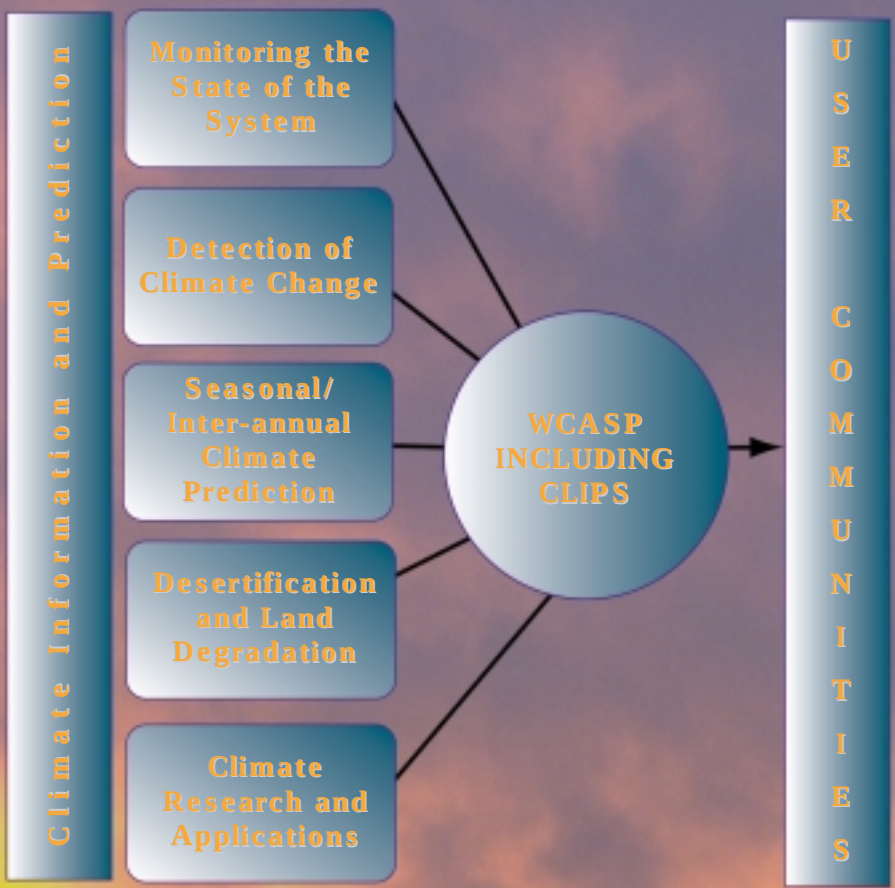
WCASP Including CLIPS Regional Activities

Linking Climate Prediction and Science to the Users



INTRODUCTION

What is CLIPS?

The Climate Information and Prediction Services (CLIPS) is a World Meteorological Organization (WMO) project that deals with the implementation of climate services around the globe. It was initiated to ensure that comprehensive information on present and future climate and its variations are delivered to users on a timely basis and in a suitable format. The CLIPS project was proposed in order to take advantage of several successful WMO data collection and research programmes, such as the World Climate Research Programme (WCRP) and the Tropical Ocean and Global Atmosphere Programme (TOGA); and operational meteorological and hydrological data collection networks, such as the World Weather Watch (WWW) and other networks coordinated by the Global Climate Observing System (GCOS).

Why CLIPS?

In the 1980s and 1990s, several important developments took place that changed the traditional perception of climate services. These included:

- Major advances in the three main areas of **prediction, monitoring and communications**, to facilitate climate applications and services, as well as the dissemination of climate information;
- Increased awareness that, in addition to mean weather conditions, monitoring of the current state of climate to determine the evolution of climate anomalies and prediction of the near future climate were essential parameters for the decision-making process; and
- Recognition that international collaboration was crucial for the development and sharing of knowledge and the prediction of global climate.

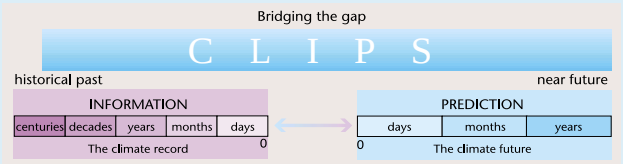
It was upon this background that the CLIPS project was established in 1995 by the Twelfth World Meteorological Congress as an implementing project of the World Climate Applications and Services Programme (WCASP), part of WMO's World Climate Programme (WCP). ***The principal objective of CLIPS is to develop the capacity of the National Meteorological and Hydrological Services (NMHSs) to take advantage of those recent advances in the science of climate and in the processing and dissemination of climate information, and to pass along the benefits of the improved climate services to the user community***. In other words, CLIPS provides an essential link between climate prediction/ information and their applications – bridging the gaps between the science and the applications to promote development activities in a manner beneficial to both producers and users of climate information and prediction products.

