Transforming Vision into Reality: How Global Change Impact Studies Centre Brought the Climate Change Issues to the Lime Light in Pakistan

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For what and for whom?

Natural disasters linked to climate variability and climate change are likely to affect all sectors of a country and all layers of its population indiscriminately. In recent years, reducing vulnerability to natural disasters and climate change has become a pressing issue for developing countries, for at least two reasons. The first reason is that these countries lack resources or other necessities to fully deal with the social and economic effects of these disasters or changes; the second is that the economies of these countries are heavily dependent on sectors and resources highly sensitive to disasters, and climatic variation and change, such as agriculture, coastal resources, water resources and infrastructure.

Consequently, for these countries, adapting to natural disasters, and climate variability and change is a major concern on the sustainable development policy agenda. To be able to adequately address climate change in a sustainable development context, one must begin by carrying out vulnerability and adaptation assessments. These assessments will identify current hazards and threats and the strategies, policies and actions needed to cope with them. Addressing current vulnerability will assist in reducing future vulnerability due to worsening impacts. Being cognizant of the fact that Pakistan is also going to be affected by the global impacts of this graver concern, Global Change Impact Studies Centre (GCISC) was established in May 2002 on the initiative of Dr. Ishfaq Ahmad, then Special Advisor to Chief Executive of Pakistan and now Special Advisor to Planning Commission of Pakistan.

Prior to establishment of GCISC, there have been sporadic and mostly one-shot studies on climate change. Key objectives of the Centre include tracking climate trends, analyzing Climate Change impacts on different sectors of development, building capacity for research and raising awareness on Climate Change issues. The main purpose of the Centre is to serve as a think tank in aid of the national planners and decision makers for strategic policy planning for sustainable development of the country in consonance with the changing global environment, and in this regard different ministries viz, Ministry of Environment, Science and Technology, Agriculture, Food and Livestock, Water and Power, Planning division were targeted.

Besides this, Center's scientific activities centered on creating a mass awareness about how climate change is going to affect the economy of Pakistan at large and also aimed at benefiting the scientific national (viz. Pakistan Meteorological Department, National Agricultural Research Council, Agricultural Universities, Water and Power Development Authority) and international (Nepal Department of Hydrology and Meteorology, Nepal Agricultural Research Council, Sri Lanka Agricultural Department, Bangladesh Unnayan

Parishad, Bangladesh Agricultural Research Council, Bangladesh Centre for advanced Studies etc) organizations through regional capacity building and by engaging them in research activities through collaborative research work and the Non-Governmental working on climate change awareness and enactment programmes.

Of what?

Centre set out to start work in three main areas of research mainly climatology, water resources and agriculture with the seed money provided by Ministry of Science and Technology in May 2002. The initial three years were mainly dedicated for capacity building of the young scientists.

Pakistan being a developing country has to rely upon International Organizations for loans and aid to keep the wheel of its economic growth moving. The international impulse on assessing the climate change impacts on the developing countries economies, which mostly are agriculture dependant, made our government institutions to respond to climate change complexities eventually in the year 2005 Prime Minister's Committee on Climate Change (PMCCC) was established. The Committee comprised of the Prime Minister, Ministers for Water & Power, Food & Agriculture and Science & Technology, Minister of State for Environment, Deputy Chairman, Planning Commission and Special Advisor to the Prime Minister. The Global Change Impact Studies Centre (GCISC) was declared the Secretariat of the PMCCC. The Committee emphasized the Centre to focus its efforts on the following two issues apart from its research mandate:

a) Assessment of the impact of Global Climate Change on the key socio-economic sectors of Pakistan, in particular Water and Agriculture, and

