2 Overview of APN Climate Activities

2.1. APN Climate Activities

The present report is a synthesis of fifty-six (56) projects (***Table 1; Appendix 1***) funded by the APN since 1998, all of which can be grouped into eight main sections:

(I) Food, Agriculture and Climate (16 projects)
(II) Seasonal Climate Prediction and Applications (8 projects)
(III) Climate Variability, Trends and Extremes (6 projects)
(IV) Regional Climate Change Modelling (3 projects)
(V) Vulnerability and Adaptation to Climate Change (9 projects)
(VI) Climate Change Mitigation (5 projects)
(VII) Coastal Cities and Climate Change (2 projects)
(VIII) Climate Change Policy and Outreach (7 projects)

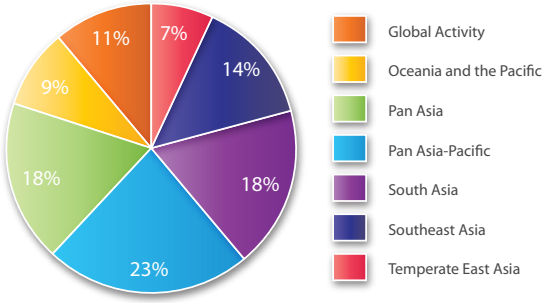
It should be noted that a number of APN projects that crosscut related issues were outside the scope of the present synthesis and have not been included. At the time of writing, the APN concluded a separate Biodiversity Gap Analysis Scoping Workshop for the potential synthesis of projects under the APN scientific theme *Ecosystems, Biodiversity and Land Use* to ensure that the APN continues to address gaps in this and other important areas.

The kinds of activities that the APN has focused on is reflected in its four goals (refer to ***Section 1.2***) in that it has supported climate projects that cover main issues of regional research; scientific capacity development, including training and transferring of knowledge; as well as communications and outreach activities at the science, policy, end-user and civil society levels. Many of the climate activities have focused on modelling and assessments for policy- and decision-making processes and have attempted to bridge the science-policy interface by producing science that underpins policy.

The research focus of the APN is regionally based and all of its climate research activities involve collaboration with a minimum of three countries, at least two of which are developing countries.

As the APN aims to develop and enhance the scientific capacity of mainly developing countries[1] in the region, all of APN's research proposals must involve developing countries as a fundamental criterion for APN funding. ***Figure 2*** shows the regional distribution of the climate activities conducted by the APN, highlighting the regional and collaborative nature of the work undertaken.

Figure 2: Regional distribution of APN climate activities



Having the capacity to conduct high quality research that provides *underpinning scientific support* for decision-makers and decision-making processes is vital for least-developed nations in the Asia-Pacific region and is recognized by the APN as crucial for improving the scientific and technical capabilities of these nations. This is the essence of the APN's scientific capacity development programme, CAPaBLE, and twenty-eight (28) of the projects included in the present synthesis were funded under the CAPaBLE programme.

At the time of writing, APN is undertaking seven (7) projects focusing on scientific capacity development for climate change impact and vulnerability assessments. As the synthesis considers only completed projects in the period 1998-2009, these activities are not included in the present report.

Figure 3 shows the outputs of the climate-related projects in terms of their major publications. Depending on the type of activity conducted, i.e. whether scientific research, scientific capacity development or communications and outreach, publications varied from peer reviewed journal papers, monographs and academic books to technical reports, assessments and various training materials to ensure the sustainability and transfer of technical knowledge, particularly for developing countries. The peer reviewed, special journal editions, books and monographs are cited in ***Appendix 3***.

