well received, with many participants underscoring the need for more such opportunities for peer-to-peer learning and joint development of ideas.

Learning Forum participants identify next step priorities for GEC research in Africa



Promoting communication at the interface of science, policy and practice



Above: Chuluun Toghtyn, START Fellow from Mongolia, explains climate change risks to Mongolian herders

Communication pathways that support interaction and dialogue between scientists, policy makers, and other societal stakeholder groups are essential for transforming knowledge into action. Fostering such opportunities for communication is an important element of START's mission. START's major activities in this area include support for participatory development of climate risk communication tools for vulnerable communities and facilitation of 'visioning' exercises and multi-stakeholder dialogues that provide opportunities to integrate climate change issues into development priorities and planning.

Bringing together stakeholders and the scientific community to enable and support effective adaptation decisions

Effective communication of climate change risks needs to be grounded in decision-making processes and priorities of vulnerable groups. The *Advancing Capacity to Support Climate Change Adaptation (ACCCA)* project helped to advance understanding of how to do this through developing risk communication methods and tools capable of supporting stakeholder decision-making. Pilot communication efforts in 17 countries in Africa and Asia were advanced by teams of scientists who collaborated with targeted stakeholder groups to identify and prioritize climate risks, synthesize knowledge relevant to stakeholder concerns and decision-making needs, and develop, test and disseminate risk communication materials designed to assist adaptation planning. The ACCCA

project was carried out between 2006 and 2009 and was led by the UN Institute of Training and Research in partnership with START, the Stockholm Environment Institute-Oxford, the University of Cape Town's

Climate Systems Analysis Group, the START regional centers in Southeast and East Asia, and Environnement et Développement du Tiers Monde (ENDA).

Field visit with Mongolian herders as part of a participatory workshop that identified and developed local adaptation strategies



Promoting effective communication between science & policy communities in Africa & Asia

Integrating knowledge about climate change into development planning is essential for formulating appropriate strategies for adaptation. However, lack of awareness about key aspects of adaptation and the scarcity of sector- and location-specific knowledge can inhibit much-needed action. To help overcome these obstacles, START – in partnership with the World Meteorological Organization, the United Nations Environment Program, the Intergovernmental Panel on Climate

Change, the University of Ghana, the University of Dar es Salaam, and the Bangladesh Center for Advanced Studies – engaged scientists, policy makers, development professionals, the private sector, media and civil society organizations in national-level science-policy dialogues. The dialogues, which took place in nine countries across Africa and South Asia as part of the IPCC's outreach around its Fourth Assessment Report, were intended to enable better integration of climate change

issues into development planning. The science-policy dialogues not only presented a platform for scientists and policy makers to interact but it also provided a multi-layered analysis of the science-policy interface in a national context and made available nationally relevant information on climate change. One of the consistent themes of these dialogues emphasized the need to build and promote political will for action on climate change.

The IPCC science-policy dialogue in Ghana, which took place in late 2010 during the run-up to COP15 in Copenhagen, helped advance the Government of Ghana's efforts on climate change. The government needed access to the latest findings coming out of the IPCC 4th Assessment Report and at the same time it needed to engage a wide range of stakeholders in the policy process to ensure that its national climate change strategy was informed by science and would engender a sense of ownership within the country.



Participants at the START Science-policy dialogue in Ghana

Recognizing this, the Centre for African Wetlands at the University of Ghana and START co-facilitated the dialogue, which involved African authors from the IPCC, Ghana-based scientists, parliamentarians, ministerial officials, natural resource management experts, NGOs and the media. Prof. Chris Gordon, Director of the Centre in 2010, states, "Our involvement in planning and hosting the dialogue gave the University high visibility within the Ghanaian government, which has resulted in greater involvement in both government programs and donor-led projects on climate change." Gordon reflects, "The most memorable part of this three-day dialogue was when, on the last day, members of the Ghana Parliamentary Select Committee on Environment and Science took command of the discussion of actions and next steps that the country needed to undertake to begin adapting to climate change. This action demonstrated the effectiveness of such dialogues for advancing progress on the way forward."

A major outcome of the science-policy dialogue for the University was the lead role given to the new Institute for Environment and Sanitation Studies (IESS) by the Ministry of Environment Science Technology and Innovation in the development of the National Climate Change Policy Framework, which led to the preparation of the National Climate Change Policy, signed by the President of Ghana in 2013. Currently IESS is leading the preparation of the National Climate Change Master Plan 2014-2020. Prof. Gordon is now the Director of the IESS and acknowledges that the Institute's "involvement with START was key to achieving this enhanced visibility".