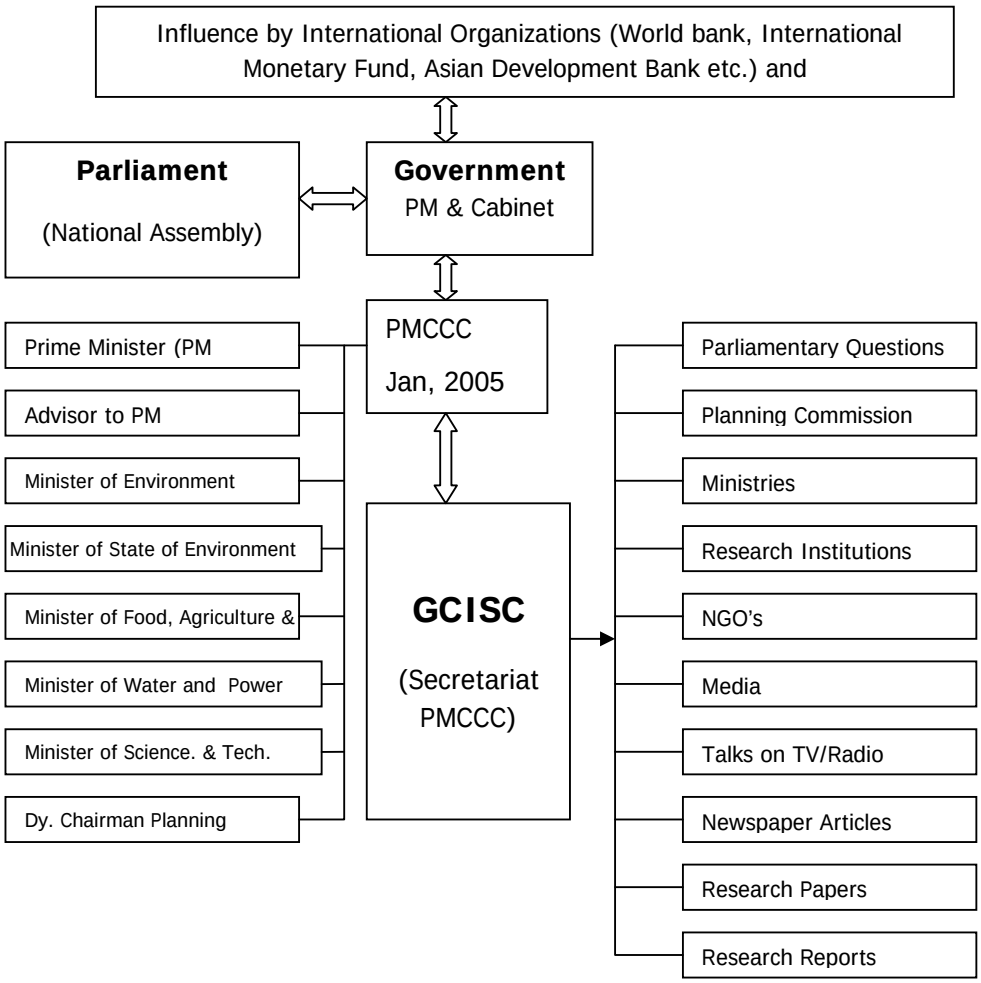
(b) Identification of appropriate adaptation measures to cope with the negative impacts.

The Centre (secretariat of PMCCC) provided science based information at different strata. Viz. provided information to Parliament by answering the questions being raised during Parliamentary discussions. The conspicuous examples being the historical analysis of last 60 years describing about the past climate changes in terms of temperature and rainfall, impact of climate change on two important cereal crops of Pakistan viz. wheat and rice and threats of glacial melting due to climate change impinging on significant impacts on water resources of the country. Planning Commission of Pakistan, a statutory body to provide planning support to government institutions, was given informed decisions at the time, they needed. The Centre was able to provide with the modeling based information on the future water availability issues in consonance with the impacts of climate change. Ministries especially Food, Agriculture and Livestock, Environment and Water & Power remained in close consultation with the Centre for the research inputs to be integrated in their research programs and policies.