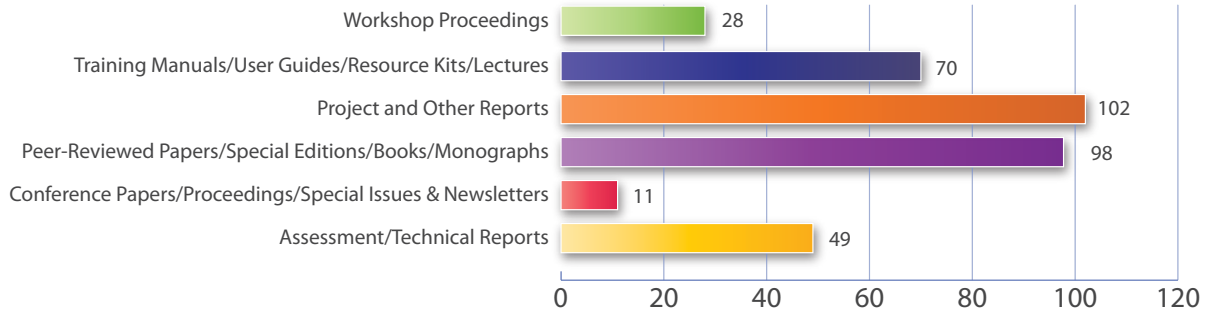


Figure 3: Major publications from APN climate-related projects

2.2. APN Evaluation: Significance and Impacts

APN has completed two significant phases since its launch in 1996 and many of the climate activities in the present synthesis were evaluated under two strategic periods that ran from 1999-2004 (1st Strategic Phase) and 2005-2010 (2nd Strategic Phase). Of the climate projects included in the present synthesis, thirty-two (32) were reviewed in Phase 1 and twenty-four (24) in Phase 2. The evaluations highlighted some significant developments and impacts. Both evaluations addressed the success of the projects in terms of relevance, efficiency, effectiveness, impact and sustainability against the APN goals. APN-funded activities have had some significant impacts and accomplishments, some of which are included here.

1 All of APN's member and approved countries with the **exception** of Australia, Japan, New Zealand, Republic of Korea, Singapore and USA are considered developing countries.

First Phase Evaluation (1999-2004)
Projects evaluated scored highly under the related goals of supporting regional collaboration on relevant issues such as facilitating the standardization, collection, analysis and exchange of relevant scientific data and information; and cooperation with international GC networks and organizations relevant in the region. Historically, meteorological services in the region have collaborated in sharing observations, methods and model results, since weather forecasts depend on regional as well as local developments. In this perspective, scientists and technical experts in the region had a good basis to build collaborative APN projects to work on climate issues, again depending on the sharing and understanding of regional and local data. Examples of such collaboration included regional climate model inter-comparisons and regional workshops to develop country-level information on climate trends and extremes and to synthesize this information at the regional level.

Evaluation Results - Gaps:
While a number of successes were noted, further efforts are needed to enhance activities that address the APN goals of strengthening interactions among scientists and policy-makers, and providing scientific input to policy- and decision-making processes, as well as scientific knowledge to the public. Participants of climate-related projects recognized the importance of science-policy interfacing, but noted that it is a difficult area for which appropriate mechanisms are often unclear, and for which resources are often limited.

Many of the projects funded by the APN involved partnerships with other organizations including the Global Climate Observing System (GCOS), IHDP, IGBP, Pacific Regional Environment Programme (SPREP), START, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), WCRP and the World Meteorological Organization (WMO), among others.

Most of the climate projects under the first phase of the APN rated well against its goals of improving scientific and technical capacities in the region and facilitating the development of research infrastructure and the transfer of know-how and technology. Collaboration between developing and developed countries in most of the projects led to knowledge and skills transfer that was mutually beneficial. A strong training component was apparent in many of the projects. Results included the increased understanding, throughout the region, of the strengths and weaknesses of regional climate models, improved modelling and data analysis skills, and the sharing of experiences, particularly in terms of how knowledge developed through climate change and natural variability research can be used to benefit society.

Based on overall performance, climate projects were considered excellent in regional cooperation, data standardization[2] and exchange of scientific data, and cooperating with international GC networks and organizations. Projects were also considered good to excellent at improving scientific and technical capabilities and facilitating technology transfer, particularly in modelling technology. Science-policy interactions were generally rated poor, with some exceptions.

Second Phase Evaluation (2005-2010)
The evaluation concluded that APN-funded climate projects had very good overall success in terms of meeting the five goals stated in the APN Second Strategic Plan (2005-2010). Generally, the projects received above average ratings, although ratings of the individual projects varied in terms of effectiveness, impact and sustainability. The few projects rated as poor were either projects awarded seed grants to further develop a proposal but failed; or projects that did not meet their original objectives due to poor project implementation or collaboration.

For the most part, climate issues were addressed with excellent regional collaboration. Most projects were able to form strong regional networks of scientists. There were also genuine attempts to have policy- and decision-makers participate in mainstream climate-related activities; however, it was realized

2 Experts expressed the view that the APN can support this kind of work even if it does not do it itself. A number of targeted workshops turned data into something useful.

that more interactions are still necessary in this field. It is important to promote among policy-makers awareness of APN climate science activities and their potential value in policy-making.

