CRISSA REGIONAL CONSULTATION

DAY 1 AND DAY 2 PROCEEDINGS

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DELHI

DISSEMINATION PARTNER: VERTIVER

Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change

PRESENTER - Dr. Marcel Marchand, Specialist (ICZM, FRM), Deltares

PANELISTS: Mr. Joginder Singh, Advisor –Technical, National Water Mission, Government of India

Mr. Muralidhar Panda, Deputy Director, FF&FRM Cell, Government of Odisha

Dr. Sandhya Rao, Executive Director, INRM Consultants Pvt. Ltd.

KEY POINTS FROM THE LEAD PRESENTATION (MM)

- The overall objective was to propose a combination of structural and non-structural measures for flood management in flood-prone areas of two selected basins (Burhi-Gandak in Bihar and Brahmani-Baitarani in Odisha), such that the selection of such measures can be replicated or adapted in other basins/sub-basins.
- The project introduced a framework for Integrated Flood Risk Management for India, illustrated through River Basin Flood Mitigation Plans for both river basins.
- The project used a computational flood risk model for both sub-basins and estimated the potential increase in flood risk due to climate change. Flood extent for the two basins could increase between 5 and 25% in 2040, respectively, if no additional measures are taken.
- Macro-economic impact of floods can be significant. Damages in both states have a rising trend (due to population increase and increase in cropped area).
- Implementation of structural measures (such as dams and embankments) result in a significant reduction of flood risk, but complete flood control is not feasible. Therefore community disaster preparedness and early warning systems need to be upgraded.
- By providing the 1:25 safety standard (25 year return period flood) for rural areas around 90% of the average annual damage could be avoided. Embankments remain an important measure, but are not without problems. Planning and construction supervision to avoid breaches and more research (both technical and social) are *needed.*
- Risk approach and Cost-Benefit Analysis (CBA) for safety standards for embankments (return periods) should be prepared as normal procedure (and is feasible even with limited existing data).
- Existing River Basin Organisations should be revitalized. Until this has materialized, as an interim solution, Project Preparation Cells for Integrated Flood Management (IFM) at central and state levels.

KEY POINTS FROM ALLIED PRESENTATION (NAME) (MP)

- Climate Change Innovation Programme (CCIP) is a collaborative programme between the Government of United Kingdom and the Government of India, now focused on Odisha, Chhattisgarh, Assam, Maharashtra, Kerala and Bihar
- Studies have projected increase in precipitation in the Mahanadi River basin, along with a projected increase in the magnitude of flood
- CCIP support would assist in better forecasting and early warning of floods
- Present flood forecasting systems rely on past precipitation inputs, which come from observation networks of rain gauges and radar. For medium term forecasts (48 to 72 hours ahead), quantitative precipitation forecasts from numerical weather prediction (NWP) is required.
- The current activity involves generating typical flow forecast that use hydrologic and hydraulic models to transform measured and predicted rainfall in a catchment to a forecast time series of flows and water levels in a river system.

KEY DISCUSSION POINTS

- This is a first-of-its-kind study on flood management, where climate scenarios have been modelled within a flood risk framework. The study has involved wide multi-sectoral consultations and incorporated best practices nationally and internationally. (JS)
- The study makes important policy recommendations such as strengthening of River Basin Organisations in all river basins and (in the interim) creation of specialised cells at state and central government levels. The study emphasizes the need for real time data acquisition networks and recommends changes in project preparation guidelines to include (among other things) more rigorous economic analysis to aid flood management practices. The Government of India would shortly be taking action on the study recommendations. (JS)
- There is a need to look a floods and droughts in an integrated manner within a river system, carefully understanding the upstream-downstream linkages. This is all the more important in the context of the recent Cabinet approval for a central water management system, the apex Court's cognizance of the severe drought situation in parts of India and the environmental issues associated with large storage dams. (SR)
- If flood risks cannot be entirely mitigated, it is important to enhance community-level capacities towards flood preparedness. (MK – audience question). However, it is equally – perhaps more - important to include local ideas in planning processes towards flood management, given that communities often have differing perceptions on structural measures such as embankments. (MM)

2 **Adaptation to Climate Change in Indus Basin**

PRESENTER - Mr. Fawad Khan, Senior Economist, Institute for Social and Environmental Transition (ISET)- Pakistan

PANELISTS: Dr. Pramod Aggarwal, Regional Program Director, International Water Management Institute (IWMI)- India

KEY POINTS FROM THE LEAD PRESENTATION

- The core objective was to generate knowledge on climate-related risks in the Indus Basin in Pakistan vis a vis their impact on marginalized communities and strategies for building resilience for recovery after flood disasters.
- The study began at the aftermath of the Indus floods in 2010, one of the “largest disasters that Pakistan has experienced in its history.” The total damage exceeded $20 Billion.
- Even though higher floods had been experienced before, the damage was four times larger than incurred in the past. Some of it can be explained through population increase however the intensive river management was the likely explanation for the disproportionate increase in the damage caused by these floods.
- Punjab and Sindh have one of the largest integrated irrigation systems in the world that feed all of Pakistan, however, having a controlled river basin through a system of irrigation channels barrages and large dams can build huge vulnerabilities in Pakistan.
- Reduced annual flow deviation of the river because of slit storage in the river bed and the north-south water flow were contributing factors to the damage caused. Due to climate change, rain fell in places where it did not usually rain. The canals and irrigation channels are designed for water to flow north to south but rain led to river water flowing east to west and west to east. The manmade construction along the river stopped the water from flowing back into the river causing massive flooding.
- Use of hydraulic infrastructure and embankments reduces low intensity and high intensity events. This leads to a false sense of security to communities that live close to water and eliminates the process of autonomous adaptation. Households and lifestyles are no longer adapted to live in a flooded plain. Therefore Low Frequency and High intensity floods lead to huge disasters.
- Open basin management may increase the autonomous response to flooding caused by Low intensity High Frequency events. Adaptation to more frequent but less intense floods is important.
- For flood adaptation, the study’s economic analysis revealed that investment into raising houses and changing lifestyles at the household level shows similar returns as investment made in embankments.
- Seed-banks created by local authorities and availability of credit services for people was found to be critical for fast recovery.
- In some areas, Land Title and Drinking Water were critical factors for recovery. People with no land title were most severely affected as they were entitled to only 25% of harvest. People with access to hand-pump had better recovery rates.
- Electricity access and sanitation were found to be important components of recovery in some areas. Education, Social Capital were important factors across the board.

- Development intervention when chosen correctly can help people build resilience and recover much faster.
- Demographic Differentiation factor was important to determine resilience: Households with higher number of females were more vulnerable in the plains as Purdah restricted their access. Households with more women in rural areas tended to do well because of seasonal migration. Remittances were found to be alternate livelihood strategies.
- **SUMMARY**
  a) A common yardstick for Vulnerability Indices does not work across all areas. Use of Vulnerability Indices should be restricted when comparing same areas.
  b) Systems agents and institutions are important to determine how services are provided.
  c) Shared Value process is extremely important besides the scientific method in learning about vulnerability.

KEY DISCUSSION POINTS

- Investment decisions are prioritised based on vulnerability Indicators that take a macro view but it is critical to include local factors. Vulnerability Indicators have their own limited use and we should not extend using them everywhere (PA).
- There is disconnect between practitioners and policy makers as practitioners come up with local solutions and policy makers always need a macro view (PA).
- Questions that need to be addressed by researchers:
  1. How do we expand the scope of local solutions?
  2. How do we understand their adaptation domain?
  3. How do we target technologies where they will work?
  4. How do we link macro policy to local solutions and vice versa? (PA)
- A huge issue in the region is the disconnect between developmental policy and climate change policy people.
- Projections of increasing climate risks in development policy planning need to be internalized to build resilience at all scales (PA).
- Researchers need to ensure **that adaptation practices, investment decisions and policies we implement today do not lead to maladaptation in the future. This can only happen if the research community breaks out of the silos it is working in today (PA).**
- Without improving governance and addressing issues like encroachment in flood plains and corruption, the true challenge posed by climate change cannot be addressed. (PA).

Q: What were the policy recommendations made at the time of the study? (KM)

We need to rethink reconstruction after a hazard. We should not reconstruct exactly as before the flood without determining the cause of maladaptation as with changing climate the landscape of hazards have also changed (FK).

Q: Was there a difference in the floods in Chitral witnessed in 2015?

It is not clear whether a certain policy can change something on the ground but access to electricity stopped deforestation. Credit and Saving were very important. (FK).

