Indo-Pak Track II Dialogue on Building Climate Resilience:

Energy-Water Resilience and Disaster Risk Reduction

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About Development Alternatives (DA)

Development Alternatives (DA), the world's first social enterprise dedicated to sustainable development, is a research and action organization striving to deliver socially equitable, environmentally sound and economically scalable development outcomes. DA's green technology innovations for habitat, water, energy and waste management, which deliver basic needs and generate sustainable livelihoods, have reduced poverty and rejuvenated natural ecosystems in the most backward regions of India.

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The Sustainable Development Policy Institute provides the global sustainable development community with representation from Pakistan as well as South Asia as a whole. Its mission is to catalyze the transition towards sustainable development, defined as the enhancement of peace, social justice and well-being, within and across generations.

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Heinrich Böll Stiftung (HBF) is the Green Political Foundation from Germany. Headquartered in Berlin and with about 28 international offices, HBF conducts and supports civic educational activities and projects world-wide. HBF is present in India since 2002, with the HBF India office in New Delhi coordinating the interaction with local project partners. HBF India's programme activities are focused on three areas: Climate and Resources; Gender & Socio-Economic Policies; and Democracy & Dialogue.

PREFACE

Development Alternatives (DA), in collaboration with the Heinrich Böll Stiftung (HBF) and the Sustainable Development Policy Institute (SDPI), organized an India-Pakistan Track II dialogue on building climate resilience on the 12th and 13th of May, 2016 in New Delhi. Civil society, government and academic representatives from both India and Pakistan participated in this dialogue.

Official Indo-Pak dialogues are prone to breakdowns and long hiatuses. Given this reality, Track II dialogues such as this one have become essential. Track II diplomacy refers to "non-governmental, informal and unofficial contacts and activities between private citizens or groups of individuals, sometimes called 'non-state' actors."

These dialogues are not back channel discussions or secret negotiations. Rather they bring together influential people who are free to express their opinions in an unbiased setting to discuss issues of common interest. Track II dialogues should not be viewed as substitution to Track I dialogues. In fact, they are intended to complement official talks by independently finding solutions to common areas of concern, without the need for formal negotiations or bargaining for advantage. Additionally, the Track II channel plays an important role in highlighting issues that go unaddressed by official channels. In the specific context of India and Pakistan, Track II dialogues can also help foster an atmosphere of peace and cooperation between the two nations.

This dialogue was built on similar events held in the past by the above-mentioned organizations on climate change. Climate change was picked as the theme for these dialogues owing to its cross-border nature. As India and Pakistan share common vulnerabilities to climate change and are similarly affected by it, they are likely to benefit from a collective response. The last dialogue that took place in Pakistan in 2012 focused on informing and supporting collective efforts by the two countries to deal with climate change and discussed how cooperation on this issue provided an opportunity to improve relations.

The specific objectives of this dialogue were:

- To encourage cross-sharing of ideas, perspectives and views across the two countries by leading experts of the representative nations on the common issues pertaining to climate impacts, energy and water security and disaster resilience.
- To emerge with a formal solution-based exchange platform that can showcase realization of emerging technologies, innovations, and policies that could prove to be vital in the climate change adaptation process.

In order to take the actions identified in this dialogue further, another such event has been planned, which will take place in Islamabad, Pakistan later this year - following which results of the discussions will be submitted as a set of comprehensive recommendations to the SAARC summit planned to be held in Islamabad in November, 2016.

The Track-II discussions in New Delhi in May, 2016 identified core areas of collaborative research, good practice documentation and knowledge and information sharing systems that would contribute to building resilience to climate impact amongst the vulnerable communities, capacities in institutional systems to respond to increasing incidents of natural disasters; and develop greater understanding towards downstream communities and solutions for cooperation between downstream and upstream communities.

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EXECUTIVE SUMMARY

Both India and Pakistan are extremely vulnerable to climate change owing to their geographic location, large populations and low adaptive capacities. As a result of their vulnerability, they are already experiencing the negative impacts of climate change. These impacts are particularly stark in the context of water security, energy security and disasters caused by extreme weather events. As more and more research emerges suggesting that the economic, social and environmental impacts of climate change in these areas could potentially be devastating, India and Pakistan are recognizing the importance of building their resilience to climate change.

