Global Change Impact Studies Centre and its Activities

Introduction

The Global Change Impact Studies Centre (GCISC) was established in May 2002 on the initiative of Dr. Ishfaq Ahmad, then Special Advisor to the Chief Executive of Pakistan and now Special Advisor to the Prime Minister of Pakistan. Seed money for this activity was provided by the Ministry of Science & Technology. Since July 2003 the Centre is being supported by the Finance Division under a PSDP allocation. In January 2005 the Centre was made an autonomous body with the Ministry of Environment and was assigned to serve as the Secretariat to the newly formed Prime Ministers Committee on Climate Change.

The main objectives of the Centre are: 1) To keep a track of the current and likely future trends of global change (climate change, technological change etc.); 2) To analyze and evaluate their likely impacts on the socio economic development in Pakistan; 3) To identify how science and technology may be called upon to cope with the adverse impacts, if any, and to advise national planners on the appropriate strategic approaches; 4) To enhance national capacity for Global Change research; and 5) To raise public awareness of Global Change related issues.

Major Activities of GCISC

1. Acquisition Implementation and Validation of various Mathematical Simulation Models:

    (i) Regional Climate Models (RegCM3, PRECIS)
    (ii) Crop Simulation Models (CERES, CROPGROW, CROPSIM, INFOCROP)
    (iii) Watershed Models (DHSVM, HEC-HMS)
    (iv) Mesoscale Meteorological Model (MM5)
    (v) Air Pollution Transport Models (CALPUFF, GAINS-ASIA)

2. Research on Various Aspects of Climate Change and its Impacts:

    (i) Assessment of past climate changes in various parts of Pakistan using statistical analysis techniques

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    (ii) Projection of future climate changes in Pakistan based on
        a) an ensemble of World level projections made by various Global Circulation Models (GCMs);
        b) dynamic and statistical downscaling of projections made by selected GCMs to obtain fine resolution projections.

    (iii) Study of the temporal changes in physical dimensions and volume of the main glaciers feeding Indus River System, using satellite imagery and GIS techniques.

    (iv) Assessment of the impacts of projected climate change on
        a) water flow in main rivers of Pakistan using different Watershed Simulation Models,
        b) productivity of various agricultural crops in different climate zones of the

country using crop growth simulation models;

(c) other socio-economic sectors e.g. Health, Forestry, Biodiversity etc.

(v) Use of meteorological prediction model (MM5, WRF) and the Long range dispersion models (CALPUFF, GAINS-ASIA) for assessment of the impact of trans-boundary air pollution on the climatic changes in Pakistan.

(vi) Development of indicators and indices for extreme climate events in the South-Asia.

(vii) Development of methodological tools for projecting frequency and intensity patterns of extreme climate events.

(viii) Development of new crop growth and watershed simulation models designed to represent specific conditions prevailing in Pakistan..

International/Regional Seminars/Conferences/Workshops Organized by the Centre:

1. International Karakoram Conference (jointly with Pakistan Academy of Geological Sciences), April 26-28, 2005, Islamabad;
2. International Symposium on "Mountains of Pakistan: Protection, Potential and Prospects," December 17-19, 2002, Islamabad;
3. APN -- CAPaBLE South Asia Regional Training Workshop on Regional Climate Modelling, February 16 - 27, 2004, Islamabad;
4. APN – CAPaBLE South Asia Regional Training Workshop on Crop simulation Modelling, June 28 – July 9, 2004, Chiang Mai, Thailand;
5. APN -- CAPaBLE South Asia Regional Training Workshop on Watershed Modeling, March 7 – 18, 2005, Islamabad;
6. APN -- CAPaBLE South Asia Regional Training Workshop on Climate Scenarios Development, August 15 – 19, 2005, Kathmandu, Nepal.
7. APN -- South Asia Regional Training Workshops on Climate Extreme Events Indicators and Indices, Jan 2 – 6, 2006 and August 21-23, 2006, Islamabad.
8. IIASA-Pakistan Seminar, April 25-27, 2006, Islamabad.
9. NCP-ICTP International Conference on Global Change, November 13-17, 2006, Islamabad.
10. APN -- CAPaBLE South Asia Regional Workshop on Comprehensive Climate Change Research Results, June 19-23, 2007, Kathmandu, Nepal.
11. APN -- CAPaBLE South Asia Regional Workshop for Harmonisation of Climate Change Research Results, August 21 - 25, 2007, Islamabad.
12. Briefing Seminar on Climate Change Research Results for National Planners and Policy Makers, 28 August, 2007, Islamabad

National Workshops Organized by the Centre:

1. GCISC Introductory Workshop on Mathematical Modelling and Its Application to Development Issues, October 29 – November 2, 2002, Islamabad (in collaboration with COMSATS and PIEAS);

2. APN Capacity Building Workshop (jointly with Agro Div. International) on Global Change Research, June 8-10, 2004, Islamabad;
3. APN CApaBLE National Workshop (jointly with Pakistan Academy of Sciences) on "Global Change– Challenges, Impacts, Opportunities and Prospects," April 28-29, 2005, Islamabad.