3 **Groundwater Resilience to Climate Change and Abstraction in the Indo-Gangetic Basin**

PRESENTER - Prof. Alan MacDonald, Principal Hydrogeologist, British Geological Survey

PANELISTS : Mr. C P Kumar, Scientist 'G', National Institute of Hydrology, Roorkee

Dr. Anwar Zahid, Deputy Director- Ground Water Hydrology, Bangladesh Water Development Board

KEY POINTS FROM THE LEAD PRESENTATION

- Research aims to provide an authoritative overview of groundwater across Indo-gangetic basin (India, Pakistan, Bangladesh and Nepal)
- The key features of the Indo-gangetic Basin are:
  1. Huge population of over 1Billion,
  2. Source of Global agriculture,
  3. Large canal system with a great history, rendering the area hydro geologically interesting,
  4. 20 million tube wells into the basin,
  5. Climate Effects, Melting Glaciers, increasing depletion of the basin are affecting the basin system

- Four case studies conducted as part of the study include:
  1. Deeper groundwater in Bangladesh-deeper aquifer where there is less arsenic
  2. Over-exploited groundwater in Punjab, India
  3. Groundwater in middle hills in Nepal and how vulnerable that might be to changing climate
  4. Salinization of ground water across the Indus

Study Findings

- There exists a huge gradient in rainfall from west to east and north to south which affects the quality of the water and ground water recharge.
- Ground water recharge is not just from rainfall but also very importantly from Canals which have a huge impact on the groundwater system
- Rivers are a huge source of recharge and change in Indus river system has a huge impact on ground water recharge across Pakistan
- Recharge is also dynamic not static- it varies not just with climate but also with abstraction
- This trans-boundary aquifer accounts for 25% of all the world’s groundwater abstraction

- Groundwater storage of this aquifer is very high at 30,000 KM^3.
- There are large spatial variations in the basin's properties because of changes in the silt and the clay which have a big impact on how contamination can migrate.
- One of the most important maps created in the study, the Ground Water Depletion map reveals (ground water depletion map in ppt),areas where water is rising next to the ones depleting.
- Obtaining site specific data is very important because of the complexity in rising and falling data across the whole region
- Water quality of the basin is a bigger issue than depletion. This is beginning to get addressed but needs more priority. (Ground water Salinity map in ppt)
- 60% of the aquifer is affected by water quality issues- this is a big issue but there is not enough data on the impacts

- **CASE STUDIES:**
  - **Bengal**
    1. Water levels in confined sediments respond to tidal and monsoonal loading of the land surface, not to groundwater flow.
    2. Individual abstraction wells can drawdown recent water, but deep groundwater abstraction is in general secure against widespread arsenic contamination in next 100 years *(Residence Times)* which is a local level issue.
  - **Punjab (Bist Doab)**
    1. Very high abstraction where lots of recharge comes from rainfall.
    2. Deep and shallow groundwater are strongly connected-currently drawing down groundwater and contaminating it.
  - **Nepal (Middle Hills)**
    1. Heavy reliance on groundwater from springs for water supply, and a growing use of shallow boreholes for agriculture at lower altitudes.
    2. Springs are typically perennial but with significantly reduced flows after monsoon- changing climate, changing snow melt can impact the behaviour of the springs.
- **SUMMARY:**
  1. The IGB aquifer offers an excellent buffer to climate variability
  2. Degradation in groundwater quality is a greater concern than depletion.
  3. Groundwater is more vulnerable to abstraction than climate change.
  4. The aquifer properties vary considerable and need variable governance-typologies
  5. Deep groundwater in Bengal is a strategic resource
  6. Groundwater in the Himalayas is important and vulnerable

KEY DISCUSSION POINTS

- Bangladesh is the 4th most vulnerable country on all disasters and water resource problems include arsenic and salinity in upper aquifers. (AZ)
- Recharge rate of deep ground water (below 300 meters) is very slow and could take hundreds or thousands of years. (AZ)
- 12-15% of people do not have access to safe drinking water. (AZ)
- In some parts, while groundwater is rising, it is not useable because of arsenic and salinity. (AZ)
- Bangladesh has a good hydrological monitoring network. Monitoring on the upper part of the water table and quality has been done for more than 60 years. Now the monitoring on deeper part is beginning with multi-level piezometers installed for monitoring 350 meter depth. (AZ)
- In Bangladesh there are several policies and acts e.g. Water Act and Bangladesh Strategic Plan to solve or manage the water problems but implementation remains a key issue. (AZ)
- Given the vulnerability regarding total water management in Bangladesh, there has been a lot of research that has generated great data sets. The challenge is to use, analyse and interpret this data to mitigate different problems. (AZ)
- Bangladesh is hydrologically divided based on the boundary of the major rivers in 7 parts but the region has not been hydro-geologically divided like watersheds which needs to be done for Water budgets. (AZ)
- Bangladesh is an agricultural dependent country and 80% of its irrigation comes from groundwater. It is found that 30-35% abstracted water has no use. Farmers think that more water leads to better crop. Stopping this misuse can help recharge and expand agriculture irrigation. (AZ)
- Poor people cannot access safe deep groundwater so they need alternative sources. Fresh water pockets need to be developed and aquifer recharge needs to be managed in saline zones. (AZ)
- Climate change affects groundwater in 2 ways:
  1. Interaction of surface water bodies with groundwater – because of climate change there is less available of surface water
  2. Intense rainfall affects recharge process- canals, rivers, etc. (CPK)
- Salient points to consider:
  1. Continuous monitoring of groundwater levels and quality in the Indo-gangetic region is a basic prerequisite to manage groundwater resources.
  2. Careful management of groundwater resources against both depletion and water logging needs to be done
  3. Implementation of conjunctive use of surface water in water logged areas.
  4. More resources required to protect quality of water.
  5. In case of coastal areas, control of abstraction to limit the ingress of seawater intrusion.
  6. Careful monitoring of deep ground water abstraction in Bengal basin.

7. Identification of suitable areas for management of artificial aquifer recharge in depleting aquifers.
8. Judicious decisions related to lining of canal systems.
9. Management of demand augmentation in big cities.
10. Protection of groundwater from sewage in urban areas. (CPK)

Q: Did you cover how the aquifers are connected across the national boundaries and whether or not they travel? (ATS)

- Trans-boundary issue is a very complex. Aquifer in essence is continuous laterally but groundwater does not flow that fast. So, it can take centuries for groundwater to flow laterally. (AM)

Q: Have you compared governance of groundwater in different countries- if so, whether it can be seen as a regional cooperation issue or a national management issue? (ATS)

- What we concentrated on was what parts of groundwater systems would make it easy to manage. We did not look at governance. (AM)

Q: One of the conclusions made was the ground water level change would be more driven by abstraction rather than climate change but intuitively abstraction and climate change are linked- more drought leads to more abstraction- do you think a more detailed study on the linkage between abstraction and climate change would add value to this? (AZ)

- It is useful to think of the main climate change impact as higher abstraction. Recharge will be less than the depletion- this as an indirect impact is very important. Climate instability drives a lot of donor money into climate resilient irrigation systems. (AM)
- Abstraction can change the scenario very quickly. Unplanned abstraction is a big reason for depletion. (AZ)

4 **Glacier Monitoring in the Himalayas using Unmanned Aerial Vehicles (UAVs)**

PRESENTER - Dr. W Immerzeel, Assistant Professor, Utrecht University

PANELISTS : Dr. Shresth Tayal, Fellow, The Energy and Resources Institute (TERI)

Dr. AL Ramanathan, Professor, Jawaharlal Nehru University (JNU)

KEY POINTS FROM THE LEAD PRESENTATION

- The project was conducted in Lirung and Langtang Glaciers.

- The main objective was to understand the change in Himalayan Glaciers over time in terms of surface elevation and the seasonal flow velocities between the survey flights of the UAV.
- Overall the glaciers have lost a significant amount of ice over the period of study. Dr. Immerzeel presented his model of using UAV to monitor Himalayan Glacier in Nepal and highlighted its advantages over direct field survey and mapping through RS/GIS. UAV has advantage in analysing melting of glaciers, its thickness.
- Glaciers are covered with debris which poses difficulty in conducting proper research. The UAV's used to conduct this study, takes pictures and creates a big image through co-ordination, and it detects picture images and then matches the features.
- The use of the UAV technology can feed into surface study of the glaciers by quantification of the changes in the surface elevation of glaciers tongues and linkages with the melt processes and flow velocities of the glaciers.
- There is a need to revolutionize research into behavior of mapping glaciers to:
    1. Quantify changes in surface elevation
    2. Study the seasonal flow velocities of glaciers accurately.
- This research revealed that the stronger the debris cover the more insulation. The debris covered glaciers lose mass at similar rate as the clean ice glaciers at the same altitude.
- Surface features like lakes and cliffs may also be responsible for the accelerated melt of the glaciers as they trap the solar radiation coming in from the space which then raises the temperature.
- Himalayan glaciers are in poor shape and are consistently losing mass and a number of glacial ponds and ice cliffs have formed on the surface of these glaciers.
- The future direction of the research should focus on: Testing on clean ice, Benchmark of glaciers, Thermal and multispectral studies

KEY DISCUSSION POINTS

- If the same UAV technology could be used for larger glaciers and sustainability of the device and if it can predict other related impacts of climate change. (ALR)
- There are difficulties in glacial monitoring in India due to the restrictions by the Indian government and getting permission to reach and study the area remains an issue. (ALR)
- It is important to have involvement of the institutional bodies that can help in conducting and carrying forward the research and data analysis.
- There is limited understanding of the melt response of the glaciers which can be overcome through this technology. He stated that Unmanned Aerial Vehicles (UAV) technology will greatly help in conducting the research as it will ease out the study methodology of the glaciers as most of the glaciers are covered with debris. (ST)

- There is a need to reduce uncertainty and provide precision in glacial studies. The information provided by the UAVs will help in prediction of stream flow which may feed into data in management of the downstream hydro-power projects and the policies and planning of the related ministries. (ST)

Q: What are the potential policy implication of the research, which you have done? Could you share some thoughts on kinds of policies or other such decision initiatives can research like this flow into, considering that the major hypothesis was compare the impact of the debris and glacier melt?