Main objectives of CLIPS

- To develop the infrastructure for Seasonal to Inter-annual Prediction (SIP);
- To develop and facilitate Regional Climate Centers (RCCs);
- To promote the science and application of SIP products; and
- To promote capacity building of producers and users of SIP.

CLIPS services

The ultimate goal of CLIPS is to develop climate services in all WMO Member countries on timescales up to a few seasons, perhaps up to a couple of years. This is based on the new perception of climate services as not only delivering climate information from analysis of past climatological records, but also incorporating routine climate



Main activities

- Provision of assistance to NHMSs in building their capacities to interact with various sectoral users of climate information through training Workshops and seminars;
- Development of methodologies to assess the effects of climate, its variability and potential change on various socio-economic activities;
- Provision of support in development of new methods and techniques in response to user needs and requirements for climate information, knowledge and services;
- Carrying out joint activities with research programmes such as Climate Variability and Predictability (CLIVAR) and WCRP; and
- Establishment of closer interaction with potential users of climate services through Workshops and other related activities.

monitoring and prediction of likely conditions in the future and the applications of this information to various socio-economic sectors such as agriculture, water resources, tourism, health, energy, transport, communications, etc. Climate extremes, whether from natural climate variability or long-term climate change, have recurred more frequently in recent decades over many parts of the globe. The impacts associated with these extremes on many socio-economic activities have led to the recognition of climate as an essential parameter in planning.

The immediate need for CLIPS is understanding and responding to the natural inter-annual/seasonal variability of climate and its inherent extremes. In doing so, CLIPS does not deal directly with climate change issues. Nevertheless, the projection that climate change will lead to higher variability in climate, especially in terms of frequencies and intensities of climate extremes, means that adaptive and mitigation strategies required to cope with inter-annual climate variability are likely to play key roles in strategies related to long-term climate change.

CLIPS takes advantage of the most current databases, increasing climate knowledge and improving prediction capabilities. This facilitates the development of relevant climate information and prediction products, as well as their application in various socio-economic sectors, thus reducing the negative impacts related to climate variations and enhancing planning activities based on the developing capacity of climate science.

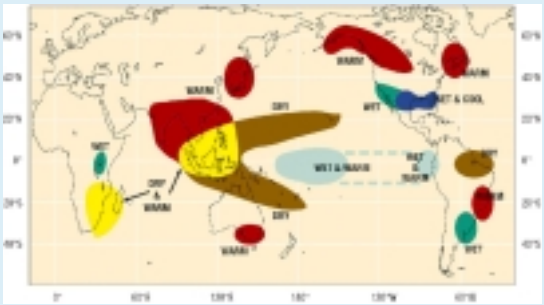
CLIPS project components

The main project components of CLIPS include training and Capacity Building, Demonstration/Pilot Projects, liaison with research programmes and networking.

ESTABLISHMENT OF CLIPS FOCAL POINTS

Background

Two important climate-related events occurred towards the end of 1997 that helped to redirect and influence the immediate future of climate science and its management. One was the evolution of a strong 1997–98 El Niño episode. This brought focused attention and awareness not only on impacts of climate variability, but also on developing capabilities of forecast systems to assist in managing these impacts. Indeed, the NMHSs made important strides in providing useful climate information and fostered interaction with the users, with the net effect of significantly reducing the impacts associated with one of the strongest El Niño events in recent decades.



Climate anomalies associated with El Niño conditions from December 1997 to February 1998

Success always brings new challenges, however, and indeed several emerged during this period. In particular, climate scientists of many NMHSs found themselves faced with questions and opportunities in climate forecasting which they had not encountered before. The smaller NMHSs were the most affected, upon discovering that developing climate prediction capabilities to provide vital climate information that required rapid integration into national policy formulation was taxing their limited resources. In order to address these challenges, further training of climate scientists was needed to equip them with skills that would enable them to respond to these challenges. As a result, a three-pronged training strategy within CLIPS was developed to assist all the NMHSs. The strategy involved the identification of Focal Points and their coordination into regional networks, the development of the CLIPS curriculum and the organization of training opportunities.