The Centre made collaborations with different National/International Research Institutions and Universities. Many National Universities, being influenced by the work of GCISC, included the subject of climate change in their curricula and research programmes. At International level the Centre, on one hand, was successful in recognizing itself as an apex

centre for climate change research in Pakistan and on the other hand the Centre's scientists were given the opportunity to learn while working with international scientists and to prove their mettle. The Centre, meantime, also provided review support to the IPCC's (Intergovernmental Panel on Climate Change) Fourth Assessment Report (AR 4). Different NGO's and Technical Advisory Panel on Climate Change (TAP) do contacted GCISC from time to time to get research based evidence on the climate change impacts on different sectors of economy. The Centre itself tried to reach public through electronic and print media to sensitize the issues of climate change. A number of TV/radio Programmes, Newspapers articles, peer reviewed papers in scientific journals and research reports kept the climate change agenda alive. The PMCCC remained active until early 2008. It was disbanded when a new government was formed following the February 2008 elections.

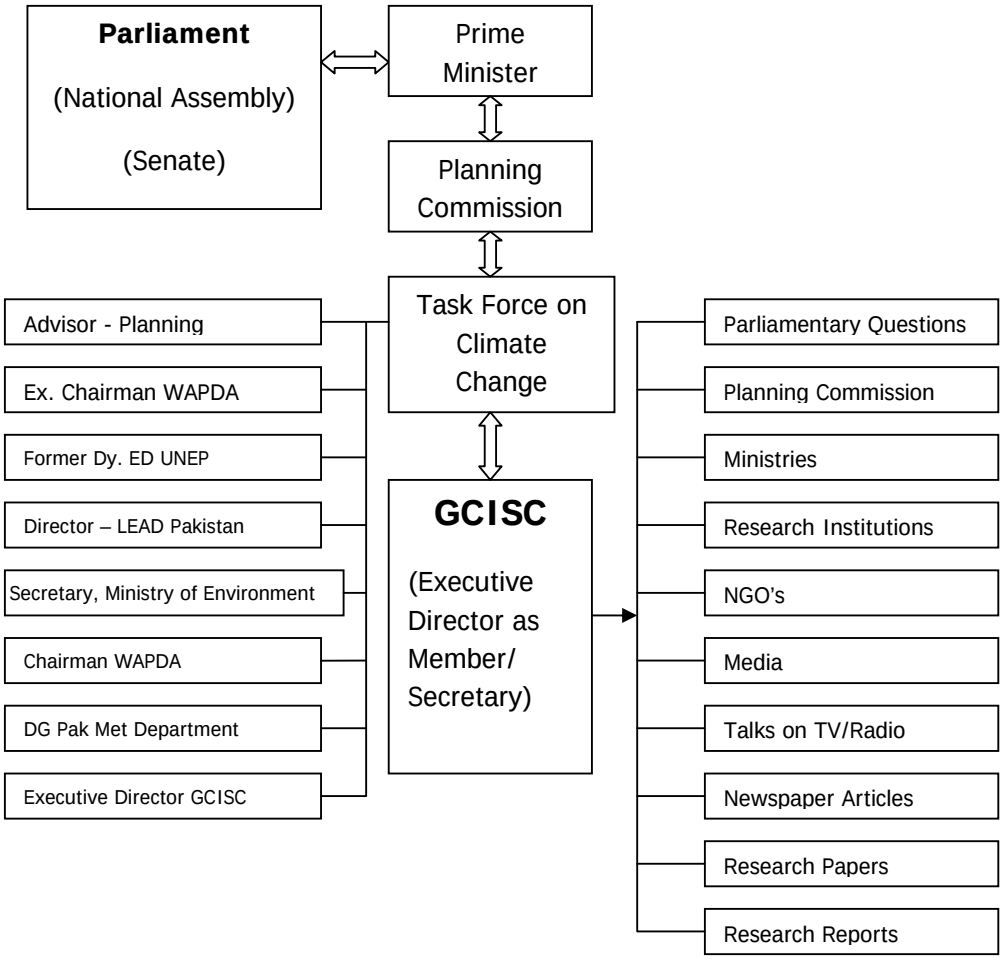
Figure 1: Prime Minister's Committee on Climate Change (2005-2008)