- Source of water in the rivers also depends on the sensitivity of the basin is to climate change. If it is snow water dependent, Climate change and temperature rise has direct effect on river flow but if it is very steady then season sensitivity is much less. So studies on functioning, response, and role of glaciers in high altitude water cycle is required. (WI)
- Better understanding of these glaciers is important for better policy management, better water planning strategies and policies. (ST)

Q: Assuming a situation where you have an image of right time and without the cloud cover what is the incremental accuracy that you get from going the UAV way just say one meter or half a meter resolution you say do you still get accuracy and if you don't differential GPS then what is the impact of that on accuracy?

- In comparison to remotely sensed application there are two points- accuracy and resolution. (WI)
- You can use GPS in the UAV which gives you 3 to 5 meters of accuracy. Now there is a UAV with differential GPS on board that means we have a base station somewhere and we can get the same accuracy. (WI)

Q: India is launching the Synthetic Aperture Radar Sensors (SAR) with the US called NAISA which is going to be an L&P band sensor. So is there an application of SAR informatory because that can come over the cloud issue and resolution issue over remote sensing. Is that something which can aid this project in future?

- Yes I think it can see through the clouds and gives quite high level of detail. (WI)

Q: Based on your glacier monitoring, can you throw some light on what kind of reduction in dry season and increasing flow in wet season are we going to see?

- The amount of rain in central Nepal in monsoon season is so high that Glaciers do not really matter but in April and May which is the time for agriculture downstream, it matters very much. (WI)

5 **Calibrating Above and Below Snow Line Precipitation as Inputs to Mountain Hydrology Models**

PRESENTER - Dr. W W Immerzeel, Assistant Professor, Utrecht University

PANELISTS: Dr. Arun Bhakta Shrestha, Regional Programme Manager, International Centre for Integrated Mountain Development (ICIMOD), Nepal

Prof. A K Gosain, Dept. of Civil Engineering, Indian Institute of Technology (IIT), Delhi

KEY POINTS FROM THE LEAD PRESENTATION

- The three pillars to further understanding of high altitude water cycles are:
  1. Understanding high altitude atmospheric processes.
  2. Understanding the Glacio – hydrological processes.
  3. Understanding the future water cycles of the third pole.
- The first step is to find out the reasons behind changing climate by integrating the surface temperature measured and the data collected from the study with the weather models.
- Mountains and snow are important hydrological process in Asian countries as they are the prime source of water supply. However the present understanding is not very elaborate as the spatial distribution of precipitation in these high altitude areas are highly unpredictable.
- In order to study climate change impact, local observations are essential to capture data on changing temperature and precipitation which varies according to the elevation.
- Accurate information on precipitation distribution is crucial to glacio-hydrological modelling but at altitudes as high, there are a limited number of stations measuring rain and snow.
- There is a need to develop precipitation monitoring systems so as to feed into mountain hydrological research and development of hydrological models in the region as this region is geographically and climatically diverse.
- Two case studies from the research, one of which was based in Indus Region, the Nanga Parbat area and the other based in the Langtang Region in Nepal were conducted:
  1. In Indus region, with the information of the glacier mass balances from space, the amount of glacial melt was used to estimate the amount of snow that should compensate for the loss to sustain the mass balance of the glacier and further this was used to estimate the amount of rainfall in higher altitude in those mountains.
  2. In the second study site, i.e. Langtang region, Nepal, temperature study was conducted along with the rainfall study to understand the dynamics of the liquid and solid precipitation. Pluviometer, tipping buckets and temperature sensors were installed to monitor and record local observations. From the observations recorded by the installed machinery it was evident that there is more temperature variation in the winters than in the monsoon (when it is

comparatively humid). The efforts of the team added to the record of high altitude meteorology in the study area.

- Proxy studies are a good alternative when local observations cannot be made but it is important to incorporate local weather observation in combination with high resolution weather models in climate studies.
- Basic fundamental knowledge about the high altitude water cycle is a must for any adaptation project. We need better integration between development aid sector, social science and physical science.

KEY DISCUSSION POINTS

- Environment and hydrology modellers face struggles due to lack of high altitude data especially in the Himalayan region (AKG)
- Both geographical and technical challenges make it difficult to collect and manage data. (AKG)
- Since the monitoring stations have already been installed, no one can afford to have this data collected for routine. This is wealth of a data should be shared as much as possible so that many more researchers can build upon the research. (AKG)
- If policies have to be derived on the assumption of how long these glacier mass will last, the timeframe of the project should be long otherwise it will be futile. (AKG)
- Some of the questions we should keep in mind - interlinking of rivers-based on the assumption of donor basin and recipient basin, re-look at the projects where the glacier mass doesn't last more than 50-60 years, climate implications, etc. (AKG)
- If we have more insight into these issues which this study is trying to get into, it will be a huge benefit to all the countries that are around this third pole- it will not just be South Asia but all the other countries also. (AKG)
- When it comes to understanding the change, there are a few natural drivers that are very important- understanding temperature change, precipitation change are very important for Cryosphere. (ABS)
- There are so many things happening at higher altitude precipitation that we do not yet know. There are anomalies-most glaciers are below 0 balance which means they are shrinking but some are advancing with warming climate. (ABS)
- Ground based observation is very important. We have to make use of innovations but we need to use traditional knowledge as well. (ABS)

6 **Strengthening Responses to Climate Variability in South Asia (India, Bangladesh, Nepal, Pakistan)**

PRESENTER - Ms. Shreya Mitra, Senior Programme Officer, International Alert

PANELISTS: Dr. Madan Lall Shrestha, Academician, Nepal Academy of Science and Technology

Dr. Himanshu Pathak, Professor & Principal Scientist, National Innovation in Climate Resilient Agriculture

KEY POINTS FROM THE LEAD PRESENTATION

- Some of the most climate change vulnerable countries like India, Bangladesh, Nepal and Pakistan have a top down approach on policies implemented.
- We need to understand the local resilience and relevance of climate change to find out the solutions, as it is affecting us locally. No level of city specific or headquarter specific policies are going to be effective.
- Climate resilience has to exist within communities and they should be understood around topics of access to natural resources, credits and jobs.
- People's capacity has to be strengthened in order to face the uncertainty of climate change and any conflict due to failure of governance and livelihood/income insecurity has to be addressed at the sub national level.
- Migration is one common impact of the current climate variability which should be considered in a peaceful manner for smooth implementation of adaptive strategy as migration can cause a lot of psychological and financial impact in the community.
- The case studies showed following results:
  1. Bangladesh –It is seen that the Shrimp farming business is vulnerable as there is less salinity.
  2. India – The loans for various farmer communities and related sector communities have to be made to more flexible and available
  3. Nepal – In the agricultural sector it is seen that the farming class is moving to high value cash crops which are less labour intensive. Further the caste system that is present and prevalent adds to the vulnerability.
  4. Pakistan – The Governance structure in Pakistan adds to the vulnerability; further due to the lack of a proper governance the job security policies also get swayed.
- Policy Implications:
  - Different policies for different risks to human security.
  - Other issues also should be highlighted and looked into.

KEY DISCUSSION POINTS

- Community livelihoods are very important. (MLS)
- For policy makers it is difficult to bridge the gap between science and policy. (MLS)
- There is no dearth of policy but implementation needs to be strengthened. In India there are several layers of policy. Every state

has developed their own state action plan, there is a national mission. Some plans are district level, even panchayat level. (HP)

- Vulnerability map for the last sixty years and the next thirty years is available. The question is how we integrate all activities so that something concrete can be put forth to the government. (HP)
- We have to ensure that state-level organizations or the line departments are involved and work together to benefit people. (HP)
- Policy makers complain that they are not getting information they need, like Vulnerability plan, Contingency Plan etc. But some plans need much more research and detail. (HP)
- In the context of climate variability, the response time is very limited. Awareness regarding polices among the real stakeholders is very limited. Lots of training and awareness is required. (HP)
- If we have to generalize local studies to a larger area, we need many more studies. (HP)

Q: Seasonal water availability is key for farmers? Have you found a variability difference between different countries and is the policy recommendation different for countries or general?