Sharing knowledge for managing climate change risks in coastal cities

START's *Cities at Risk (CAR)* program brings together scientists, city planning professionals, politicians, and civil society representatives to improve collective understanding of how climate change will impact rapidly growing urban centers in their regions and to develop climate and disaster risk management strategies that take into account anticipated challenges. In Asia, START convenes international conferences, organizes intensive training institutes and supports city-specific research, communication and outreach activities that encourage coordinated action among scientists, policymakers and the public as well as the integration of scientific information into policy and planning. In Africa, recent CAR-focused scoping workshops have identified priority knowledge and capacity needs for urban risk management and resilience. Recommendations from the Africa workshops are underpinning design and development of a new 3-5 program of Cities at Risk research, education and training for the continent.

To date, START's *Cities at Risk* activities have engaged individuals and institutions from more than 20 cities in South and Southeast Asia and eleven cities in Africa. The program contributes directly to the international program on Integrated Research on Disaster Risk (IRDR).

Confidence and network are integral to capacity toolbox



Hendricus Andy Simarmata happily acknowledges that his involvement in START has been a key to his growth as a scientist and to his contributions to international work on global environmental change. Simarmata is a lecturer in the Urban Development Studies postgraduate program at the University of Indonesia and Head of Training and Professional Development Division for the Indonesia Association of Planners. He notes, "The START program helped me to understand global issues, to meet international experts, and to learn from other countries' experiences. This has helped me to understand and define development needs for my own region."

Having first engaged with START during a *Cities at Risk* training event on vulnerability assessment tools and methods (held in Bangkok in 2010), Simarmata later presented his evolving research at the 2011 START-organized Second International Conference on Cities at Risk: Building Adaptive Capacities for Managing Climate Change Risks in Asian Coastal Cities (CAR II) in Taipei. Ideas generated at CARII subsequently led to a proposal to START from Jakarta, on which Simarmata was a lead proponent. The proposal was funded and now supports collaborative research and urban planning by researchers, provincial government and at-risk communities in North Coastal Jakarta.

Simarmata admits that he felt unprepared to work on global environmental change impact prior to his involvement with START. Because of the experiences, skills and confidence that he has been afforded by START opportunities, however, he recently collaborated with other START alumni to develop a training module on integrating GEC and urban planning tools with disaster risk reduction measures. The group plans to use to module to transfer such skills to others in their field. Simarmata adds, "My experiences with START have prompted me to write my doctoral research proposal. Thank you, START, for giving me valuable knowledge and an international network for my career development."



Partnering with universities to develop innovative learning pathways



Above: START ACCFP Fellows at an IHDP Open Science Meeting in Bonn, Germany

Universities have a vital role to play in helping society to adapt to climate change and other impacts from global environmental change. Realizing the potential of universities to be active agents of change will require new educational approaches that emphasize problems-based and solutions-focused experiential learning.

START's emerging portfolio of activities to promote GEC education responds to the need to foster innovative approaches for university based learning that are oriented towards meeting societal needs for adaptation. START is working with a number of partners at African universities to develop and implement strategies for generating and sharing relevant knowledge.

Integrating climate change into teaching, learning and communicating

START is partnering with the University of Dar es Salaam on a university-wide program to integrate teaching and learning on climate change into the classroom experience and to promote communication on critical climate change issues between the university and the public. The work, carried out through the University of Dar es Salaam's Center for Climate Change Studies (CCCS) in collaboration with START, involves developing new curricula to enhance learning about climate change, providing training that develops instructional approaches for teaching on climate change issues, promoting inter-disciplinary research on climate change, and facilitating opportunities for discourse between university-based researchers, civil society organizations, the private sector, and policy makers.

The CCCS partnership with START has been very important to successful implementation of the Climate Change Research, Education and Outreach (CCREOC) program, financed by the Open Society Foundation. START has engaged with the CCCS secretariat to identify appropriate avenues

for mainstreaming climate change knowledge in the existing university curricula, developing a stand-alone MSc program in Climate Change and Sustainable Development at the university, creating training tools and communication materials, designing modules, and making references and teaching materials available.

Knowing the science, dealing with the change: An interdisciplinary graduate program

In April 2013, 24 students started the MSc course in Climate Change and Sustainable Development established through the CCCS-START partnership. The MSc program includes 15 courses taught by faculty from across all schools at University of Dar es Salaam.