The scientific and technical expertise was considerably increased through workshop and hands-on training. With some project initiatives, institutional units were formed and were able to sustain their functions after APN funding ended. Some projects communicated effectively at all levels, particularly at the grassroots level. Collaboration with other GC institutions facilitated projects to look at climate issues from a regional perspective and, at the same time, provided opportunities for scientists to communicate with their counterparts in the broader GC community; however, more interactions with the GC community are needed. The transfer of knowledge and methodologies were conducted well through training and workshops. Research infrastructure in the region is improving and some APN projects were able to help in establishing specific infrastructure.

Many of the research projects reviewed were policy-relevant, with successful and highly rated projects focusing on specific impacts on the environment and society. These projects identified relevant problems and proposed well-developed methodologies to achieve outcomes beneficial to either a scientific community or the public at large. The projects improved regional and national networking of scientists in specialized fields of research, which resulted in improved collaboration. The research outcomes resulted in better understanding of the impacts of climate change in the region and an increased awareness of these issues by policy-makers and resource managers. All projects were designed to meet the needs for scientific information relevant to regional issues.

The projects all had important policy considerations but the degree of science and policy interaction needs to be strengthened. Sustainability of project implementation (where sustainability was a project objective) also needs to be improved, particularly those with long-term support and not a one-time only activity. Projects classified under the "Crosscutting and Science-Policy Linkages" had the weakest ratings as it was difficult to assess outcomes when the criteria for determining success were not well defined. There is an increasing need to evaluate economic impacts; food, water and energy security; and financial consequences to facilitate science-policy interfacing. Without adequate metrics to determine a successful outcome, it is difficult to determine if a science-policy linkage has been made.

2.3. APN Evaluation: Highlights of Outstanding Projects

Nine of the fifty-six (56) projects were identified by the APN's first and second strategic phase evaluation teams (comprising independent reviewers, APN Scientific Planning Group [SPG] Members and the APN Steering Committee) as outstanding. Summaries and highlights of these projects are outlined here.

2.3.1. CSP01: Continuation of Regional Climate Modelling (RCM) Development

Regional climate modelling groups from throughout the region collaborated to compare their Regional Climate Models (RCMs) (*Figure 4*). This set the scene for comparing regional projections of future scenarios using these models, which was expected to provide vital information for policy-makers. Some of the science generated from this project fed into the IPCC Third Assessment Report (TAR). The evaluation of climate models from this project provided the scientific knowledge for decision-makers and other users in their appropriate settings to apply projected climate change information, as there are significant uncertainties in such projections. The project organized several workshops and an advanced workshop to build the scientific capacity to apply the climate models in developing countries. Several young scientists

Evaluation Results - Gaps: While a web-based platform of RCMs had been used by 13 countries and more than 30 scientists, which allowed them to access the RCMs; the website is no longer running. This is a common problem with other project-related websites that do not seem to be able to maintain websites long-term due to lack of funding, rapidly changing web-based systems, in-country regulations, lack of institutional memory, etc.

	China	Korea	Japan	China	Korea	Japan	
RIEMS	-2.59	-3.46	-3.36	0.51	2.29	1.37	RIEMS
CCAM	-1.25	-2.35	-1.52	-1.61	0.91	0.59	CCAM
DARLAM	1.40	-0.68	0.90	-0.04	1.29	0.76	DARLAM
SNU RCM	0.43	-4.03	-5.94	-2.93	-1.71	-3.76	SNU RCM
RegCM	-3.98	-7.57	-5.06	-1.02	-0.40	-0.44	RegCM
RegCM2a	-2.55	-3.96	-4.13	-3.53	-0.41	-0.89	RegCM2a
RegCM2b	-1.11	-5.90	-7.34	-2.31	-0.81	-0.28	RegCM2b
ALT MM5/LSM	0.11	-3.77	-3.85	-4.46	-2.96	-2.77	ALT MM5/LSM
MRI	0.82	4.76	5.06	-3.09	1.23	2.43	MRI
ENSEMBLE	-0.96	-2.99	-2.80	-2.05	0.01	-0.33	ENSEMBLE

>=6 5 4 3 2 1 0 -1 -2 -3 -4 -5 -6 <=-7

Figure 4: Model-simulated seasonal averaged temperature bias (°C) in 3 East Asia sub-regions for winter 1997 (left) and summer 1998 (right) [Source: Fu]

from the region also worked in the Temperate East Asia main centre (START node in the Asia-Pacific region) in using the RCMs for their research. This project was recognized as a model inter-comparison study at the international level by WCRP and IGBP.