The new government which came to power in 2008 also took Climate Change issue high on the agenda. This time Planning Commission took the initiative which is directly headed by Prime Minister of Pakistan and a Taskforce on Climate change (TFCC) has been established in October 2008 with a broad spectrum under the headship of Special Advisor to Planning Commission of Pakistan. The TFCC comprises of eight members. Eight working Groups with

leading sector experts help guide the TFCC in the areas of Climate, Agriculture, Water, Energy, Transport, Ecosystem and biodiversity and International trade. Planning Commission has been declared as the Secretariat of the TFCC.

Figure 2: Schematic diagram of GCISC Linkage with Task Force on Climate Change



The TFCC is mandated with the following objectives:

1. To contribute to the formulation of climate change policy that would assist the government in pursuing the paramount goal of sustained economic growth by appropriately addressing the challenges posed by the threat of climate change.

2. To identify and recommend the appropriate policy measures for ensuring water security of the country through planning and coordinating in-depth studies of the impacts of climate change and the melting of Himalayan glaciers on the Indus River Flows.

3. To formulate appropriate policy guidelines to ensure food security and energy security of the country in the wake of overall warming, the changing temporal and seasonal water picture in Indus River System, and the rise of the sea level caused by global warming.

4. To recommend policy measures for promoting large scale Adaptation and Mitigation efforts, including various CDM activities, in various sectors to counter the overall challenge of climate change.

5. To assess the existing institutional capacities in various organizations and recommend measures for their strengthening, as deemed appropriate.

6. To recommend measures for enhancing understanding and awareness of climate change issues among all relevant stakeholders, including the general public.

7. To recommend the establishment of an appropriate over-arching review-and policy making body responsible for advising the Government of Pakistan for addressing the threat of climate change in all its manifestations on the continuing basis, to carry forward the work done by the Task Force.

It has only been six months before that TFCC was formulated and mandated with a huge task, GCISC being the driving force. Writing of Interim report, early this year was the first task which TFCC accomplished successfully. Based on this report the Planning commission granted TFCC to continue its efforts towards desired policy goals.

What policy models were employed?

With certainty one model can not be ascribed towards the activities of the Global Change Impact Studies Centre. At different time spans the Centre policy remained under the influence of different models intentionally or intentionally.

When the Centre initiated its work it followed the rational choice and punctuated equilibrium model. At most of the time stages model was followed. Incrementalism model, the Centre followed on regular basis, during the time of capacity building of scientists. Advocacy coalitions and policy communities and networks were used when the Centre focused on the agenda of communicating scientific results. I also recall of employing Multiple streams and window of opportunity models when there were debates on climate change and the Centre has to provide science based evidence to the public and prompt the decision makers for some action.