Students welcomed the new courses and recognized the importance of such a program for their continued professional development. "The start of this climate change course helps me to understand first the science itself, how climate change is changing, and then, by knowing the science, it will help me with how to deal with it," said Katonda Richard, MSc student.

Building capacity for biodiversity conservation under a changing climate in the Albertine Rift

University level multidisciplinary programs that facilitate learning about climate change, biodiversity and ecosystem services are rare in the Albertine Rift region of Africa – a biodiversity hotspot that is increasingly under threat from natural and human-induced drivers of change. To meet the need for enhancing capacities to manage these emerging threats to biodiversity, START, in partnership with the University of Dar es Salaam, offered Master's level courses and externships for regional conservation practitioners, researchers and university faculty. The program coupled teaching of course modules that foster interactive learning about climate change implications for biodiversity and human-well being with follow-on externships, which enabled the direct application of course knowledge to field research assessments.

A separate training effort for university faculty, supplemented by

access to online course modules, equipped regional educators with resources and tools to incorporate program related learning into conservation curricula at their own universities. To date, the program's curriculum has been formally integrated into the University of Dar es Salaam's Master's program in Natural Resource Assessment and Management. The effort has also networked the University of

Dar es Salaam with other regional universities and institutions, offering enhanced opportunities for sustained collaboration, knowledge sharing and communication. The program ran from 2007-2011.

Efforts to further advance learning on climate change and biodiversity continue through START's current (2013) support for the Regional Network of Conservation Educators in the Albertine Rift.

Coming to the table: Identifying strategies for action

In November 2011 a regional stakeholder Dialogue on Climate Change, Biodiversity Conservation and Ecosystem Services was convened in Dar es Salaam, Tanzania. This dialogue brought together conservation practitioners, experts, academic, policy and decision-makers and NGO representatives to participate in interactive sessions and share perceptions of the impacts of and adaptation to climate change and other



stressors in the Albertine Rift biodiversity hotspot. Discussions emphasized the significant risks to biodiversity from land use change, conflict, population growth, illegal activities and invasive species, as well as climate change.

The Dialogue provided a platform for participants of Education and Training programs in 2008 and 2010 to share findings from regional externship projects organized under START's *Biodiversity Conservation under a Changing Climate* initiative. Participants also shared perspectives on potential strategies for action to address the multiple drivers of ecosystem change and build resilience among human and natural systems. An integrated approach that balanced conservation goals with sustainable development priorities, underscoring the urgent need for continued capacity building, regional cooperation and knowledge sharing.



Participants of 2012 training on climate change and biodiversity conservation



LOOKING FORWARD: CHARTING A COURSE FOR THE NEXT 10 YEARS (2014-2024)

START is committed to helping society anticipate and respond effectively to both risks and opportunities presented by global environmental change. We recognize that an effective response requires strengthening the knowledge base regarding current and future vulnerability and creating better awareness among key decision makers that enables long-term planning for adapting to change. Strengthening knowledge systems to support resilient development requires significant mobilization of resources that target people, programs, and institutions in

building and sustaining capacities for research and communication. Strong and well-supported scientific networks are an indispensable component of such knowledge systems in that they provide an important source of new knowledge to inform dynamic adaptation processes.

START's strategic partnerships and ever-growing network of program alumni, which extend into both the GEC science and development communities, enable it to address emerging knowledge needs, and in doing so, create innovative opportunities and partnerships for

strengthening research capacities in Africa and Asia-Pacific. Our core mission of research-driven capacity building positions START to engage with and contribute substantively to regional and global initiatives such as the Integrated Research on Disaster Risk (IRDR) program and Future Earth.

In the next ten years, we look forward to productive and impactful programs and growth through which we will dedicate ourselves to fostering collaborations that inspire action **In the next ten years, START's priorities are to:**

ACTION AREA 1

Strengthen and expand trans-disciplinary and multi-sectoral expertise in integrated research and assessment that foster stronger and more engaged south-north and south-south research networks.

The complexities inherent in global environmental change require that research and assessment approaches more fully integrate the biophysical, social and behavioral sciences. To realize this objective, START believes that much more effort is needed to ensure that research communities in the global south continue to build strengths and capacities, that various communities of practice be better positioned to capture opportunities for interdisciplinary collaboration within and across regions, and that the flow of knowledge, information, and ideas between researchers and decision makers enables knowledge to more effectively catalyze action. In response to these needs, START will:

- » Intensify its efforts, in collaboration with regional and international partners, to develop and facilitate multi-year, trans-disciplinary research and assessment programs that improve understanding and management of interactions between global environmental change and development.
- » Promote new approaches for knowledge generation that engage a wide range of academic and non-academic partners in processes of co-learning related to how GEC influences disaster risk management, urban development, food security, ecosystem services, and human health and well-being. This will include opportunities for researchers to undertake investigations jointly with local communities, NGOs, boundary organizations, and groups that interface directly with policymakers.
- » Continue to provide 'holistic' Fellowship experiences that include research funding as well as specialized training experiences and targeted opportunities for national, regional and international exchange and collaboration.