2.3.2. CSP03: Asia-Pacific Workshops on Indicators and Indices for Monitoring Trends in Climate Extremes

This was a set of data analyses workshops in which participants from individual countries brought their own data and analyzed them for indicators and indices of trends in climate extremes. A series of papers were published enabling the IPCC to incorporate these results – which are of relevance to policy-makers and hazard managers – in its Fourth Assessment Report (AR4). Participants also brought the results to the attention of their own national policy-makers. The WMO used the series of workshops as a model for other regions and, since the APN's first phase evaluation (1999-2004), two other workshops were conducted in the Asia-Pacific region, one of which was considered outstanding in the APN's evaluation of its second strategic phase (see CSP20 below).

Figure 5: Hands-on data analysis in monitoring trends in climate extremes [Source: Manton]

APN has continued to demonstrate its commitment to addressing the most significant scientific and societal challenges associated with climate variability and change as well as the broader field of global change. I believe that their experience with early Pacific Island research and education projects (like the Training Institute: Project CSP09) helped APN see the need for/value of a targeted capacity-building programme like CAPaBLE and APN is to be applauded for this insight and leadership. I continue to be proud to be an APN Principal Investigator and look forward to a long, collaborative relationship.

2.3.3. CSP09: Training Institute on Climate and Society in the Asia-Pacific Region

The Training Institute on Climate and Society brought together participants from universities, research institutes, research institutions, NGOs, government agencies, and private sector enterprises from throughout the Asia-Pacific region. The training institute included presentations on several of the research projects supported by the APN and participants shared their experience on applying climate information for the benefit of society. Not only did the project significantly involve scientific capacity development of those who attended the Institute, but also made a substantial contribution to APN's third goal of strengthening interactions with scientists and policy-makers.

Perhaps one of the most important products of the Institute was the creation of a regional network of individuals actively engaged in the development and use of climate information to support economic development, community planning, resource management and practical decision-making in key sectors throughout the region. The Institute's specific focus on agriculture during the third week also provided an opportunity to expand regional awareness of and participation in the "Climate Prediction and Agriculture" project (CLIMAG), which APN considered as outstanding in its achievements during its second strategic phase evaluation; refer to CSP17 below.

Figure 6: Billboard highlighting an El Niño season and calling for water conservation [Source: Shea]

This project also contributed to the transfer of know-how and technology by providing participants with the latest scientific information on the nature and consequences of climate variability and change for the Asia-Pacific region as well as access to and familiarity with the use of state-of-the-art tools, techniques and technologies for climate forecasting and assessment. Through group sharing of individual experiences, participants and resource people developed a more detailed understanding of how climate affects the people, communities and resources of the region and how individual communities and governments are acting to address those challenges and opportunities.

2.3.4. CSP17: Applying Climate Information to Enhance the Resilience of Farming Systems Exposed to Climate Risk in South and Southeast Asia

APN stakeholders considered the project to have had major impact on the conduct of multi-disciplinary research, highlighting the importance of simulation modelling being the glue that connects several disciplines, thus providing a focus on outcomes relevant to end-users. (***Figure 7***) The project successfully addressed capacity development through staff training and the development of postgraduate scholarship opportunities. The science conducted was highly regarded and considered an excellent example of the value of international, inter-disciplinary research, as evident by the peer-reviewed publications arising from the project (***Appendix 3***). The project had tremendous positive impacts at the vulnerable grassroots level within the Asian region and established a network of scientists committed to providing useful climate information to stakeholders and end-users and building appropriate partnerships to reduce climatic risks. The commitment to having a consortium of partners to build and extend the existing pilot study areas is highly beneficial to farming systems. The fact that tools developed in this project are being used in decision-making in the community-level farming sector is testimony to the project's effectiveness, which has significantly impacted scientific capacity building to incorporate climate information in agricultural processes.