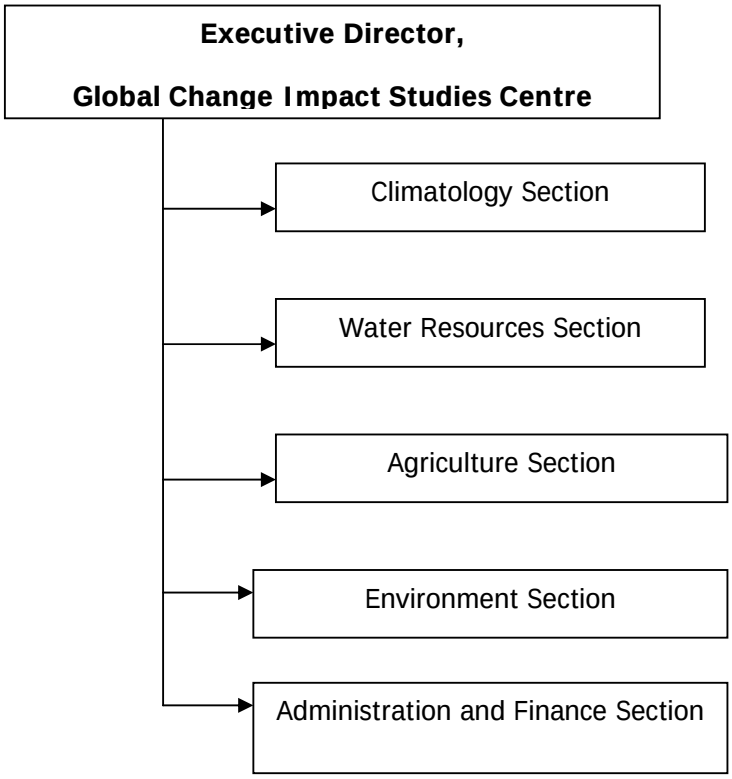
Who and how?

To start with the Centre was not an easy task. The Pakistani nation really owes to the efforts of Dr. Ishfaq Ahmad, an eminent scientist, who took the daunting challenge of initiating research based climate change studies in Pakistan using modeling approaches.

Dr. Arshad M. Khan, another eminent Physicist became the first Executive Director of the Centre. The programmes and research activities of the Centre are planned in consultation

with an Advisory Committee which comprises of eminent scientists and is headed by Dr. Ishfaq Ahmad Special Advisor to the Planning Commission of Pakistan. The Committee periodically reviews and monitors the ongoing programmes and activities of the Centre and provides general guidance for shaping and prioritizing of its future technical programmes.

Fig. 3: Organizational Structure of GCISC



Centre keep on focusing the climate change issues with three pronged agenda

1. At political level Centre's authorities have the strategy to liaise with members of Parliament, Ministers and bureaucrats. We keep them inviting in the Centre for lectures and showing them our work. The young scientists were also provided with the opportunity to present their research results during their visits and also in the workshops and seminars. This process of networking and engaging, which started soon after the inception of the Centre, is still in progress.

2. At Technical level Centre remained in touch with the leading scientific experts in the areas of work in which GCISC is working using a variety of methods including the following. We from time to time seek their guidance in our science plans. Using their long experience and their contacts abroad we were successful in collaborating with different International and National scientific Institutes/organizations. There were exchange of scientists; especially young scientists were promoted to go the institutes of international fame to build their capacity in their subject areas of work. As the major challenge in establishing the GCISC was to start from scratch as there was no

capacity/trained force on Climate Change issues. Being aware of this fact Centre from the very first day focused its attention on this issue. The efforts were bolstered by approval/award of a 3-year Regional APN CAPaBLE Project on "Enhancement of National Capacities in the Application of Simulation Models for Assessment of Climate Change and its Impacts on Water Resources and Food and Agricultural Production" in 2003 under CAPaBLE program of Asia Pacific Network for Global Change Research (APN), Japan. Pakistan was the lead country, our Executive Director being the Principal Investigator, and Nepal and Bangladesh were the two partner countries. This project really helped a lot in placing our research results before the government.

3. For mass awareness the Centre's scientists appeared from time to time in Public seminars, stakeholders meetings and International Days to inform the concerns of climate change in the sectoral performance of the country. Networking with the Non-Governmental Organizations also provided a means for the dissemination of research results and made stakeholders to think and reiterate the need for coherent policy to cope with the challenges of climate change and variability.

As the Centre's main source of funding was Public Sector Development Programme (PSDP) which is approved by Planning Commission of Pakistan, hence the Centre remained closely connected with planning commission- a body of decision makers, and remained influencing it by our ongoing research activities and emphasizing the need for a provocative action in the face of climate change. Regular interaction for dissemination of our scientific results to Policy/decision makers through seminars/workshops, special briefings and frequently invited visits were the ways of our connection and influence to Planning Commission. Quarterly or six monthly progress reports was also another way of liaison with them. Financial support by different International donors not only paved the way for running the Centre's research activities but also helped impressed our policy makers to think about the global agenda in the country's perspective.