- The main policy recommendation is to take the local context as starting point of your analysis.(SM)
- Governance varies across the region and that is key to creating resilience. (SM)
- Institutional capacity, governance are far more important than the physical aspects of the impact. It is seen that Bangladesh is more policy conscious in this field and in Pakistan the policy makers need to be more context specific. (SM)

Q: Context specific situations can become unmanageable- What practically do you say to governments both in local and central level about taking into account context specificity or the vulnerability?

- Governments are set up in a way that addresses their own portfolios; at the government level there is a need to understand what coordination mechanisms are required to design integrated approaches. (SM)
- There should be more coordination among the development groups. It could happen at decentralised levels that across South Asia. (SM)
- Funding silos exist but many projects should be integrated into local developmental plans. (SM)
- Research based findings are necessary for development of policy and implementation. (SM)
- Until now we have used global models to predict climate variables to mitigate local problems in the region. What is needed is more local information for better mitigation and response and resilience to climate change impacts. The real causes for climatic variables need to be identified across the region. (SM)

Q: To what extent the strategies that you identified are enabled by policy instruments such as State Disaster Management Plan (SDMP) etc.?

- They are enabled to do what they set out to do but do not allow to tackle the multiple risks. So resilience is built only either for one or few risks for a short term. (SM)
- Climate adaptation is not only funding instrument that should help people adapt environment al risks. (SM)

7 **Action Research on Community-Based Adaptation in Bangladesh**

PRESENTER - Mr. Sarder Shafiqul Alam, Senior Research Coordinator, International Centre for Climate Change and Development (ICCCAD)

PANELISTS: Prof. K C Malhotra, Former Professor of Anthropology, Indian Statistical Institute

Ms. Zeenat Niazi, Vice President, Development Alternatives

Dr. Yogesh Gokhale, Fellow, The Energy and Resources Institute (TERI)

KEY POINTS FROM THE LEAD PRESENTATION

- Developing community based climate adaptation in Bangladesh requires M&E (monitoring and evaluation) for proper implementation of programs and identification of gaps.
- Capacity development for communities, government agencies, partners, NGOs is needed.
- Community based actions specific to climate vulnerability require community participation to address gradual onset of climate changes and sudden climate change which defer in scale and frequency. Since communities are direct stakeholders they are in a better position to tackle problems more effectively.
- These intervention activities are supported by other research organizations in Bangladesh and the knowledge and results are disseminated across a wider audience for capacity building on community based actions. True output will only be effective when the knowledge is managed across national and international level.

KEY DISCUSSION POINTS

- “What is the process of adaptation at the ground level that is understandable by farmers?” This will hold a challenge for people working with communities. (ZN)
- The challenge that is to be faced is the communication of the vulnerabilities at the grass root level and how to train the local communities to build resilience. (ZN)
- It is very important to translate community information to other sectors for successful implementation and execution of the program. (ZN)
- Three programmes that are similar in nature have been carried out in Uttarakhand, Himachal Pradesh along with the North East Rural

Livelihood Project. This includes and focuses on the involvement of the local bodies and makes them take up the activities. (YG)

- We need to follow an integrated approach based on the needs of the communities in order to develop adaptation and resilience. (YG)
- The term 'community' has been used because the local governance institution is a part of and represents the community. We need to work with these institutions.(KCM)
- The governance structures have been governing for centuries but they lack the capacity of implementing projects now because they do not have capacity to manage more recent changes that are occurring. They are still in the process of understanding those changes. They still are in the phase of coping not adapting which takes much longer time. (KCM)
- We must understand the impacts of climate change and must realize that bio-diversity is mainly getting affected. There is hence a need to establish such mechanisms to see the actions, projects etc. like seed-banks, food security-grain banks, health banks etc. (NOT IN VIDEO) (KCM)

Q: Communities respond to various calamities and impacts of climate change with or without govt. funding and intervention. How much has you research been able to document such kind of practices where communities have responded may be continuously or developed innovatively to deal with the impacts at local level?

- At community level, people help each other and try to come out of the loss they had by cultivating new crops.

Q: Generally these kind of projects work with the result framework idea. So identified targets and indicators and access your project impact based on how much progress has been done with respect to the given indicators? When ARCAB started working on these lines did you have this kind of idea in mind so that you would come out with some kind of quantification that will be able to influence this much population because you said you have theory of change concept that you follow. So how much have you gone according to framework that you developed in the theory of Change?

- Basic data about the site were taken but could not be connected to the scientific data because of unavailability of climate change data for all the districts (No Weather stations available for all the districts). (SSA)
- Capacity building training was organized only for the action partners, NGOs, and all levels of government officials. (SSA)
- One of the biggest challenges faced in implementing or executing any project is that the government officials keep changing every 3 years. (SSA)
- It is also important that two funds have been added to Climate change funding like – Climate Trust Fund and Climate Resilient Fund which go directly to the local government institution for implementation. (SSA)

PRESENTER - Dr. Cristina Rumbaitis Del Rio, Regional Programme Manager, Oxford Policy Management

PANELISTS: Mr. Siddarthan Balasubramania, Country Head, Global Green Growth Institute

Dr. Vikram Dayal, Associate Professor, Institute of Economic Growth

KEY POINTS FROM THE LEAD PRESENTATION

- This study looks at the status of framework in national policies vision documents in 5 countries (Afghanistan, Bangladesh, India, Nepal and Pakistan) and focuses on the current strategies, success rate, emerging practices and knowledge gaps.
- Green growth is a term developing and emerging for over last 10 years and solidified in past few years and is meant to look at how to achieve low carbon development, macro-economic growth, social inclusion and environmental sustainability as well as climate change resilience and medication and put that altogether into one set of objectives.
- A key challenge is in identifying research institutions working particularly on a research framework on Green Growth in the region
- Green growth initiatives have been taken by ministries: all countries in the region have a national development framework (national strategy visions and 5 year plans) with elements of green growth usually related to energy, climate change, sustainable agriculture concepts for forestry issues and climate resilience only not the main issue.
- Climate side of the term has been isolated from Green Growth as it has its own separate funding, policies etc.
- The role of NGOs is very critical and the private sector is also engaged in creating policy incentives like reduced tax incentives for production of green goods and clean energy.
- Weak and variable political level commitments, limited mechanism for inter-ministerial coordination and low capacity for implementation makes green growth implementation difficult.
- Another challenge is commitment of policy-makers not to trade off long-term benefits against short-term economic opportunities.
- Policy portfolios need to be designed to address near-term development and long-term green growth transformation goals.
- Private financing must be mobilized to advance green growth agenda
- Public-private collaborations are required.
- Evidence on ‘green’ elements in planning and policy-making based on country characteristics and priorities needs to be generated.
- Green growth can be aligned with poverty reduction activities.
- From a case study done in Ethiopia we can learn and adapt few strategies like political leadership, formulation of specific policy recommendations, emerging funds as innovation funds and develop those investment mechanisms to support the cause.

KEY DISCUSSION POINTS

- Green growth cannot and should not be defined because it varies from place to place and is contextualized to regional issues. (SB)
- Green Growth should not be looked only through the Climate change lens. Green Growth needs to meet the developmental goals of the government. (SB)
- Green growth is a multi-sectoral concept. It is about the long term, to make sure one intervention derives multiple benefits- Social, environmental, economic growth. (SB)
- Science is important to create the basic information to build on the policies but that is not enough. We have to communicate in a language that policy makers understand and converting scientific findings into comprehensible terms. (SB)
- Most of the policies get driven by economists and their perceptions. (VD)
- We are worried that we do not know the future, so there is a lot of extrapolation and models are basically systematic ways of making assumptions. Invariably there are a lot of assumptions and very little data. (VD)
- Studies that address the counter factual seldom get observed. It is important to do experimentation- evidence based policy making may not be suited to the issue of Green Growth. More data and less assumptions are required for this research. (VD)
- However, if we do not have evidence based policies then we have conviction policies Scientists need to evaluate how good all the research is out there and use that to make decisions. (A MacDonald)

Q: A good road network is very critical for overall growth especially in hilly areas. I talked to the PWD department and their budget is very less that if we talk about resident road construction so it would not get washed out every year due to natural disasters then the cost of the road per kilometre rises to 6 times than the conventional way of construction. So how do we marry current way of business in the departments and the needs for higher investments?