2.3.5. CSP20: Development and Application of Climate Extreme Indices and Indicators for Monitoring Trends in Climate Extreme Indices and Indicators for Monitoring Trends in Climate Extremes and their Socio-Economic Impacts in South Asian Countries

The project was able to associate eminent scientists as resource persons in addition to excellent regional collaboration. The preparation of indices and indicators on climatic extremes was prepared for the first time exclusively for the region of South Asia and, at the same time, the project captured the essence of all APN goals. The project on the development of climate extreme indices enhanced the capacity building of scientists in developing countries to the extent that they now have the expertise to do meaningful research in the field of climate extremes. They are now in a position to contribute to the IPCCAR5, which would include a Special Report on Extreme Events and Disasters: Managing the Risks.

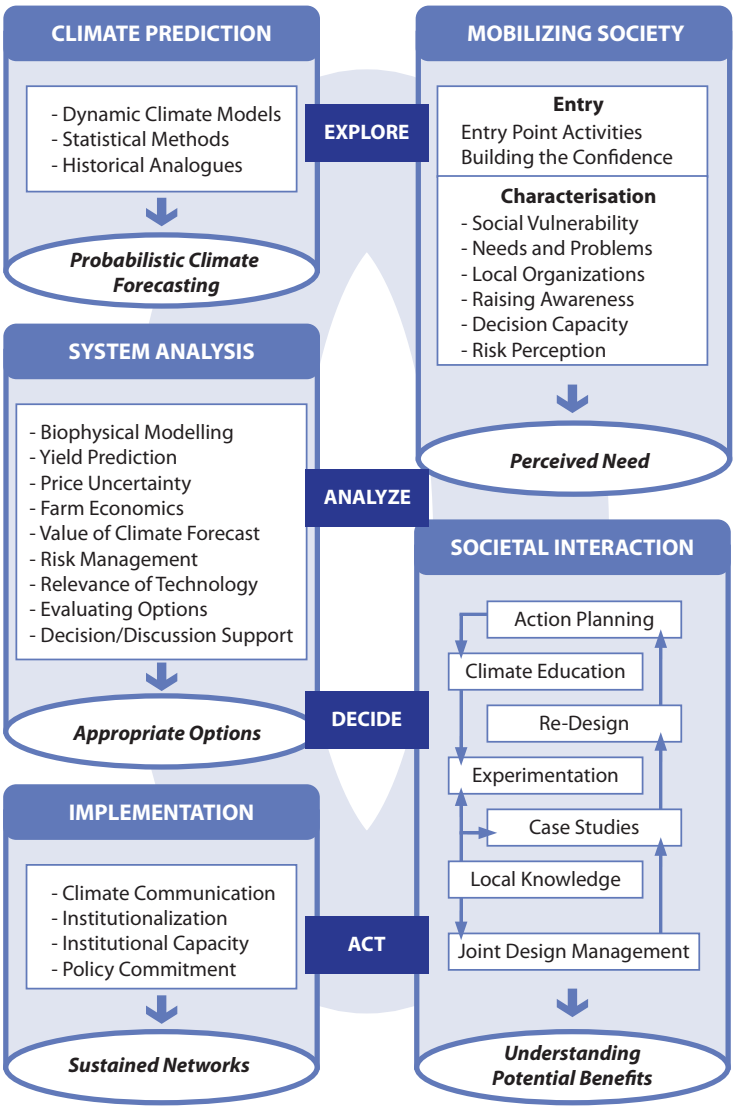


Figure 7: Framework showing the application of models and engagement of multiple stakeholders for climate forecasting in farming systems [Source: Meinke]

Policy-makers need appropriate adaptation measures to help minimize losses due to climate extremes. This project has generated new information on how climate extremes have changed in South Asia. The availability of this information to policy-makers will help them implement policy agendas in participating countries. The participating countries gained updated knowledge of software like *RClimDex* and *RHTest*, used them for analyzing daily meteorological data, and further developed expertise in working out trends in core climate extreme indices.

Rather than study event-based climate extremes, such as floods, droughts, severe cyclonic storms, tornadoes, etc., the project provided a capacity building component to study climate extremes in statistical terms such as cool nights, cool days, warm nights and warm days, which offers a meaningful picture of climate extremes in terms of their trends in a more understandable manner for decision-makers for determining appropriate adaptation measures across South Asia.