Coordination of CLIPS Focal Points into regional networks

The goals of the Regional Network of CLIPS Focal Points are to develop capacity in NMHSs through the selection and training of individual experts, and to develop interaction on a regional basis. It is envisaged that the latter objective will be achieved by networking Focal Points into subregional groupings, with rapporteurs appointed by the Regional Associations (RAs) acting as coordinators. Each RA is expected to give its consent for this approach. Regional coordination will build on the activities to be carried out by the Focal Points. Because of the different levels of infrastructural and human resource development in each country, responsibilities of individual Focal Points will vary according to the requirements of each country and/or region.

Implementation status for identification of Focal Points

In order to promote further interaction within Member countries and RAs, the NHMSs were requested to appoint national CLIPS Focal Points who could interact with the Regional Focal Points to support the networks formed on the basis of common geographical concerns. The process of establishing CLIPS Focal Points and forming regional networks has progressed quite well. To date, national Focal Points have been nominated for RAs I, III, V and VI. A request to nominate Focal Points for RA II has been sent out to Permanent Representatives (PRs) and a response is expected in the very near future. RA IV has indicated a preference for regional, rather than national, Focal Points. The names and contact information of all the nominees are posted on the CLIPS Web page (http://www.wmo.ch/web/wcp/clips2001/html/index.html).

WMO Regional Associations

I – Africa
II – Asia
III – South America
IV – North and Central America
V – South-West Pacific
VI – Europe

CAPACITY BUILDING ACTIVITIES, INCLUDING CURRICULUM DEVELOPMENT

Background

One of the key components of CLIPS is Capacity Building for producers and users of climate information and prediction products. The Regional Climate Outlook Forums (RCOFs) that have been implemented in various parts of the world bring together experts in various fields, local and international climate scientists, and end-users of climate information and prediction products, in an environment that encourages interaction and learning. This particular aspect of the forums has been a major milestone in the CLIPS quest for Capacity Building.

CLIPS Capacity Building Workshops

The establishment of Focal Points has enabled CLIPS Capacity Building activities to be focused in an effective manner. Workshops for CLIPS Focal Points have proven to be very effective mechanisms for helping build capacity of a core group of experts in NMHSs involved in SIP. So far, three Capacity Building Workshops on Regional Climate Applications and Prediction for CLIPS Focal Points have been held: one for the Pacific Region (Auckland, New Zealand, December 2000) in association with the Meteorological Service of New Zealand and the National Institute of Water and Atmospheric Research (NIWAR); one for West Africa (Niamey, Niger, May 2001) in collaboration with the Niger Meteorological Service and African Centre of Meteorological Applications for Development (ACMAD); and the third for the Eastern and Southern Africa Region (Nairobi, Kenya, August 2002) in conjunction with the Drought Monitoring Centres (DMCs) in Nairobi and Harare, and the United States' National Oceanic and Atmospheric Administration/Office of Global Programs (NOAA/OGP). Resource expertise for these Workshops is drawn from local, regional and international institutions. The next CLIPS Workshop is scheduled for RA VI in Erfurt, Germany from 12 to 18 June 2003. The training process has three main components: the first deals with climatological and predictability aspects; the second is mainly geared towards a variety of 'cross-over' issues necessary for the effective delivery of climate services; and the third handles application issues.

Participants of the CLIPS Training Workshop for Eastern and Southern Africa, August 2002

One single Workshop serves as introductory, and does not fully equip the Focal Points to face the challenges involved in the generation and provision of relevant climate information and prediction products for the formulation of national policies. A number of Focal Points have therefore received further follow-up training, mainly organized by the University of Oklahoma, United States, courtesy of the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) in collaboration with the CLIPS Project Office and NOAA/OGP. It is anticipated that CIMMS will provide additional training opportunities for Focal Points from other regions in the future. In addition to these specific Workshops, CLIPS has also supported some Focal Points and other climatologists in their participation in other relevant Workshops and meetings.

In some regions, CLIPS has continued to achieve its Capacity Building objectives through training national climate scientists in the science of statistical climate modeling and prediction, in collaboration with regional institutions such as the DMCs and ACMAD. These specific training initiatives are tied to the Regional Climate Outlook Forums (RCOFs), to enable the scientists to generate national outlooks as input into the consensus regional outlooks at the beginning of every major rainfall season.