- Green growth is a growth which should be social ably inclusive and environmentally sustainable. (SB)
- Business in different departments is because of the current system we have. The whole budgetary allocation is going department wise. Green growth is supposed to be cross cutting inter disciplinary concept. (SB)
- In India, all the departments are putting money together. But the specific issue is among ecosystem where the infrastructure becomes one department responsibility. (SB)
- If you see 13th commission define green growth, it is rethinking growth in a way there is minimal impact. (SB)
- In India Green Growth is restricted to economy and we need to come out of this. (SB)

- We are probably we are learning by the mistake rather than thinking through that is where the long term thinking of the green growth is very important. (SB)
- The challenge is to flip the calculation or wrap the political economy of the decision making so that the resilient choice or the green choice is more palatable, innovative, and exciting. (CR)

DAY 2

Session 1: Climate Studies on Allied Themes: Exploring Linkages
Panelists:
Dr. Simon Lucas, Team Leader (Climate and Development), DFID India,
Ms Izabella Koziell, Climate Lead(Asia Regional Team), DFID,
Dr. Nafees Meah, Director, Research Councils UK(RCUK)

The session began with Dr. Simon Lucas giving an overview of how the climate change narrative has evolved in the past fifteen years. Dr. Lucas pointed out that there still remains a large gap between programs working towards influencing policy making and the research community and the climate change community comes together with different set of languages, analytical approaches and narratives making the challenge particularly difficult.

Uncertainty, Dr. Lucas said, remains the biggest challenge in climate change because money cannot be spent on solutions until there is assurance about impact. While there is increasing amount of data to demonstrate what can be done, it is difficult to bring all that data together to understand the sum of that knowledge.

In a country like India which has the tools and resources to tackle the climate change problem, the role of international agencies and global science in helping India address these challenges becomes important. Dr. Lucas stated that integrating climate change into sectoral policies can create meaningful results as it helps push the sectors that have not yet thought about climate change in the right direction. Giving Water resources as one example of such sectoral policies, Dr. Lucas stated that although water resources consistently feature in state action plans on climate change in India, it is important to address the political reasons behind why existing water resource management plans do not work. The current resources and tools that exist are very effective at addressing the next 5-10 years' worth of climate change impacts but in order to address the 20-30 year horizon of impacts, there is a need for radically different solutions.

Describing how certain drivers that have always existed can link to climate change solutions, Dr. Lucas cited the example of Risk insurance and Renewable energy. Risk Insurance companies, he mentioned had existed long before climate change was invented but it took fifteen years for risk insurance in climate change to become a reality and similarly for Renewable energy solutions that had been invented in response to depletion of fossil fuels.

Dr. Lucas moved on to the issue of research influencing policy makers by stating that there is confusion over what the latest data is, where policy makers can access it, and whether the format it is being presented in is context specific or not. Research takes too long and it doesn't produce what policy makers need today and the Knowledge exchange systems being used

today are not quick enough. Dr. Lucas added that the research process drives people to be academic above and beyond the output of the project and the community is driven by process too much. There needs to be more emphasis on allocation of resources to uptake of research outputs throughout the research process to engage users throughout the process. In conclusion Dr. stated that there is much more that can be done to make the research that is produced, much more effective, much more influential and bridge the divide.

Ms. Isabella Koziell gave a broad overview of DFID's current programs that foster regional cooperation on better management of climate, water resources and other natural resources across South Asia. "Our key learnings are that ; we need to support the development of innovative and flexible approaches, we still need to do a lot of pragmatic experimentation on the ground and run rigorous evaluation alongside these approaches and that evaluation will help deliver the evidence and convince decision makers about implementation approaches," stated Isabella.

Ms. Koziell shared that working collaboratively is more difficult across some boundaries than others in the region but that knowledge exchange remains a key area of the programs' focus. On cross-border collaboration issues, she stated it is not easy working across borders and across countries but bringing researchers together can help chart the way forward. "We are looking to develop more enabling policy and planning approaches and incentives to work across borders," said Ms. Koziell.

Stating the importance of stakeholder engagement and communicating the issues, Ms. Koziell said that getting people to talk about issues in non-contentious fora, getting media involved, delivering more impartial messages on some contentious issues has to be the way forward. Ms. Koziell, highlighted the importance of engaging behavioral science in understanding behavior change, because the real blockage of uptake lies there. We need to really understand enough about what people will respond to, stated Ms. Koziell.

Ms. Koziell, elaborated on DFID's current three programs that have strong linkages to CRISSA work;

The first program, South Asia Water Governance Program (***pound*** 23 million program) supports SAWI which is being implemented by the World Bank. The program works with SWAI on Flooding and Flood Risk Management as well as with media platforms such as Third Pole where outputs from CRISSA could be fed into. The program also works with the Asia Foundation to support a civil society component to engage more on international rivers and cross border issues on rive management.

The second program, Managing Climate Risks for Urban Poor(85million pounds) builds resilience in small to medium size cities across South Asia in partnership with Rockefeller Foundation, USAID and ADB. ADB is using the funding to pilot, innovate and test new ways of planning, design and

infrastructure development that is more resilient to weather extremes and climate change in the future.

The third program, Climate Proofing Growth and Development in South Asia implements the CCIP India component around state action planning. The programs work across Pakistan, Afghanistan, Bangladesh, Nepal and India. A final program she mentioned is a pipeline program with a strong research program that is about supporting regional engagement on weather and climate services especially related to Glaciers.

Ms. Koziell reiterated that climate science must be delivered in a manner that is comprehensible for users to make day to day decisions. More linkages need to be created to bring researchers with decision makers. Uptake is often left to the end of the process but there is a need to bring it at the beginning. A lot more creative thinking throughout the research process is needed to bring research to policy makers. Incentives for researchers to incorporate uptake within the research process and incentives for policy makers to take the time to understand have to be created. Communicating research in a way that it allows time for decision makers to get through research outputs is a critical need Ms. Koziell concluded.

Dr. Nafees Meah, began with an overview of the Research Councils UK-India partnerships programme and its 5 multi-sectoral inter-disciplinary projects across India. A project in Punjab conducts Groundwater research project to understand aquifer behavior and decreasing water tables. Another partnership with the Ministry of Earth Sciences carries a large-scale observational study through an FAM aircraft that measures atmospheric chemistry and a water glider that studies temperature and salinity measurements. This research will generate an understanding of different aspects of the monsoon to create an effective climate model. The “Sustainable Water Resources for Food, Energy and Ecosystem Services” program with Ministry of Earth Sciences studies the details of issues around the storage, quantity and usage of water in three sub-basins-Himalayas, Indo-Gangetic basin and Peninsular India. This will lead to creating specifications for a water resource allocation model.

Emphasizing the need for generating reliable scientific data Dr. Leah stated that climate model research lays the groundwork for governance and policy and inferring policy from scientific data about only one aspect of the data is a challenge that needs to be addressed. A huge amount of basic research is required to understand physical and social systems and high quality environmental data is required to reduce uncertainty in climate modeling. While a lot of data is available across organizations in India, it is variable and not useable because of gaps that exist. Moreover, Dr. Leah stated that collecting data is not sufficient; it also has to transfer into knowledge. Dissemination of the data is extremely important at the regional scale as well as the global scale because the scientific community both in the region and abroad should have access to it to build on new research

Finally Dr. Leah highlighted the importance of bringing together academics, policy community, businesses and NGOs on a single platform to help design and co-create knowledge on water resources in the region.

Integrating Peri-Urban/ urban synergies into urban development planning: Insights from ESPA research

Dr. Priyanie Amerasinghe, Senior Researcher, Acting Head, International Water Management Institute (IWMI)

Dr. Amerasinghe gave an overview of the Ecosystem Services for Poverty Alleviation (ESPA) program, an international inter-disciplinary research programme funded by UK's DFID NERC, and ESRC and launched in 2010 and completing in 2017.

ESPA aims to deliver high end cutting edge research with an understanding of the ecosystem functions and how people benefit from these services of the ecosystem and to understand the relationship between political economy and sustainable growth. The objective is to enhance the understanding of impacts of urbanization on ecosystem services and associated implications for multiple dimensions of poverty

Dr. Amerasinghe stated that the linkages and applications of current policy initiatives in relation to ecosystem services and poverty are not well understood. The ESPA researchers are working on creating methodologies and impact pathways on how to make assessments of ecosystem services and associated dimensions of poverty and see how urban planning can incorporate these in the planning process and finally share the knowledge with the research communities in order to determine the outputs required for policy planning.