2.3.6. CSP37: Integrated Assessment Model for Developing Countries and Analysis of Mitigation Options and Sustainable Development Opportunities

The project was organized around three themes - i) development of national scenarios with a developing country perspective; ii) explicit recognition of developing country dynamics in the modelling, and iii) initiation of national modelling exercises and development of national databases in the three participating countries of China, India and Thailand.

The project provided an integrated modelling framework taking into account different aspects of climate change mitigation measures, policy changes and sustainable development. It also developed national databases of socio-economic data, demographic information and technological information as well as development scenarios in the context of national development plans and changes in GHG mitigation policies. Scientific capacity building was achieved by focusing on solutions rather than on tools and skills.

Project outcomes were interfaced with various international environmental assessments by project team members participating in the activities such as IPCCAR4, Global Environment Outlook 4 (GEO-4), Asia-Pacific Environment Innovation Strategy (APEIS), and Development and Climate project led by UNEP RISO Centre on Energy, Climate and Sustainable Development. A significant number and variety of materials (***Figure 8***) were produced from this project and papers from the project activities were cited in the IPCCAR4.

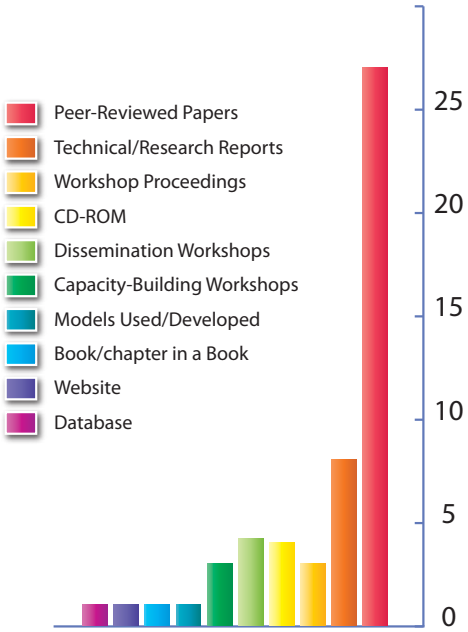


Figure 8: Outputs of CSP37 on Integrated Assessment Modelling [Source: APN Secretariat]

2.3.7. CSP51: Capacity Development for Greenhouse Gas (GHG) Inventory Development in Asia-Pacific Developing Countries

This project was considered a great success because it focused on a topic of importance to all of the Asia-Pacific region; resulted in *in situ* data for the region being collected and made available; led to the development of equipment and procedures that can be readily used in the region; involved strong developed country support and developing country interest and commitment and has the impetus for further related activities. In terms of key strengths, this project succeeded in the transfer and testing of portable field equipment in the developing countries involved, ultimately leading to the compilation of follow-up projects from within the developing countries. The availability of real data as opposed to international norms was one of the keys to success, as was the transfer of easy-to-use technology for determining CH_4 and CO_2 concentrations in rice paddies and the potential this creates for use in other developing countries. The creation of a GHG inventory that has real relevance to a country as opposed to the adoption of international norms provided key traction for policy development. In all, the expanded capabilities and experiences of young scientists will hopefully lead to greater benefits for the region.

2.3.8. CSP52: Greenhouse Gas (GHG) and Aerosol Emissions under Different Vegetation Land Use in the Mekong River Basin Sub-region

The project aimed to develop the capacity of scientists working in the Mekong River Basin to develop appropriate technology in GHGs and aerosols inventory and to provide scientifically sound decision support information to policy-makers to improve regional air quality. The project helped to provide technical skills and knowledge related to the estimation of GHG emissions from biogenic sources and aerosol emissions from biomass burning through onsite training in Cambodia and a hands-on-training workshop in Thailand. The project involved scientists from Lao PDR, Cambodia, Myanmar and Thailand, which enhanced interaction and regional cooperation to some extent. The main outcome was the transfer of science and technology to participating scientists. The project is a good start in terms of regional cooperation among scientists and policy-makers involved in the preparation of UNFCCC national communications. The project produced some excellent results regarding the extent and impact of biomass burning and standards for assessments were established. However, it is not currently clear

how future applications of the products will help change policy. Cooperation among the scientists was key to the success of this project.