CLIPS Curriculum Development

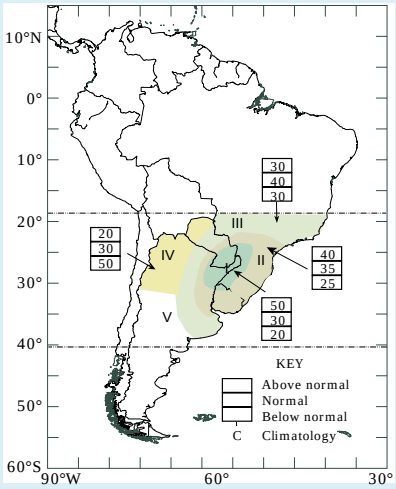
CLIPS Curriculum Development is being undertaken as an effective means of involving a large number of organizations with the relevant expertise in CLIPS, and also for making available a high level of expertise in all aspects of Capacity Building within CLIPS. The Curriculum is designed not only to assist in the training of CLIPS Focal Points, but also to provide a resource for other meteorologists and end-users, as well as for training in Regional Meteorological Training Centres (RMTCs). The development process of the Curriculum is implemented in a series of stages, with each stage addressed as the need arises. At the Primary level, the Curriculum includes

modules on Basics, Introductory Atmosphere-Ocean Dynamics, Modeling, Predictability and Prediction, Applications, Presentation, and Project design and Management. Each of these groups is expected to include about five to 10 individual modules. A number of first-class modules have already been produced by experts who were requested to prepare individual modules. The submitted material has been taken through the screening process prior to inclusion in the Curriculum. For ease of presentation, the modules have been prepared using Microsoft PowerPoint, but the experts have added explanatory lecture notes to facilitate proper comprehension of the material. Additional modules have also been obtained from training courses and relevant presentations in conferences. These additional modules have been posted on the WCASP Web page, together with the submitted material. Member countries have stressed the need to have the curriculum available in as many of WMO's official languages as possible.

REGIONAL CLIMATE OUTLOOK FORUMS (RCOFs)

The CLIPS project made an important contribution towards the development and evaluation of the RCOFs, along with other collaborators. Since their inception, the RCOFs process has demonstrated a significant growth in understanding the links between the climate system and socio-economic activities, in identifying beneficial applications, in estimating the potential value of climate services, and in collaborating with decision makers in specific applications sectors. An increasing demand for climate services has been recorded in many parts of the world as a result of these developments.

Participants of a SARCOF Climate Outlook Forum in Mangochi, Malawi, August 2001



South-eastern South America Climate Outlook Forum Forecast for March to May 2003

The Forum process has facilitated the recognition in many parts of the world that climate information, including short-range climate predictions, is an essential element in mitigating against the impacts of climate variations. It is therefore not surprising that a review of the RCOFs held in Pretoria, South Africa in October 2000 acknowledged the role of the Forums and proposed ways of strengthening and sustaining them. By their design, RCOFs have also provided an important Capacity Building function for both providers and users of climate services in many parts of the world. The Forums have, in addition, fostered interactions and exchange of information (key elements of CLIPS activities) between climate scientists and users of climate information. Regional

For further information contact:
World Meteorological Organization, World Climate Programme, 7 *bis*, avenue de la Paix,
PO Box 2300, CH-1211 Geneva 2, SWITZERLAND
Tel: (+41 22) 730 83 14/730 83 15; Fax: (+41 22) 730 80 27;
E-mail: ipa@gateway.wmo.ch

Some regions in which Climate Outlook Forum have been held

institutions such as the DMCs, ACMAD and the International Research Centre on El Niño (CIIFEN) have played key roles in the organization and overall implementation of these Forums. These institutions have forged strong linkages with other stakeholders, such as WMO, the United States Agency for International Development (USAID), NOAA/OGP, the United States Geological Survey (USGS), and the International Research Institute for Climate Prediction (IRI) in RCOFs initiatives.

The Forums have become regular meetings in some regions such as Western Africa, Eastern Africa, Southern Africa, Central America, South America and the Pacific, where NMHSs meet to discuss and develop consensus seasonal forecasts for the regions. To date, more than 35 forums have been held throughout the world. The most recent ones include those for countries in South-eastern South America (April, July and August 2001; April, July and August 2002 and March 2003), Greater Horn of Africa (February and August 2001; February and August 2002; and March 2003), Southern Africa (September 2001 and 2002), West Africa (May 2001 and 2002), Central Africa (September 2002), West Coast of South America (November 2002) and North Africa (May 2002). There have also been regular RCOFs in Central America and the Pacific. WCASP has continued to support and participate in these Forums as recommended by various sessions of WMO's Constituent Bodies.