Context

Overwhelming evidence accumulated over the last two decades clearly showed that human activity has reached a level where it is significantly affecting the global environment. Furthermore, the global change due to anthropogenic perturbations is happening at a much shorter time scale compared to the natural events. Third Assessment Report (TAR) of Intergovernmental Panel on Climate Change (IPCC, 2003) proved to be an eye opener for the Governments and scientific community. It was feared that some of the resulting adverse impacts will have serious implications in areas such as climate, health, water, energy, food security etc. in many parts of the world. The year 1998 was declared as the warmest year of the century. The report further provided research based evidence on the receding of Himalayan glaciers in Asia and warned about the future water scarcity problems that could confront South Asia in particular.

Developing countries with weak scientific and technological base were feared be most vulnerable to such adverse impacts. In the present global change scenario Pakistan is facing a number of challenges in its quest to move forward along the path of sustainable

development. The most important among these is the provision of basic human needs for its fast growing population without irreversibly damaging her fragile eco-systems. However, natural processes are so complex and variable that, before any mitigation strategy is embarked upon, a basic understanding is essential of the processes that affect the environment and also the ways they will impact various sectors of development. The cloud burst of year 2000 in Rawalpindi/ Islamabad causing heavy losses to life and property and prolonged drought of year 2000-2003 impinging on poor economic growth of agriculture based economy geared the national brains towards a concerted action eventually GCISC came into existence in May 2002. To keep abreast with the global climate changes and to train the young force of the Centre many Training/capacity building activities were conducted. As mentioned earlier the main focus of the Centre is to sensitize the issue of climate change through its research programme usingmodeling approaches. After the Centre got the capacity of using climate models, hydrological models, crop simulation models and transboundary air pollution models, and we were able to present some concrete scenarios in terms of future temperature increase, rainfall variability, future water availability and the future impacts of climate change on cereal crops which provided a leverage to our work and the Centre became the harbinger of change. International world accepted it leading role in Pakistan and our Centre started to be consulted in Climate Change related aspects in Pakistan.

"I am looking Forward to our collaboration for the benefit of science and policy in Pakistan."

"It is good to be back, notice progress, and prepare for the Pakistan-IIASA workshop 25-27 April 2006.

Professor Leen Hordijk
Director, International Institute for Applied Systems Analysis
A-2361 Laxenburg,Austria

"With best wishes for future leaders in Pakistan in the area of global change, and all goodwill, sincerely yours KRS."

Professor K.R.Sreenivasan
Director, Abdus Salam International Center for Theoratical Physics, Trieste,Italy

The review of the IPCC fourth Assessment Report (AR 4) is one of them. Our young scientists proved their mettle in the International Trainings and workshops and some of them are now also being called as invited speakers. In the Climate change adaptation and mitigation programmes developed by Word Bank and Asian Development Bank (ADB) in the context of South Asia, our Centre is being consulted.

The calendar of climate change and extreme events kept on moving from global to regional and local scales shaping the voice at all levels. The examples being, Tsunami 2004, devastating cyclones Rita, Katrina and Wilma in USA, Extreme rainfall event of Bombay July 25-27, 2005.

"I am very impressed by the dynamism and the impressive results of this young Centre. It is an excellent contribution to Climate Change and climate variability research and also an outstanding example of the baneful of a multidisciplinary approach. The support of the government and in particular the Special Advisor to the Prime Minister of Pakistan had been crucial. So once again congratulations, and all the best for the future".
Michel Jarraud, Secretary General WMO, Geneva 6th Feb, 2007

Events a the local level unusual rainfall in Rajanpur district and hailstorms at different places in march 2008 and the rapid changes in cloud cover, increased crop water demand etc. helped shape our research policies at Centre level and also policy makers became more convinced of the impact of global changes on national economy.