ESPA conducted a mapping exercise to understand how ecosystem services are in the Delhi Peri-Urban region and what interventions are required for urban-rural synergies. Social mapping was done with community group engagement to understand their perceptions of urbanization and how peri-urban agriculture is affected. To define peri-urban, the research classifies what is happening at the *"mandal"* level through land use, land cover and population categories. Satellite imagery does not suffice to give information on agriculture so the ground-data was collected at the district level. Looking at the poverty dimensions of vegetable production areas in *mandals,* research showed that there is greater poverty in agriculture than there is in other sectors. Conservation of Peri-urban areas is important to the well-being of the poor Dr. Amersinghe stated. Town Panchayats are the only institutions that look after the peri-urban areas so these policy makers need to be engaged. There is a need to understand that policy influence must extend across city level, regional level and community level and a lot of work needs to be done in stakeholder engagement at national level. It is also important to work with city

planners. Dr. Amersinghe concluded that connecting ESPA research results and convince city planners to address the issue at peri-urban issues that deal with poverty and its linkages to ecosystem services is very important.

Evidence-Based Policy Making for Climate Action in South Asia: Policy Perspective

Panelists:

Dr. Abid Suleri, Executive Director, Sustainable Development Policy Institute, Islamabad
Dr. Engr. Jnan Ranjan Sil, Additional Secretary, Ministry of Environment & Forests, Bangladesh
Dr. Madhav Karki, Executive Director, Center for Green Economy Development, (CGED-NEPAL)

Moderator: Swapan Mehra, CEO, Iora Ecological Solutions

Policy making in a democratic context is a complex process – there are many actors who drive the policy making process. Many a time, policy making could be based on evidence or on conviction. Enabling policy making for climate action is hard because:

i. The consequences of climate change are felt in the long term and policy making usually deals with a 1 – 5 year window.
ii. Risk is never fully institutionalized in policy planning processes. Adopting a cross-sectoral approach that incorporates risk transfer and risk balance can be key
iii. Local evidence on what works in climate action may not lend itself to national level planning – scaling up and scaling down are complicated
iv. Interlinkages between research and policy are nuances – is research available when policies need to be formulated? How is it packaged and marketed? Does it lend itself for policy planning in the short, medium and long term? Has the context been laid out and all the stakeholders mapped? Does it internalize the needs and interests of policy makers?

With substantial funding and attention diverted to the South Asia context and considering the task that lies ahead, three questions were posed to panelists:

1. **Do you think that policy and planning for climate action is adequately influenced by research and evidence?**

There is a need to differentiate between policy and planning: evidence often tends to support policy but not necessarily in the planning. As Dr. Abid Suleri

mentioned, in Pakistan, policymakers have in general responded to evidence around (recent) extreme events like floods and heat waves, especially when they affect lives and livelihoods. However, policy has not always translated to planning largely due to lack of clarity on whose mandate it is to deliver (on implementing policy), given the multiple layers of government. Research therefore needs to factor in the 'political economy of planning'.

There is varied level of awareness in climate action- central government might take into account evidence of cost benefit analysis of a particular investment while state level decision makers might need to be made aware of the problem first. As Mr. Aloke Barnwal highlighted, different levels of decision making in policy need to be considered.

Dr. Madhav Karki explained the nuances of the relationship between researchers and policy makers. The big challenge for researchers is not to supply evidence but identify the demand for the evidence. Many times, policy makers are unable to articulate the demand for evidence based research. Researchers also tend to assume that when hard evidence is presented, policy makers will accept it readily. It is important to present evidence in a manner that is of interest to policy makers as they work to serve their constituencies and may find storytelling methods to be more appealing that arduous research reports.

2. **Are there any specific areas of research that could enhance policy processes in the short and medium terms (5-10 years)?**

Dr. Engr. Jnan Ranjan Sil highlighted that research in groundwater, agriculture, salinity, forest biodiversity, climate induced migration and impact on health and water borne diseases are areas that are worth exploring. Vulnerability and adaption also emerged as key issues that were cross-cutting and hold enormous potential.

On a more general context, panelists felt that policymakers tend to respond to issues that make headlines in the media. In this context, they may specifically look for research that identifies climate vulnerabilities and ways of creating resilience against those vulnerabilities, or research that can link climate issues with issues of security. Likewise, as Dr. Suleri pointed out, research that helps monetize losses due to climate-induced events or can relate these losses to economic indicators like GDP attracts attention.

Panelists advised that since policy makers look for practical vulnerability outputs to make decisions, researchers need to communicate vulnerability more adequately to be able to influence policy. They stressed on the importance of acknowledging traditional knowledge and being flexible to take up a more multi-sectoral, multi-dimensional concept of vulnerability in research. While monitoring and evaluation efforts, including participatory approaches, need to be carried out through the course of the research and after, it is important that the research community engages with the policy making community right from the start. Dr. Karki suggested that de-

scientification of scientific output to simplify science for policy makers is a potential way forward.

3. **Are there any challenges in regional coordination both in terms of research and policy-making?**

A key challenge identified was the lack of regional nodal agency; there is little link among climate action across the seven countries.

Trust building remains a challenge across the region. As Dr. Suleri explained, the use of advanced technology like Unmanned Airborne Vehicles (UAVs) for glacier monitoring in politically sensitive areas may be challenging unless the cumulative scientific benefit across countries can be strongly established.

Lack of shared learning poses another challenge for policy makers and researchers. Sensitivities about data sharing, trans-boundary issues such as water pose a huge challenge for regional coordination. Ownership of research and evidence needs to be addressed

Dr. Madhav Karki pointed out that most research is conducted as one-off projects as there is lack of funding for continued work which prevents scaling up to create organizational change, knowledge sharing, institutional capacity building and a change in the mindset.

Ways to tackle the mismatch in coordination include funding and developing collaborative research where researchers in several countries respond to a single research question. Not only does this help produce different country case studies, it promotes regional coordination. An example provided by Dr. Suleri was the research on climate response within the same agro-ecological zone but in different countries (such as farmers in the Punjab region of India and Pakistan dealing with water stress) that enabled cross-learning. Countries may learn from instances of judicial activism in other countries in the region as well. Another entry point could be working through the Sustainable Development Goals on pertinent issues like resilience that pan across the different goals, national commitments and efforts.

Evidence-Based Policy Making for Climate Action in South Asia: Donor Perspective

Panelists:
Dr. Vidhisha N Samarasekara, Senior Climate Change specialist, Asian Development Bank(ADB)
Dr. K Murali, Senior Program Officer, International Development Research Centre (IDRC)

Mr. Shirish Sinha, Deputy Director, Swiss Agency for Development&Cooperation (SDC)
Mr. Vivek Kumar, Senior Advisor, Norwegian Embassy

Moderator: Chhaya Bhanti, Founder, Vertiver

Fixing the challenge of climate change requires tremendous resources. In 2014 Climate Finance amounted to $450 billion which was an 18% jump from the previous years. Currently, development institutions provide almost 33% of the climate flows. How much money is headed in what direction and who is coordinating the fund flow? How much coherence and coordination exists across the region within the donor community and how does it influence climate action in South Asia. With these points as backdrop, three questions were posed to the panelists of this session:

1. ***Do you feel there is adequate coherence and coordination among donors funding climate action / research?***

Coordination at the national level is cemented more by government priorities and national priorities that bring everyone in the donor community to work together said Dr. Samarasekara. She added that new approaches to strengthen coordination need to be developed and extended to bilateral communities and donor communities at large. Partnerships can ensure coherence. Designing projects at the beginning of the project with a group of donors working on a common agenda can achieve coherence. World Bank and ADB's priorities are aligned for climate action in the region but things evolve as priorities change at the country level.

Dr. Murali at IDRC stated that while there exists knowledge of each donor program, t whether there is coherence and whether the community helps each other in the region remains a question. He stated that there is a need for donor supported meetings in which the community can share and learn from each other. Stating an example of a way to move forward towards improved coordination Dr. Murali mentioned the "China Model"
in which the country with the help of UNDP identified areas that needed emphasis in their country and the donors were only allowed to put the money in those sectors. This model Dr. Murali said could be adopted if a country has to develop in an integrated way.

Mr. Sinha stated that to a large extent they have an understanding of what other agencies are doing but there are limits to how much coordination can be achieved because at times it is country driven and at others it is policy driven. He stated that much more coherence exists on the mitigation side but not as much on the adaptation climate research domain. He stated that a donor

coordination group of all donors in India led by IFC and supported by GIZ meets regularly on mitigation side that allows people to come together and share what they are doing. Some coordination efforts he said are opportunity driven such as a project SDC has in which DFID began the initiative to support provincial level adaptation planning with a strong focus on research and SDC joined in the middle of the project and in the second phase SDC has taken the lead and DFID is playing a supporting role.

Mr. Sinha concluded that there is some level of coherence in terms of how we define areas to look at but at the same time coordination is driven by the donor's own priorities and the priorities of the national government.