COLLABORATION WITH OTHER PARTNERS

CLIPS has continued to collaborate with a number of national, regional, international and academic institutions, individual experts and other WMO programmes in implementing its activities. Some of these activities include RCOFs, Capacity Building, Applications of Climate in Agriculture and Food Security, Health and Water Resources, organization and participation in relevant meetings, Research as well as Climate Monitoring and Prediction. The Table on the next page summarizes some of these activities and the collaborating institutions.

DEMONSTRATION AND PILOT PROJECTS

These are meant to demonstrate the value of using climate information in a decision-making process. The initial objectives and modalities of implementation of Pilot Projects were refined following the results of sectoral support missions undertaken from the end of 1995 through 1996, covering several countries in RAs I, II, III and V. The evaluations of the missions and follow-up communication between the CLIPS Project Office and the NMHSs have formed the basis for preparing proposals for submission to donor programmes, to initiate Pilot Projects in Member countries.

Two categories of projects were envisaged, namely Demonstration and Pilot Projects. Both were able to deal with individual components of enhanced climate services, e.g. aspects of the use of the Internet, downscaling of information to regional and national scales, establishment and enhancement of user interaction, and the study of predictable climate signals such as El Niño/Southern Oscillation (ENSO). They could also consist of a series of integrated topics, in which each project is designed to

evaluate a number of components of the enhanced services. Demonstration and Pilot Projects offer sure ways of developing climate services that depend on predictions.

Demonstration Projects

These are to be organized through Member countries that already have experience in the provision of modern climate services. The projects are therefore supposed to facilitate sharing of the experiences in the provision of the services among NMHSs. The financial support to these projects would be limited to the publication of reports and their distribution to Members.

> One good example of such a Demonstration Project (Foresight Project) was the successful outcome of the CLIPS Food Chain Showcase Project in the United Kingdom, titled *Seasonal Weather Forecasting for the Food Chain*. This project illustrated the existence of opportunities for producers and users of climate information and prediction products to work together to develop strategies for extracting economic value from seasonal predictions, and of the effectiveness of objective methods for determining forecast value and defining application strategies.

Efforts are underway to see that methodologies with wide geographical and sector applicability are explored within CLIPS, and, that these methodologies objectively assess the benefits achieved. To this effect, the NMHSs have been encouraged to improve their collaboration with users, including other government bodies (from the local through national levels), for the application of climate information. The Foresight Project could be emulated in some of these endeavours.

Collaboration with other partners

Item	*Collaborating institutions*	*Activity*
RCOFs	World Bank, IRI, EC, NOAA/OGP, TCOP, DMCs, ACMAD, CIIFEN, NMHSs	• Development and Examination of RCOFs • Organization and hosting of RCOFs
Capacity Building	NMHSs, ACMAD, NOAA/OGP, USAID, DMCs, NIWAR, CIMMS	• Organization of Workshops and Capacity Building of of Focal Points
Applications	CAgM, CLIMAG	• Identification of available forecasting tools, including seasonal forecasts and climate prediction as well as crop models suitable for Africa
	WHO, UNEP	• Implementation of activities on climate and health
	HWR	• Implementation activities related to climate and water resources
Meetings	IRI, Red Cross and Crescent Societies, ADPC, WHO	• Co-organization of meetings that address the key issues of enhancing climate services
Research	WCRP, CLIVAR	• Determination of the potential for seasonal predictability. • Modeling and prediction to understand the regional climate variability especially over Africa
Climate monitoring	Global Forecast Producing Centres	• Provision of El Niño/La Niña updates
Climate prediction	Various	• Initiation of dialogue with all institutions involved in the development, production and delivery of climate services to reduce duplication

Pilot Projects

These projects are organized mainly on a national and/or subregional scale and require substantial external support using, for example, Voluntary Cooperation Programme (VCP) channels. Countries and/or subregions to be selected as participants in Pilot Projects are identified through expert missions, outcome of training events, requests by Member countries and recommendations of WMO constituent bodies.

Strategy I for initiating Pilot Projects

- Receive expert mission report;
- Identify target countries;
- Propose priority sectors;
- Identify counterparts;
- Identify project leader and duration;
- Identify project objectives;
- Establish evaluation criteria; and
- Identify source of funding.