2.3.9. CSP56: Water Resources in South Asia: An Assessment of Climate Change - Associated Vulnerabilities and Coping Mechanisms

Among the regions of the world, South Asia is one of the most sensitive to changes in climate. This region depends very heavily on the precipitation from the Asia regional monsoon as well as water derived from the snow and glacier melt in the Himalayas, also known as the Water Tower of Asia; both of which are affected by climate change. This three-year project focused on the following activities: i) Analyzing recent experience in climate variability and extreme hydrological events, and their impacts on regional water resources; ii) Assessing the impacts of projected climate change and variability and associated extreme hydrological events, and socio-economic changes on the water resources of Pakistan, India, Nepal, and Bangladesh; iii) Determining the vulnerability of regional water resources to climate change, identifying key risks to each sub-region and prioritizing adaptation responses; iv) Evaluating the efficacy of various adaptation strategies or coping mechanisms that may reduce vulnerability of the regional water resources; and v) Providing input to relevant national and regional long-term development strategies.

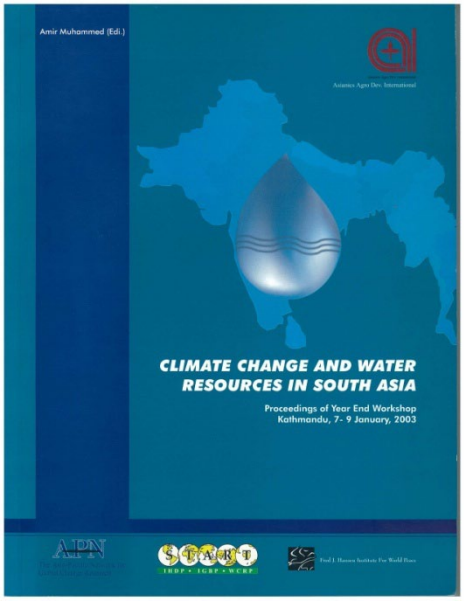


Figure 9: Publication from CSP56 on climate change and water resources in South Asia [Source: Muhammed]

The project brought together scientists from several disciplines, including meteorology, climate science, hydrology, economics and agriculture. Policy-makers demonstrated keen interest in the project because of its importance in planning the harnessing of future water resources in light of anticipated climate change. Use of multi-media techniques developed as a part of the project activities to disseminate the improved technology especially to illiterate farmers was expected to prove effective. Finally, for the flood prone regions, the project analyzed the incidence of past floods and trends for the future and discussed mitigation measures in order to forewarn threatened populations about the incidence of flood so they could prepare to minimize any damage.

2.4. CAPaBLE Phase One Evaluation: Highlights

An independent evaluation that looked at the outputs of CAPaBLE activities conducted in the first phase of the CAPaBLE programme, which ran from April 2003 to March 2006, provided excellent results and ultimately led to the CAPaBLE programme becoming an integrated pillar for capacity development within the APN framework. During this first phase, eighteen (18) projects were completed at community, local, national and regional levels.

Key messages from the evaluation, which are highlighted in the "CAPaBLE Phase I In Review – Climate Change" publication (***Figure 10***) was the success of the CAPaBLE programme, particularly in developing the capacity of individuals and institutions in significant areas:

- Developed research infrastructure and transfered expertise and technology through the provision of equipment and user knowledge, transferring and sharing of data, provision of information and methodologies to researchers and institutions.
- Strengthened regional collaboration for climate change research and development.
- Developed and enhanced scientific and technical capabilities of researchers.

- » Developed new and enhanced awareness of policy-makers and civil society on climate change issues.
- » Achieved success in science-policy interactions particularly in areas where they had previously been lacking.
- » Achieved success in development and better use of climate change tools for decision-making processes.
- » Provided unique and timely outputs that can be incorporated into future work on climate change.

Four of the eighteen projects were rated excellent – CSP26, CSP34, CSP36 and CSP37 (details of CSP37 are outlined in ***Section 2.3.5***). Brief highlights of the other three projects are provided in the following sections.