Tools and approaches that START will use in meeting these objectives include research grants and fellowship programs, multi-stakeholder learning forums, advanced training institutes, and workshops and seminars on effective communication. START will also continue to challenge itself and its partners to design innovative and non-traditional tools and approaches for achieving its goals.





ACTION AREA 2

Promote effective communication between communities of research, policy and practice that enhances the ability of countries and regions to generate relevant and actionable knowledge and to catalyze research into action

More effective pathways are needed to support the formation of partnerships between researchers, policymakers, and practitioners that foster multi-directional communication of knowledge in socially relevant and actionable terms. In this vein, START will work to advance and improve communication through:

- » Collaboratively developing multi-stakeholder dialogues between research, policy and practice that enable knowledge sharing, interpretation and synthesis, and that identify strategies and actions for building demand-focused knowledge systems.
- » Expanding the scope and availability of training opportunities to more effectively engage scientists and other professionals in the development and application of innovative problem-solving and communication tools, methods, and approaches targeted at a wide range of decision makers.
- » Seeking out new partnerships with other organizations that are active at the interface of communication, development and global environmental change in order to enhance opportunities for innovative communication that reach a broad range of stakeholders.
- » Promoting opportunities to consolidate and synthesize climate information that resides in the grey literature.

Potential groups to engage in these activities include policymakers and government technical staff, extension services, civil society groups (including NGOs, CBOs, and religious associations), media, schoolteachers, and the private sector.



ACTION AREA 3

Support efforts by universities in Africa and Asia-Pacific to inform and engage society in creating more resilient and adaptive development trajectories

A well-informed citizenry, responsive institutions, and problem-focused knowledge generation are critical factors in enabling society to adapt to climate change. As centers of learning, universities have a vital role to play in advancing this vision. Given its long-standing partnerships with universities in these regions, START is exceptionally well-positioned to support universities' efforts in this respect. START will do this through:

- » Collaborating with African and Asian universities to develop and promote educational approaches that emphasize experiential learning that is problems-based and solutions-focused.
- » Actively promoting intra- and inter-regional university partnerships as well as university collaborations with a range of non-university partners to integrate the knowledge and priorities of societal stakeholders with those of the research community.
- » Convening periodic regional forums to promote coordinated action on education, climate change and capacity building. Efforts will include enrichment of existing curriculum and the development of new curriculum on global environmental change, enhanced faculty and staff development programs to inspire and support excellence in teaching, and integration of teaching, research and practice.
- » Partnering with universities to develop new curricula and teaching approaches that enable graduates to address major emerging themes and trends in climate change. Activities under such partnerships would include developing resource packs that aid faculty members in integrating climate change into their courses; creating professional training modules / short courses to address specialist needs; and creating opportunities for course developers to exchange experiences, materials, and ideas to facilitate development of new courses and teaching strategies across relevant disciplines.

To assess its impacts and achievements in these three priority areas, START will consistently evaluate both the effectiveness and reflectiveness of program implementation and results. These actions will build on START's current approaches to monitoring and evaluating its programs and activities, which place high value on enduring impact and proper management of funds, and help START, its partners and its funders achieve the most effective outcomes possible.

PARTNERSHIPS FOR ACTION

START's work is most effective where strategic partnerships are developed that optimize complementary strengths and that are rooted in regional needs and priorities. Such partnerships make long-term and productive collaborations possible. During the past twenty years, START has forged diverse partnerships that span universities and research institutes, international global change research programs, intergovernmental organizations devoted to global environmental change research, regional and international NGOs, multilateral organizations and private foundations.

To effectively advance its capacity building efforts and ensure a legacy of sustained achievement, START will consolidate and strengthen its existing partnerships and engage new partners that advance our efforts to inform societal decision-making. One important avenue for strengthening

partnerships is through involvement in large global initiatives, including the IRDR program and the International Council of Science/International Social Science Council's *Future Earth* initiative. We also look to partnerships with universities, research centers, NGOs and others, outside of these global initiatives, as important for achieving our goals for the next ten years.