Strategy II for initiating Pilot Projects

- Participants prepare data for training Workshop;
- Initiate Pilot Project at training Workshop;
- Consolidate Pilot Project after Workshop; and
- Prepare follow-up steps similar to those under Strategy I.

There are two different Strategies for initiating and implementing Pilot Projects, depending on the level of preparedness, sectoral needs, recommendations arising from support missions in the region of interest, and other considerations. The first strategy is convenient when preparatory work has already been undertaken. The second strategy is more appropriate when the degree of preparedness is inadequate and the fact-finding missions have not been initiated, or the formation is obsolete because of the amount of time that has elapsed since they were undertaken. Under these circumstances, CLIPS Advanced Training Workshops are used to initiate the Pilot Projects.

Following the recommendations of a review of the RCOFs in South Africa, and through the support of USAID and NOAA/OGP, Pilot Application Projects (PAPs) have been implemented in a number of regions. The implementing agencies of these PAPs are the Individual Principal Investigators in collaboration with the concerned NMHSs, the DMCs and WMO. The PAPs address issues from across the 'end-to-end' spectrum, from production to dissemination of climate information and prediction products, interpretation, use and evaluation of climate outlooks. It is envisaged that lessons learned from these PAPs can enhance the evolution of the RCOFs and can be transferred from one region to the other and from regional to national levels.

CLIPS Web site

Dissemination and sharing of information is paramount in the implementation of CLIPS activities. With this in mind, a CLIPS Web page (**http://www.wmo.ch/web/wcp/clips2001/html/index.html**) has been developed to provide information on WCASP, including CLIPS-related activities. The Web page is meant to promote the sharing of climate information among Member countries; relevant OPAGs on Climate Applications, Information and Prediction Services; and other WMO programmes on aspects of data management, climate prediction, applications and user requirements, and Capacity Building. The Web page will be continuously improved and updated for the benefit of Member countries, especially the CLIPS Focal Points.

PLANS FOR THE FUTURE

Capacity Building

The CLIPS Training Workshops on Regional Climate Applications and Prediction for CLIPS Focal Points have been held in RA I and RA V. Similar Training Workshops are being planned for other RAs.

CLIPS will continue exploring, within funding limitations, the possibilities of facilitating further training and providing support for the Focal Points to participate in relevant conferences.

Pilot Application Projects

The CLIPS Project Office, in collaboration with other donors, will assist in the development of PAPs in various countries as a follow-up to Capacity Building.

Collaboration

The CLIPS Project Office will forge close coordination and cooperation between the NMHSs and many sectoral organizations and institutions to ensure that climate services are provided. This will contribute significantly to the development and testing of adaptation measures to deal with longer-term climate change impacts.

CLIPS will also continue collaborating closely with other WMO Programmes such as WCRP, the Commission for Basic Systems (CBS), Climate Variability (CLIVAR) and the Technical Cooperation Programme (TCOP); other United Nations agencies such as the World Health Organization (WHO); as well as regional and international organizations and institutions on matters related to research and provision and applications of climate services for sustainable development.

Regional Climate Centres

The Inter-Commission Task Team on Regional Climate Centres (ICTT/RCC) recommended expanding the roles of existing meteorological centres with adequate infrastructure and the necessary means to act as RCCs in the provision of a range of climate services. The CLIPS Project would work with the RAs to facilitate the implementation of RCC activities.

Development of methodologies

The CLIPS project will work closely with Global Centres involved in producing seasonal to inter-annual climate predictions to ensure that model intercomparisons are carried out and the information is disseminated as widely as possible.

The project will work with RCCs on aspects of downscaling to increase the spatial detail in the forecast information.

The Project will provide a framework to establish operational methods for verification of forecasts, including criteria for measuring forecast quality.

Glossary of acronyms

ADPC	Asian Disaster Preparedness Centre
CAgM	Commission for Agricultural Meteorology
CCl	Commission for Climatology
CIIFEN	Centro Internacional de Investigación Sobre el Fenómeno El Niño
CLIMAG	Task Force on Climate Prediction and Agriculture
EC	European Commission
HWR	Hydrology and Water Resources
ICTT/RCC	Inter-Commission Task Team on Regional Climate Centres
OPAG	Open Programme Area Group
SARCOF	South African Regional Climate Outlook Forum
TCOP	Technical Cooperation Programme
UNEP	United Nations Environment Programme
WHO	World Health Organization