With this in mind, a Track II dialogue was organized to discuss what measures exist and could be taken by the two countries, both individually and collectively, to build resilience. To enhance water security it was recommended that integrated water resource management practices and better irrigation policies be adopted. To ensure energy security the further development of renewable energy sources and especially decentralized renewable sources was suggested. Finally, to reduce damages caused by weather induced natural disasters better integration of the Sendai framework in national disaster management policies and better integration of disaster management policies in sub-national mainstream policies was discussed.

It was also highlighted that both India and Pakistan could benefit from a better exchange of data, technology and best case practices in these and other areas. In light of the impediments to the official dialogue process between the two countries a lot of emphasis was laid on the role of Track II channels to take these and other recommendations forward. It was pointed out that given the difficulties to cooperation between the two nations, it could prove beneficial to focus efforts on small feasible actions rather than creating large ambitions plans. However, while bilateral cooperation on this issue was encouraged, it was suggested that climate change be seen more in a sub-continent context given its cross-border nature.

This report encapsulates the presentations and discussions that took place at the Indo-Pak Track II dialogue on building climate resilience and presents the outcome achieved. It is written with the intension of documenting the dialogue that took place so that it can be referred to, built on in the future, and not be forgotten, as is often the case.The outline of this report is as follows. The first section of this report explains why building climate resilience in these two countries is crucial. The following three sections are on the areas of water security, energy security and climate induced disasters respectively. Each of these sections first gives a background on the current situation, then explains the climate linkage and finally presents some of the resilience building activities taking place in the two countries. The last section of this report, presents the outcome document of the dialogue, called *the Delhi Declaration*.

This declaration is the mutually agreed upon summary which will act as the reference point for the next Track II dialogue on the same topic.

THE DELHI DECLARATION

Why we need Cooperation?

Strengthening regional cooperation is needed for reducing vulnerability to climate change and enhancing resilience. This includes among other things:

- Enhancing water security
- Supporting vulnerable communities
- Promoting energy security
- Mitigating climate induced disasters

Track II

Track II serves as an informal platform for exchange of ideas for:

- Contributing towards the implementation of common positions taken by the countries on the global agenda
- Drawing lessons from best practices in the region, on adaptation to climate change and building social resilience
- Collating background data and enable the development of a shared repository
- Building on previous Track II engagements through study analysis and assessment
- Providing inputs into Track I processes at regional forums (e.g. The SAARC Summit in Pakistan)

Effectiveness of Track II processes

- Involvement of experts and influential persons
- Ideas not in vacuum but in context responding to social needs
- Responsiveness to community led agendas
- Act as a neutral facilitator
- Need for patience and perseverance
- Free and frank discussion
- Contextualize with the regional agenda

Policy Engagement

- Promote an understanding of ecological interdependence in the region
- Engage and sensitize policy makers to the need to remove obstacles to regional cooperation, including
    - Facilitating timely access to public data
    - Facilitating people-to-people interaction including youth, journalist, local governments, research institutions, private sector and civil society organizations.

Action Points

Civil society organizations have the capability to take following actions:

- Data gathering
- Situation analysis/ background and comparative research studies
- Creation of web knowledge portal
- Sharing of lessons from success stories (e.g. energy, land management and Rural Support Programme-community based work)
- Pilot initiatives to demonstrate effective ways of addressing climate change

Policy Champions

- Engage policy makers and parliamentarians in dialogues and discussions at all levels including through such forums as National climate caucuses of parliamentarians
- Encourage the governments to renew their resolve to address climate change challenges jointly

CLIMATE RESILIENCE IN THE REGION

Though all countries are affected by climate change, they are impacted in different ways and to different extents.

The South Asian region, which includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, is one of the most vulnerable regions to climate change. The principle reasons for this are poverty, population, a strong dependence on agriculture and geographic location. India and Pakistan have a combined population of over 1.4 billion, are home to over 300 million poor (living below $1.9 a day), and collectively have over 650 million people engaged in the agricultural sector, making them very susceptible to climate change.(The World Bank)

As a result of its vulnerability, this region is already deeply impacted by climate change despite contributing relatively little to global GHG emissions about 7% in 2012 (Country Greenhouse Gas Emissions Data, 2014). The region is currently seeing rising temperatures, precipitation that is more variable, more extreme weather events (including intense floods, droughts, and storms) and a rise in sea levels. These changes have taken a toll on the region's economic performance and on the lives and livelihoods of millions of poor people. (IPCC AR5 Summary for Policymakers, 2014)