Mr. Kumar remarked that they develop their programs keeping in view the priorities of Norway and Indian Government and interact with various embassies through donor coordination platforms in mitigation to keep abreast of initiatives by others to avoid duplication and achieve synergies.

2. ***To what extent are your priorities influenced by current research, national/ international commitment and priorities of co-donors?***

Dr. Samarasekara stated the example of the CRISSA program as a model way of engagement between donors and ADB's client, the Government of India. Since the project was designed in partnership with the government and DFID and ADB as co-financiers, their flood management program worked well with the research taken up by the government. Reliable scientific data and arguments remain critical for ADB to strengthen its dialog with governments and ADB finds value in partnering with reputed regional research institutions and responding to knowledge gaps. Research and evidence are crucial for improving the sustainability of ADB's investments to donor governments.

Dr. Mural stated that since IDRC is a solely research support organization they have flexibility in what they support. IDRC regularly conducts regional consultations primarily involving governments, thought leaders within the region, and conducting global surveys to determine what is best for a given context. The current research influences what they will do next. DFID and IDRC's joint program in Africa called Climate Change Adaptation in Africa supported 50 young researchers and became a huge success as the researcher developed a lot of solutions. This provided the team a different perspective on how research should be implemented in Africa and currently IDRC is running a program in Asia that is determined by what was done in Africa.

Mr. Sinha added that when global programs started at climate science and research took on major focus areas and that as a donor agency, engaging at the field level whether on mitigation or adaptation, they require being backed by adequate research and science. SDC works on using the most advanced

scientific research available. Their bilateral program with the Department of Science and Technology in India to implement the national mission for sustaining the Himalayan ecosystem, was based on a collaborative research phase using the most advanced vulnerability risk assessment from IPCC AR5 as the basis for the research methodology. Coordination is driven by opportunities at national and international level and SDC adjusts its programs based on emerging opportunities.

Mr. Kumar stated that Norwegian Embassy assists partner countries by developing programs at two levels- one with government through joint working groups in various topics. The counterpart agencies in Norway and India meet on an annual basis to evaluate and establish areas for partnerships. The other level is through bilateral interaction with institutions to pick up a program

Some examples of their work include supporting a dialog with Council for Energy Environment and Water as the first public dialog to deliberate on India's INDCs and support for the National Biodiversity Authority in setting up a center for Biodiversity policy and law. The Norway Embassy focuses on building capacity of institutions in the government and civil society in order to enable them to to fulfill their national and international commitments.

3. ***Are there challenges in donor coordination in the case of regional/ trans-national funding and are these different from those in country-level funding?***

   It's a lot easier to work at the country level stated Dr. Samarasekara because country priorities are consistent, making it easy for ADB to respond to in terms of applying procedures etc. Working at the regional level comes with a different set of complexities. There are political sensitivities that are beyond the scope of donor agencies, but there do exist ways of transferring knowledge across through the research community. ADB encourages exchange between researchers across the region. Exchange visits that take government officers form one country to another to see how water adaptation solutions are one example of coordination that ADB facilitates.

Dr. Samarasekara further stated that rather than looking at it from a funding angle, the donor community needs to look at priorities at the country level in order to respond to the gaps that exist. By facilitating the research before or applying it to project design, the donor community can get very strong support and these partnerships are the way to go.

In conclusion Dr. Samarasekara emphasized that developing partnerships with knowledge institutions in the region and building capacity at the regional level are important and especially important is to build regional capacity to reduce the reliance on knowledge coming from outside the region.

In talking about transnational activities in donor coordination, the regional dynamics in South Asia make it very tough to negotiate across the region stated Dr. Murali. Citing the example of a project he is coordinating that is contiguously based across India Pakistan Nepal Bangladesh, Dr. Murali's biggest challenge is to not be able to bring all researchers together because of visa issues. In addition lack of research capacity in the region remains an issue. Dr. Murali stated that when programs need to be funded, it is difficult to find an organization with adequate research capacity to undertake research. He stated that more work needs to be done on increasing the convening capacity of regional players and posited whether SAARC countries could be brought together on climate action.

In conclusion Dr. Murali stated that knowledge transfer across region is also important by engaging researchers working across similar geographical typographies.

Mr. Sinha stated that the research and adaptation priorities and expertise for each donor agencies are so different that to get them on the same level remains a challenge. The design of collaborative research is difficult where there are geographical sensitivities. In the current collaboration between Swiss and Indian researchers, the government restrictions remain a challenge. SDC supports partner institutions such as ICIMOD on issues such as Glaciology that have trans boundary issues. He further stated that the collaboration that is happening to implement state action plans between different development agencies, is a good example of a government-led coordination. He echoed that on the mitigation side there remains a lot of coordination but much more coordination is needed on the adaptation and research side.

Mr. Kumar shared that the Norwegian embassy does not have experience in regional or transnational initiatives as they work primarily in India but Norway is supporting the South Asia Water Initiative and has achieved coordination in that program. There need to be more opportunities to develop more coordination among the donors in the regional programs he stated by defining common concerns among different participating agencies, and enabling transparency and information sharing. He proposed a web portal that can be developed that contains data on various donor programs to help researchers develop joint programs.

Audience Comments:
An audience member from ADB stated that funding requirements for addressing water issues are very vast and one agency cannot fulfil that requirement. Therefore coordination takes place at the level of designing a project and governments play a key role in dividing work between agencies. In terms of taking up regional research, if we avoid sensitive geo-political issues several regional studies can be taken up as any research proposal submitted has to be approved by Government of India.

Q- Do you think that in each of your respective organizations you have enough money for climate research- at the international level one would think that there's not enough money going around and finance really is a sticking point in the negotiating or do you think it is not a question of money at all but what you fund that is relevant for policy making?

It's not about money but it's about how we as an institution really target efforts to look at the priorities at the government level and also ADB's priorities in terms of where we want to go with climate change as we move forward. It's about doing more and proactively pursuing these agendas more effectively (VS)

If we're talking only about research, money is not a problem but if you're looking at infrastructure development then that is an issue. Solar used to cost 100 times what it costs today, but to arrive there research needs to be done continually. If a car were to be developed the same way as chips have developed, a car would have carried 700 people at $1/10^{th}$ of the cost of a car today- so that kind of research needs a lot of funding. Innovation is what is lacking and how to harness that innovation is a big challenge in climate change. Up-scalability of innovations remains a big challenge.(KM)

Funding is not a problem and varies from project to project.(SS)

Q
Normally the transnational research collaboration has been done by academic or research institutions and they have very low power for policy advocacy. There are some institutions that are designated by the governments like SAARC institutions and why are these institutions not involved with research and academic institutions to do regional research that might have better influence on the policy making process?

We work with regional institutions but if it's under the framework of a bilateral agreement then we can't work across boundaries. There are limitations as to what extent we can have regional institutions to be involved with our projects.(SS)

Best example is ICIMOD. It has coordination with 8 countries and they have convening capacity and influencing policy because they are part of the government. About SAARC per se, there are institutions but what is the contributions to climate change I really do not know personally. But the model that can work is ICIMOD.(KM)

Q- DIFD has large South Asia programs, can we hear their perspective on questions number 3:

ALOK BARNWAL:

We are trying our best to coordinate with different donors. MOEFCC is playing a central role in making sure donors are aware of each other's programs and providing support for larger climate policy goals. We have several inter donor meetings on climate change on energy access. For ex, Solar Parks DFID, ADB, World Bank work closely together. I still believe that it is happening on a project basis- probably more strategic thinking could be evolved. We could interact more frequently.

In terms of funds many times what happens is that our funds are also quite responsive in terms of what our partner government needs. In climate change when you work on resilience the demand is mostly on demonstrating something on the ground that can be scaled up rather than spending on research. Sometimes we have to balance these things and see how much can be set aside for research and for hard core technical research on resilience.

Towards Greater Coherence in Climate Research

Panelist:

Dr. Kazi Matin Ahmed, Department of Geology, University of Dhaka

Mr. Ali Tauqeer Sheikh, Regional Director, Asia, CDKN

Mr. Jagat K Bhusal, Chairman, Society of Hydrologists and Meteorologists, Nepal

Dr. Indrani Phukan, Deputy Project Director, GIZ Natural Resource Management Programme

Mr. Ajit K Samiyar, Senior Manager, Bihar State Disaster Management Authority

Moderator: Anirban Ganguly, DFID

What do we mean by coherence in the context of climate research? This is research that feeds into climate action. So the research that is expected by design to feed into certain climate action on the ground. The very nature of climate science is such that climate action needs inputs from various disciplines, biophysical to the social and economics of the issues. Is there coherence across different themes? We need inputs from the top as well as from the bottom. Community based approaches and how they dovetail with higher level scientific data. That's the issue of coherence here and it is particularly important because we're dealing with a very complex, messy and contested context but we need all that to lead coherently to climate action in

mitigation and adaptation. Are there certain themes that are under researched or over researched? There is one view that the landscape of climate research is conditioned by so called research "honey-spots." Is this is a danger of research being concentrated in certain areas and does this concentration get backed up by strong scientific and policy reasons. Is the research spread even to the extend we want to and is the research capacity even, are institutional capacities even across the region? What are the concrete modalities of research policy linkages? How can climate science be communicated effectively to policy makers in the region. These are the questions that form that background for this session:

1. How coherent is climate research in the region in terms of thematic and geographical priorities? Are there themes/ regions that need to be prioritised? Are there themes/ regions that are comparatively over-researched?