> ***"Thank you for the awareness represented. I intend raising these issues on the floor of the house as well as playing my role in the Environment Committee. Additionally, helping through raise public awareness campaigns. "***
>
> Ms. Marvi Memon, MNA and Chairperson Parliament Standing Committee on Environment
> 4th July 2008

I joined GCISC in December 2004 as a Research Fellow and in March 2005 I was able to deliver my debut presentation on climate change and crop productivity using crop simulation modeling approach at an International forum. Later part of the Year 2005 and Year 2006 saw me with diversified scientific roles besides crop modeling. Year 2006 also paved the way for my work with Global Environment Change and Food Systems's (GECAFS), UK project and I am still engaged with GECAFS activities.

Year 2007 brought me fortune as I was selected for Young Scientist Summer Programme (YSSP) at International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria and also I was nominated as a member of the Expert Team in Commission on Agricultural Meteorology (CAgM) of World Meteorological Organization (WMO) for a term of 4 years. These two events provided legitimacy to my work and poised me with the passion to do something innovative. Being part of the GCISC I also had the opportunity to review the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR 4)

During later years I have had the opportunity to represent GCISC at different National and International Forums, especially the opportunities, now a days, to participate in different stakeholders meetings within the country for brainstorming on how to go towards sustainable development and mainstream climate change adaptation and mitigation programmes into the national plan of action proved to me a fruit for thought for present policy making course at ANU under AusAID Australian Leadership Award Fellowship Programme.

The involvement of GCISC in the following projects provides a strong evidence of its scientific skills which not only have attracted the scientific community but also provided the National Planners a sound reasoning of its existence and its future role in addressing the national policy issues in the face of climate change.

Project Title	***GCISC Partners***	***Funded By***
Enhancement of National Capacities in the Application of Simulation Models for Assessment of Climate Change and its Impacts on Water Resources and Food and Agricultural Production	Bangladesh, Nepal and Pakistan Meteorological Department (PMD)	CAPaBLE program of Asia Pacific Network for Global Change Research (APN), Japan (Renewed for 3rd Year in May 2006)
Development and Application of Climate Extreme Indices and Indicators for Monitoring Trends in Climate Extremes and Their Socio-economic Impacts in South Asian Countries	Bangladesh, India, Nepal Sri Lanka and Pakistan Meteorological Department (PMD)	APN (one year project awarded in October 2005)
Feasibility study for the Pilot Adaptation Project to Test Information Technology as a tool for Information Generation and Dissemination Enabling Farmers to Cope and Optimise Management of Climate Variability and Change	The Energy Resources Institute (TERI), New Delhi, India	UNEP/GEF through TERI. (Two month Project awarded in May 2005, Project completed).
Basin Scale Analysis of the Vulnerability of Food Systems to Global Environmental Change	Bangladesh, India, Nepal, Pakistan and Global Environmental Change and Food Systems (GECAFS), U.K.	CGIAR (one year project led by GECAFS, UK, started August 2005)
Improving Policy responses to interactions between Global Environment Change and Food Security across the Indo-Gangetic Plains	Nepal, Bangladesh, India and GECAFS	CAPaBLE program of APN (Two year project led by Nepal, starting October 2006)
Assessment of Food and Water Security in South-Asia under a Changing Climate Using Crop Simulation and Water Management Models, and Identification of Appropriate Strategies for Adaptation to Meet Future Demands	Bangladesh, Nepal, India, Pakistan, Sri Lanka	APN ARCP (Two year Project led by GCISC, Pakistan, 2008-2010)
Impacts of Global Change on the Dynamics of Snow, Glaciers and Runoff over the Himalayan Mountains and Their Consequences for Highland and Downstream Regions	China, India, Nepal, Pakistan	APN ARCP (Two year project led by Nepal, 2008-2010)
Information Sharing System (ISS) to enhance coping capacities of farming communities in dealing effectively with Climate variability and Climate Change	TERI (India), GCISC (Pakistan) and UNEP	Three year project now, under processing by Global Environment Facility, GEF