These impacts are likely to be exasperated in the future as little has been achieved so far in the fight to mitigate and adapt to them. In India and Pakistan unusual and unprecedented spells of hot weather are expected to occur far more frequently and cover much larger areas in the future. Rainfall is expected to become more unpredictable. Abrupt changes in the monsoon could precipitate a major crisis, triggering more frequent droughts as well as greater flooding. Crop yields are expected to fall significantly because of extreme heat by the 2040s.Although it is difficult to predict future ground water levels, falling water tables can be expected to reduce further on account of increasing demand for water from a growing population, more affluent life styles, as well as from the services sector and industry. Melting glaciers and the loss of snow cover over the Himalayas are expected to threaten the stability and reliability of primarily glacier-fed rivers, particularly the Indus and the Brahmaputra. Alterations in the flows of the Indus, Ganges, and Brahmaputra rivers could significantly affect irrigation, affecting the amount of food that can be produced in their basins as well as the livelihoods of millions of people. The sub-continent will also see a higher rise in sea levels than higher latitudes. Sea-level rise and storm surges can lead to saltwater intrusion in the coastal areas, impacting agriculture, degrading groundwater quality, contaminating drinking water, and possibly causing a rise in diarrhea cases and cholera outbreaks. Additionally seasonal water scarcity, rising temperatures,

and intrusion of sea water could threaten crop yields, jeopardizing the countries food security. Should current trends persist, substantial yield reductions in both rice and wheat can be expected in the near and medium-term. The increasing variability and long-term decreases in river flows can pose a major challenge to hydropower plants and increase the risk of physical damage from landslides, flash floods, glacial lake outbursts, and other climate-related natural disasters. Climate change is also expected to have major health impacts, increasing malnutrition and related health disorders. Heat waves are likely to result in a very substantial rise in mortality and death. Climate change impacts on agriculture and livelihoods could also increase the number of climate refugees leading to social conflict. (The World Bank, 2013)

These impacts of climate change are and will be felt most by those who are who are socially, economically, culturally, politically, institutionally or otherwise marginalized. In India and Pakistan these will include those living under the poverty line, women, children, the elderly, the disabled, tribal communities, those living close to coastlines and on river banks and those who rely on agriculture for their livelihood.

Given the vulnerabilities of these countries and the impacts they face, it is imperative for them to build up their climate resilience. Resilience is defined as the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a potentially hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions(Managing the Risk of Extreme Events and Disasters to advance Climate Change Adaptation, 2012).

Climate resilience and adaptation are often used interchangeably. However, resilience is a broader term than adaptation. Typically adaptation involves specific actions taken by decision makers in response to a current or anticipated threat that exceeds a threshold of acceptable impact, for example, creating urban canopies for shade as heat waves start getting more frequent and intense. Resilience includes adaptation measure but also considers the overall adaptive capacity of society and its ongoing ability to increase that capacity. In the heat wave example, a resilience focus might also facilitate considerations of how cooling centers could also increase participation of under-represented communities in a variety of activities (as well as provide shelter in other emergencies, making them less vulnerable and better connected. A resilient society is one that isn't just capable of absorbing impacts and change, but of using those changes to develop a regenerative capacity(Second Nature).

Recognizing its importance, both India and Pakistan have put in place national policies and plans to combat climate change. In June, 2008, India's released its first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. The plan identified eight core national missions, which include the Solar Mission, Mission for Enhanced Energy Efficiency, Mission on Strategic Knowledge for

Climate Change etc. Subsequently, Indian states have also submitted their State Action Plans for Climate Change (SAPCC) and are now entering the phase of implementation. Similarly in September 2012, Pakistan launched its National Climate Change Policy which provides a framework for addressing the issues that Pakistan faces or will face in future due to a changing climate. This policy highlights the various adaptation and mitigation policies that Pakistan needs to adopt. Both countries also have in place a National Disaster Management Authority (NDMA).