Dr. Ahmed stated that researchers have to shift their paradigm. Research uptake has to be kept in mind for disseminating results. There is a need to identify the stakeholders at the beginning and keep them involved and engaged throughout the process. There is lack of coherence across the region but there is more coherence within the country and the research community needs to look beyond the geographical boundaries to take account of common problems across South Asia. Removing political boundaries from the point of view of research is critical to achieving the trans boundary multi-disciplinary research that is important to climate action.

Dr. Ahmed emphasized the need for indigenous knowledge to be taken into consideration when conducting new research and to build upon that knowledge.

He also stated that building regional research capability is crucial to improving quality of research and the lead has to come from the region. Current many policies exist on paper but cannot be implemented because of the lack of capacity. Generating the knowledge and implementing the knowledge requires bringing trans-disciplinary issues within the curriculum. Emphasis needs to be given to local case studies to enable shared learning concluded Dr. Ahmed.

Mr. Sheikh stated the need for research projects to not be designed from the supply side stating that the lack of bottom up approaches and top down research processes do not connect with immediate policy priorities. He further stated that the current research often fails to meet the budgetary timelines of policy makers in the region.

Dr. Bhusal stated that water scarcity and associated biodiversity are key areas of regional research. He added that although Himalayas have drawn a lot of attention, the middle hills communities in Nepal dependent on rainfall are already severely affected. He stated data form the IPCC(AR5) report which currently has 36,200 available important studies and Asia represents

only 22% of the research studies while Europe has more than 29% and the North American region has 26% research. He said that very few studies exist in the Third Pole, in the Hindukush Himalayan region research is under represented.

Dr. Phukan stated that knowing what current research and information exists is important. Stock-taking of what exists can prevent replication and duplication which is currently leading to waste of resources as a lot of information for climate action already exists.

Mr. Samiyar stated that climate risks are currently addressed in isolation by government agencies. Climate change adaptation is not integrated into flood management which must take into account risks associated with climate change. Some climate risk data remains classified in the region which prevents knowledge-sharing. There is a need to increase collaboration between universities and government run institutes to generate better climate data he concluded.

2. How could the research and policy community work to enhance coherence?

Dr. Ahmed stated that in Bangladesh the issue of uncertainty of the timing of policy makers' appointments remains a problem for sustaining momentum required to allow research to affect policy. This is a huge issue that needs to be addressed by the research community. Retention with technical agencies works but not with ministries because the continuity is challenged.

Economic, natural and social processes are seldom covered by the same research shared Mr. Sheikh. Scaling up, reflecting inwards does not happen and scaling out for good findings of research can present a challenge in implementation. There needs to be better information sharing to increase cooperation which can lead to collaboration and therefore to greater coherence. Mr. Sheikh also emphasized that researchers need to establish relationships of trust with policy makers by engaging them and refine the strategic nature of their demand for research. Investing in internal reflection is important to go beyond contractual learning so that the macro can be linked with the micro.

Mr. Bhusal stated that recognition of the climate risks in development planning would help to better adapt to changes and create resilience. Climate change should be included in cross-cutting sectoral policies.

Dr. Indrani Phukan shared examples of her experience in the North East of India. She said that when a state has an existing framework such as Sikkim which created a vulnerability map prior to climate scenarios, it becomes easier for the research community to create policy and implementation linkages. So working across states in India, it is important to look at the capacity of the states.

Mr. Samiyar added that research outcomes need to reach last mile of connectivity. There needs to be closer interaction between development activities and climate change adaptation along with interstate and local level planning and practices. Climate modelling needs to be improved to influence policy. Development of early warning systems are a great way for research and policy community to work together to enhance coherence.

He also added that Adaptation needs to have a bottom up approach across the board capacity through adaptation budgets for Panchayati Raj institutions, urban local bodies and disaster risk reduction for climate change adaptation. Adaptation is local and requires local knowledge and decision making and it falls under the jurisdiction of panchayats and municipalities within the state.

4. ***Are there challenges in terms of communicating research to policy makers? If so, how do they impact this issue? Do you have suggestions to deal with the challenges?***

Mr. Sheikh shared that policy making tradition in the region is not culturally rooted in evidence-based policy thinking. Research findings need to make a stronger business case for uptake by policy makers. The gap between the timing of research and the immediate need of policy makers needs to be addressed and the uncertainty in research findings and inconclusive outputs need to be minimized.

There currently exists a “broken triangle,” with the scientists on one side who can’t assess the demand of the policy makers and do research autonomously, shared Mr. Sheikh. Communities and their historical knowledge and sensitivities are seldom responded to by government or scientists. There is a need to bring these key stakeholders together.

Finally he stated the need for connecting the timing of research with internal policy making timelines to coherently link key community issues with climate action. Co-creation of research agendas with policy makers he said, can be very effective by asking how the two biggest challenges of the region; ppoverty and vulnerability can be linked together coherently to climate ?

Dr.Bhusal agreed that there were challenges and recommended that inconclusive research should be avoided and collaboration between researchers and policy makers needs to increase. He also stated that engaging citizens in research can go a long way in gaining political commitment. Cooperation between trade and climate communities facilitates climate action. Citizen science can play a key role and recognizing that

bureaucracy represents a transient framework but the vote bank is more permanent and engaging citizens in creating feedback systems is important.

Dr. Phukan agreed that there is a need to bring more coherence among existing frameworks such as connecting adaptive capacity building to scientific research and sociological research. There needs to be increased coherence in policy community. For instance climate models at a macro level that exist do not cater to district level planning, or weather stations installed by one Government scheme do not enable data sharing among others working on similar issues. There needs to be more coherence and collaboration on scientific data sharing.

Finally Mr. Samiyar stated that Land use planning and water management need to be synthesized and call for coordination between different departments and levels of govt. Implementation of a plan needs to be made.

Q&A:

Anwar Zahid:

I first must acknowledge that of course there are coherence and communication between policy makers and researchers and our task it to identify those gaps and minimize them. In Bangladesh the arsenic contamination was discovered in early 1990s and in 2004 the "Arsenic Mitigation Policy" was formulated based on research findings. If I'm confident as a research about my findings I will ensure that these findings are communicated to the policy. This is in our region an important point.

Dr. Karki:

Generally the thematic priorities are decided based on how the donor community and the government allocates research funding and there's a lot left to be desired there. There has been lots of research based on IPCC results but one of the areas that does not get too much attention is biodiversity ecosystem services. Although there is research the coherence in related sectors such as agriculture, water etc. needs to be improved. One of the ways we can enhance coherence is the countries have to have a research policy where all climate sector policies have to be designed in a coherent way. In terms of communicating translating research in local languages is very important. The key outcomes should be summarized for the community and shared with the policy makers

Concluding Remarks:

Professor Matin: *Creating a knowledge network among South Asian countries dealing with climate research in the region will be very useful.*

Mr. Sheikh: *The sustainability of regional research will depend on the capacity of local institutions****, research agendas need to be co-created with***

policy makers, find a champion for research and research findings such as a *Policy Entrepreneurs who can play a key role in the region. Look internally for scaling up and look externally for scaling out.*

Bhusal: Data restrictions by government needs to be addressed through regional cooperation

Samiyar; Researchers need to approach policy makers directly to convince them of the benefits of the research being conducted for last mile connectivity.

Phukan: Research should be aligned with national priorities and in India the National Action Plan can be looked at as a starting point for adaptation and mitigation actions. Feedback systems from research community and communities about implementation and policy needs to be improved. Knowing what exists is important- replication and duplication is leading to waste of resources as a lot of information for climate action already exists. There are several knowledge platforms but need to determine which knowledge platforms to contribute to for maximum impact.

Summary:

-Better synchronization of research timelines with budgetary and policy pronouncement cycle is needed.

-Disproportionate representation of research and mismatch in scales in South Asian region in terms of geographical and percentage distribution of research remains a key issue.

-The nature of bureaucracy is to move in but technical agencies are more permanent and voters are permanent. So engagement at those points is required.

-Capacity of the government or the local communities to scale up small scale interventions.

- Treating policy maker as part of the process instead of a mere consumer of research at the end of the research is crucial.