Outcomes

The main outcome is, the Centre has been able to recognize Climate Change as a major concern for Pakistan's development among the policy makers and national planners. In January 2005 a high level committee called the Prime Minister's Committee on Climate Change (PMCCC) was established and GCISC was designated as its Secretariat. The Committee comprises the Prime Minister, Ministers for Water & Power, Food & Agriculture and Science & Technology, Minister of State for Environment, Deputy Chairman, Planning Commission and Special Advisor to the Prime Minister. This committee was a policy and review forum focusing on the challenges related to the climate change. GCISC through PMCCC remained successful in getting on board the Climate change related future strategies and issues of concern like

- National assessment of sectors requiring involvement and framework for collaborations.
- Awareness among policy- and decision-makers for perceived needs intersectoral coordination.
- Capacity building in various relevant government ministries
- Promoting research on links between climate change and potential impacts in vulnerable communities.
- Strengthening the institutional basis for the implementation of national climate change policies and programmes.
- Strong monitoring and documentation involving stakeholders.

In 2008 a Task Force on Climate Change (TFCC) was formulated under the auspices of Planning commission of Pakistan to sensitize the issues pertaining to climate change and its implications for Pakistan' development. GCISC's Executive Director has been nominated as the Member as well as the Secretary of this Task Force. The centre provides scientific evidence based information to the task force in the light of which TFCC places Pakistan's climate confrontation strategy to the Government. Eight working groups, on different issues/sectors with leading experts of the country are working under this taskforce. An interim report on the climate change impacts on key sectors of national economy was prepared by GCISC which was approved as a baseline line report to continue work and devise adaptation and mitigation strategies to cope the threats being faced by our country.

At scientific level the Centre has been able to develop the capacity of young scientists (more than 300) in the aforementioned areas not only in Pakistan but in other countries of South Asia viz. Bangladesh, India, Nepal and Sri Lanka by organizing different Regional Training workshops. Effective collaborations with internationally famed organizations Viz. Abdul Slam institute for Theoretical physics (ICTP) Italy, International Institute for Applied Systems Analysis (IIASA) Austria, Global Environment Change and Food Systems (GECAFS) UK and Asia Pacific Network for Global Change Research (APN) Japan, University of Georgia, Griffin,

USA are few to name. Besides these there is a long list of collaborations with National institutions. In a span of 7 years Centre is awarded with eight research projects in the said areas. Many regional and national scientific capacity building workshops and seminars and meetings for the awareness of national planners and policy makers were organized by the Centre in due course of time. A number of publications in the form of research papers in peer reviewed journals, books, monographs and research reports are on its credit.

Centre in the last few years has been able to popularize the climate change impacts issue to such an extent that many NGO's has put this issue on their main agenda and organizations/institutions have now become talking on climate change impacts and become expecting GCISC about advising on adaptation and mitigation strategies.

Despite of a large list of quite appreciable achievements the Centre had to face plethora of constraints which severely affected its pace of progress. Non availability of adequate meteorological and other relevant data in sufficient details and in digitized format ever remained a constraint for the Centre. Non availability of suitably trained manpower in the area of mathematical simulation modeling and equipped with multi-disciplinary background was also one of the main hurdles which put us aback in speedy progressing., Inadequate facilities, owing to financial constraints, for high speed computation and storage of large amounts of data, as are necessary for climate change related work, made our work more difficult. Due to aforementioned reasons we still are struggling for the comprehensive assessment of the impacts of climate change on our economy. Although we have been able to streamline the climate change and variability issues but a coherent policy aiming at desirable adaptation and mitigation strategies, in the face of climate change, for the sustainable development of our country is yet an unfinished agenda.