Research Projects with International Funding:

1. Enhancement of National Capacities in Pakistan, Bangladesh and Nepal in the Application of Simulation Models for Assessment of Climate Change and its Impacts on Water Resources and Food and Agricultural Production, Asia Pacific Network for Global Change Research (APN), Japan (October 2003- August 2007);
2. Development and Application of Climate Extreme Indices and Indicators for Monitoring Trends in Climate Extremes and Their Socio-economic Impacts in South Asian Countries, Asia Pacific Network for Global Change Research (APN), Japan (October 2005-September 2006; October 2007- September 2009);
3. Information technology (IT) as a tool for information generation and dissemination enabling farmers to cope and optimize management of climate variability and change (Pilot project funded by UNEP/ TERI, India; completed in June, 2005);
4. Information sharing system (ISS) to enhance coping capacities of farming communities in dealing effectively with climate variability and climate change (submitted jointly with Teri, India to UNEP/GEF in March, 2006);
5. Basin scale analysis of the vulnerability of food systems to global environmental change (one year project, GECAFS, UK (August, 2005- July, 2006).
6. Improving Policy Responses to Interactions between Global Environmental Change and Food Security across Indo-Gangetic Plains, (APN), Japan (August, 2006- July 2009).

Technical Draft Reports (undergoing peer review):

DR-1	Climate Profile and Past Climate Changes in Pakistan
DR-2	Climate Change Scenarios for Pakistan and Some South Asian Countries Based on Six Different GCMs and their Ensemble.
DR-3	Climate Change Scenarios for Pakistan, Nepal and Bangladesh for SRES A2 and A1B Scenarios using outputs of IPCC AR4 17 GCMs (Interim Report)
DR-4	Validation of Regional Climate Model PRECIS over South Asia.
DR-5	Assessment of Future Change in Temperature Extreme Indices using Regional Climate Model PRECIS over Pakistan
DR-6	Climate Change Scenarios over South Asia Region Simulated by PRECIS RCM (Interim Report)

DR-7	Validation of Regional Climate Model RegCM3 over South Asia.
DR-8	Climate Change Scenarios for 2050s & 2080s over South Asia using Regional Climate Model RegCM3 (Interim Report)
DR-9	Development of Climate Change Scenarios for Specific Sites Corresponding to Selected GCM Outputs, using Statistical Downscaling Technique.
DR-10	Comparison of Different Interpolation Methods for Temperature Mapping in Pakistan.
DR-11	Calibration and Validation of Watershed Models (e.g. DHSVM, UBC) for Basins of Interest
DR-12	Monitoring of Biafo Glacier of Karakoram Using Remote Sensing and Geographical Information System (GIS) Techniques.
DR-13	Climate Change: Implications and Adaptation of Water Resources in Pakistan.
DR-14	Climate Change and Wheat Production in Pakistan: Calibration, Validation and Application of CERES-Wheat Model.
DR-15	Climate Change and Rice Production in Pakistan: Calibration, Validation and Application of CERES-Rice Model.
DR-16	Climate Change and Agriculture in Pakistan: Adaptation Strategies to Cope with Negative Impacts.

International Collaboration:

1. Asia Pacific Network for Climate Change Research (APN), Japan;
2. Physics of Weather and Climate Section of the Abdus Salam International Centre for Theoretical Physics (ICTP), Italy;
3. International Institute for Applied Systems Analyses, Austria;
4. International Centre for Climate and Environment Sciences (ICCES) and Chinese Academy of Sciences (CAS), China;
5. Global Environment Change and Food System (GECAFS), UK;
6. Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia;
7. Bureau of Meteorology Research Centre, Australia;
8. National Center for Atmospheric Research (NCAR), Boulder, Colorado, USA;
9. Global Land and Ice Measurements from Space, University of Nebraska, USA;
10. University of Georgia, Griffin, USA;
11. Stony Brook University, NY, USA;
12. Georgia Institute of Technology, Atlanta, Georgia, USA;
13. Bangladesh Unnayan Parishad (BUP), Bangladesh;
14. The Energy and Resources Institute (TERI), Delhi, India;
15. Indian Institute of Tropical Meteorology (IITM), Pune, India;
16. Department of Hydrology and Meteorology, (DHM), Nepal;
17. Department of Meteorology, Sri Lanka.