In October 2015, India formally submitted its Intended Nationally Determined Contribution (INDC) to the climate agreement due in December 2015 in Paris. Its key elements were: to reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level, to achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030, with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF) and to create an additional carbon sink of 2.5 to 3 billion tons of CO2 equivalent through additional forest and tree cover by 2030. Pakistan too submitted its INDC in November 2015 which reiterated Pakistan's commitment to reduce its emissions after reaching peak levels to the extent possible subject to affordability, provision of international climate finance, transfer of technology and capacity building and clarified that Pakistan would only be able to make specific commitments once reliable data on peak emission levels was available.Both countries also committed to adopt the 2030 Agenda for Sustainable Development in September 2015.In addition to the agenda having a dedicated goal to take urgent action to combat climate change and its impacts (SDG 13), climate change is an intrinsic factor what will affect the achievement of all other goals.

However, given the scale of the problem any steps that India and Pakistan take independently to combat climate change, are likely to be insufficient. In order to make any real progress it is crucial that both countries lean to work together. There is plenty that these countries can learn from one another, for example in the solar energy sector. The solar energy sector is well established in India, while Pakistan has only recently begun to grow this sector after revising its utility laws to allow individual to sell the surplus power they generate back to the grid and lowering the import duty on solar panels. In the past, historical baggage has prevented these two countries collaborating to improve human development. If climate change goes un-addressed due to poor bilateral relations it will be harmful for both parties and could create situations which further exasperate tensions. For example if India were to invest heavily in hydropower to meet its energy demands in a sustainable manner it could impact Pakistan's downstream water access. Additionally, India and Pakistan must work with other nations in the South Asian region, which is one of the least politically, integrated of the world, to develop a regional climate strategy, which is currently lacking (Bhatiya, 2015).

ENHANCING WATER SECURITY AND CLIMATE CHANGE ADAPTATION

Background

Water resources are vital for life. They are required for domestic, agricultural, industrial, recreational and environmental activities. In the recent past however, water resources in India and Pakistan, have come under have come under tremendous pressure from industrial development, urbanization, population growth, and environmental pollution. This coupled with poor water management and increasing variability in rainfall and climate patterns has seriously threatened their water security. Water security can be defined as "the reliable availability of an acceptable quantity and quality of water for health, livelihoods and production, coupled with an acceptable level of water-related risks (Sadoff, 2007).

In 2009, India had 728 billion m^3 of usable water. Against this supply, water demand is likely to increase to 1093 billion m^3 in 2025. As a result the per capita water availability is expected to fall to 1341 m^3in 2025 compared to 1820 m^3 in 2001. . Based on the average requirement of water for various purposes, the situation is considered as water stress condition when the per capita water availability ranges from 1000 to 1700 m^3 per year and it is considered water scarcity when the availability reduces to 1000 m^3 per year. Most Indian States are predicted reached the water stress condition by 2020 and water scarcity condition by 2025. (BAIF Development). Similarly, the per capita water availability in Pakistan is expected to fall to 837 m^3in 2025 from 1672 m^3 in 1990, making the situation even worse in Pakistan than it is in India (Majeed, 2012).

Climate Change Linkage

In both India and Pakistan, climate change is expected to exacerbate this situation. As temperatures soar, evaporation increases which could lead to droughts. Additionally, rising temperatures are melting glaciers at an unprecedented rate. Disappearing glaciers could create an acute freshwater shortage in areas that depend on it. This is further complicated by the fact that higher temperatures mean more precipitation will occur as rain rather than snow. As a result, higher levels of soil moisture and groundwater recharge will be less likely to occur and areas that rely on snowmelt as their primary freshwater source could increasingly experience water shortages. On the other hand climate change is also predicted to increase extreme rainfall and rainfall intensity, potentially leading to floods. Climate change is also expected to

increase the frequency and intensity of cyclones which often turn in national disasters. Finally, a rise in sea levels due to climate change could trigger inundation, change sediment balance and lead to an intrusion of saline water far into the land mass via rivers causing ground water contamination(GRACE Communications Foundation).