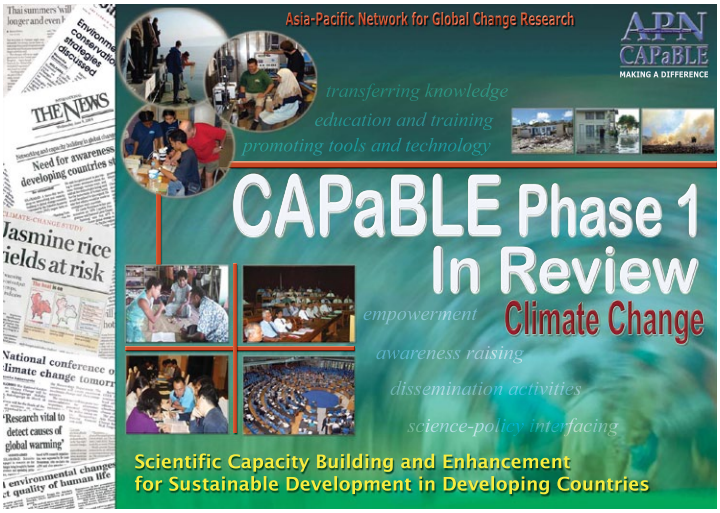


Figure 10: CAPaBLE Phase 1 In Review – Climate Change [Source: APN Secretariat]

2.4.1. CSP26: Training Institute on Climate and Extreme Events in the Pacific

The Climate and Extreme Events Training Institute was held in the Pacific in Fiji (2004), Samoa (2005), and Kiribati (2006). The institute addressed the need to create a regional network of scientists, decision-makers and institutions skilled in the use of climate information and services to support practical decision-making in key sectors such as agriculture, water resource management, public health and safety, tourism and community planning, and resource development within the Pacific Island Countries region.

Key impacts:

(1) The 70 participants trained are able to contribute to:
- » National local awareness building and climate planning and adaptation activities as part of National Adaptation Programme of Action (NAPA)
- » Regional climate projects such as Pacific Adaptation to Climate Change (PACC)
- » General sustainable development initiatives

(2) There is anecdotal evidence that trained personnel are using their skills in professional activities for mainstreaming climate to support policy formulation.

2.4.2. CSP34: APN Scoping Workshops on Global Earth Observations System of Systems (GEOSS) & the Capacity Building Needs of the Region: Focus Climate

The aim of the scoping workshops was to identify capacity building needs for research in global earth observations and climate change and its impacts; identify the role of the APN in such research; and underpin systematic observations and create road maps for designing ideas appropriate for capacity

building activities. Key impacts were determined for those vulnerable sectors identified as food and fibre; biodiversity; water resources; coastal ecosystems; human health and settlements; and land degradation.

Key impacts:

(1) The workshops identified the main constraints in the Asia-Pacific region, particularly for developing countries, which included:
- » Lack of observational data (meteorological, oceanographic, socio-economic, etc.);
- » Inaccessibility to existing data;
- » Scarcity of experienced scientists and lack of adequate scientific infrastructure; and
- » Lack of familiarity with relevant methods and models.

Figure 11: Participants of the GEO Scoping Workshops [Source: APN Secretariat]

(2) The workshops identified the overarching capacity needs of developing countries:
- » Continuous training and capacity development to advance efforts towards comprehensive and sustained understanding of the Earth's processes;
- » Research on climate modelling and socio-economic impacts and adaptation;
- » Collection, rescue and analysis of historical data; and
- » Linking earth observations and climate modelling.

2.4.3. CSP36: Enhancement of National Capacities in the Application of Simulation Models for the Assessment of Climate Change and its Impacts on Water Resources and Food & Agricultural Production

This 3-year project conducted underpinning scientific research on regional climate change modelling in manifestations of temperature & precipitation changes, monsoon variability, floods, droughts and other extreme events; water and food security and melting of glaciers in three countries of Bangladesh, Nepal and Pakistan. In addition, extensive capacity building training workshops were conducted using various RCMs, Watershed Simulation Models and Crop Simulation Models.

The enhanced capacity was effectively utilized to varying extents to pursue envisaged research on:

- » Implementation, validation and calibration of a variety of RCMs, WSMs and CSMs;
- » Development of coarse and fine resolution climate change scenarios;
- » Assessment of the impacts of expected climate change on annual and seasonal flows of main rivers and on the yields of major crops in different agro-climatic zones; and
- » Identification and evaluation of appropriate adaptation measures and coping mechanisms to counter the negative impacts of climate change.

The project outcomes were much appreciated by the heads of the Planning Commissions in Nepal and Pakistan, who emphasized that this type of research is highly relevant to the countries of South Asia whose water and food security are at great risk due to global climate change. Furthermore, there were notable changes in government and bureaucracy attitudes towards climate change issues. The project team have stipulated that governments are now much more attune to issues of climate change and are seeking further information as to its impacts and clarifying their vulnerabilities.