In the coming decade, the number and type of organizations involved in START regional structures are expected to grow in number and geographic reach within Africa and Asia-Pacific. This expansion will ensure that START maintains the flexible and decentralized approach to regional research and capacity building that has been critical in earning its reputation for excellence as a capacity building organization. Changes in how START's regional structures operate will occur in the

context of the rapidly evolving needs for new knowledge, new initiatives for supporting adaptation and risk management within development and new partnerships for knowledge generation and sharing. START must remain sufficiently agile to avail itself of these new opportunities and respond effectively to new challenges.

In 2013, START marked its 21st year in operation. Over these two decades, the landscape of global environmental change science-for-development has undergone considerable change, with rapid growth in the number and diversity of new organizations and initiatives committed to this cause. These efforts have helped to build greater public awareness and interest in using science to inform planning for long-term development and adaptation challenges. We are proud of the catalytic role START played in making this happen.



OUR PARTNERS AND SUPPORTERS

- Academia Sinica, Taiwan
- Academy of Sciences for the Developing World (TWAS), Italy
- Addis Ababa University, Ethiopia
- Africa Adaptation Program (AAP)
- African Academy of Sciences (AAS), Kenya
- African Centre of Meteorological Application for Development (ACMAD), Niger
- African Monsoon Multidisciplinary Analyses (AMMA), West Africa
- AGRHYMET, Niger
- American Geophysical Union (AGU), USA
- Ardhi University, Tanzania
- Asia Pacific Network for Global Change Research (APN)
- Bangladesh Centre for Advanced Studies (BCAS), Bangladesh
- BirdLife International, Kenya
- Boston University, USA
- Budongo Conservation Field Station, Uganda
- Cameroon Wildlife Conservation Society, Cameroon
- Centre for Climate Change Studies, University of Dar es Salaam, Tanzania
- Centre for International Forestry Research (CIFOR), West Africa
- Chinese Academy of Sciences, China
- Chulalongkorn University, Thailand
- Climate and Development Knowledge Network (CDKN), Africa and Asia
- Climate Change, Agriculture and Food Security (CCAFS) Program, Africa
- Climate Systems Analysis Group (CSAG), University of Cape Town, South Africa
- Conservation Alliance International, Ghana
- Council for Scientific and Industrial Research (CSIR), South Africa
- DKI Jakarta Provincial Government, Indonesia
- Duke University, USA
- Earth Resources Observation and Science (EROS) Center, USA
- Earth System Governance Project, Sweden
- Egerton University, Kenya
- eThekweni Municipality, Durban, South Africa
- European Commission (EC)
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- German Federal Ministry for Education and Research (BMBF), Germany
- Human Sciences Research Council, South Africa
- Humanitarian Information Facilitation Center, Zimbabwe
- ICLEI - Local Governments for Sustainability, South Africa
- In-kind government support, China
- Indian Institute for Human Settlements (IIHS), India
- Indonesia Association of Planners (IAP), Indonesia
- Institute for Social and Environmental Transition (ISET), Nepal
- Institute for Sustainable Development, Ethiopia
- Institute of Resource Assessment, University of Dar es Salaam, Tanzania
- Institute of Technology Bandung (ITB), Indonesia
- Inter-American Institute for Global Change Research (IAI)
- Intergovernmental Panel on Climate Change (IPCC)
- International Centre for Theoretical Physics (ICTP)
- International Council for Science (ICSU)
- International Council for Science, Regional Office for Africa (ICSU-ROA)
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), West Africa
- International Development Research Centre (IDRC), Canada
- International Food Policy Research Institute (IFPRI), USA
- International Geosphere-Biosphere Program (IGBP) and National Committees
- International Human Dimensions Program (IHDP)
- International Institute for Environment and Development (IIED), United Kingdom

International Program on Integrated Research for Disaster Risk (IRDR)
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International Strategy for Disaster Reduction (ISDR)
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Sustainable Seas Trust, South Africa
Swedish International Development Cooperation Agency (Sida), Sweden

Swedish Meteorological and Hydrological Institute, Sweden
Thammasat University, Thailand
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United Nations Environment Program (UNEP), Kenya
United Nations University, Institute for Environment and Human Security (UNU-EHS), Germany
United State Agency for International Development (USAID), USA
United States Department of Energy (DOE), USA
United State Geological Survey (USGS), USA
United State Global Change Research Program (USGCRP), USA
United State National Aeronautics and Space Administration (NASA), USA
United States National Oceanic and Atmospheric Administration (NOAA), USA
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World Climate Research Programme (WCRP)
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