Resilient Solutions

During the technical session on water, in the Track II dialogue, some specific solutions to adapt to the water crisis in India and Pakistan were discussed. The first solution recommended the use of integrated water resource management in water scarce areas. To explain what this involves a case study of a project done in the Bundelkhand region of Madhya Pradesh, India was presented. This project aimed at both securing water sources and promoting sustainable utilization. These objectives were sought to be achieved through the underlying principle of capacity building for water governance. For securing water sources a ridge to valley approach was followed with an emphasis on both water harvesting and soil loss prevention. This approach resulted in maximization of runoff capture, securing buy-in and ownership of the village stakeholders and brought water-logged/un-irrigated land under cultivation. On the other hand to promote sustainable utilization of resources a 'more crop per drop' approach was followed. This involved water budgeting to plan crop pattern according to availability of water and balance of competing demands, the use of adaptation technologies such as dry sowing, short duration varieties etc., the creation of contingency plans for monsoon delays and information dissemination through farmer institutions. This resulted in a reduced impact of decrease in water availability on livelihood security, improvement in farm productivity levels and more equitable allocation of limited water resource between competing demands. The two objectives of this practice were achieved using a participatory process. Community institutions were developed for managing watershed development activities and maintaining the watershed infrastructure. It was endeavored to mainstream water resource management into local governance (panchayat) and planning (gram sabha) process. In Bundelkhand, integrated water resource management has led to over 10 million liters of water being conserved each year.

The second solution discussed was regarding better irrigation policies and practices. It was suggested that irrigation agencies should create a formal water allocation policy that includes contingency plans for different degrees of water shortage. When a shortage occurs, allocation decisions should be made at basin and system levels rather than at local distribution system levels. Irrigation planning also could to take into consideration changes in the catchment area using up-to-date data to make systems less vulnerable to drought. Further, early warning systems should to be developed that monitor changing conditions and trigger contingency plans at the first sign of water shortage to avoid crop failure. It was also suggested that a regional drought, monitoring and assessment system be developed, operated and maintained

along with associated tools, methods, databases and models, research be undertaken on droughts in the context of agriculture and the environment and that information on droughts should be disseminated to improve accuracy of early warning in terms of time and space.

It was pointed out that watersaving practices such as precision irrigation, zero tillage, raised bed planting and laser leveling of fields, could help farmers make the best use of scarce supplies and improve the productivity of water, even under normal conditions. A special emphasis was laid on rainwater harvesting for the same

ENERGY SECURITY FOR CLIMATE RESILIENT DEVELOPMENT

Background

Energy is the lifeline of the global economy – a crucial input to nearly all of the goods and services of the modern world. The energy industry contributes to economic growth in two ways. First, energy is an important sector of the economy that creates jobs and value by extracting, transforming and distributing energy goods and services throughout the economy. Second, energy underpins the rest of the economy. Energy is an input for nearly all goods and services. Both India and Pakistan currently face challenges to their energy security. These persist in both energy creation and distribution and include energy deficits, dependence on fossil fuels and a dependence on energy imports, rural access issues etc. (World Economic Forum, 2012).

In recent years, India and Pakistan's energy demand has growing due to economic development and population growth. This is demand is not being met; despite in many cases the ability to pay. In 2012, about 20% of the population in India and about 6% of the population in Pakistan still lacked access to electricity. A majority of these people lived in rural areas (The World Bank).

Climate Change Linkage

Anthropogenic climate change is caused by the emission of greenhouse gases into the atmosphere. These gases are a byproduct of burning fossil fuels like coal, oil and gas to meet the energy needs of the world. However while the quest for energy security causes climate change on the one hand; it is also on the other hand required to build resilience to climate change. This is because better energy access helps reduce vulnerabilities of communities and thereby puts them in a better position to fight climate change. Hence there is a close link between adaptation and development and energy. The use of electricity, biofuels etc. to prepare food in rural areas over more conventional methods like using wood from nearby forests is one example of how better energy access can be used a climate change adaptation strategy(Literature Review on Energy Access and Adaptation to Climate Change, 2015, 2015). So while a greater and more efficient energy production and distribution is need of the hour, it is crucial that this demand is met through renewable sources.

Resilient Solutions

During the dialogue, it was recommended that both countries further build their renewable energy sector as a means to enhance climate resilience. To highlight Pakistan's efforts to grow its renewable energy sector, a study was presented on Pakistan's wind energy market. Pakistan has a total installed wind capacity of 308 MW and projects in the pipeline to increase to about 470 MW. However, its wind energy markets are relatively new and face challenges in terms of grid availability, the operation efficiency of government agencies, regulatory and policy framework decisions and the availability of finances, which need to be overcome. With an installed capacity of over 23,000 MW India has a more mature wind energy sector than Pakistan. It was therefore, recommended that Pakistan make efforts to learn from its neighbor in this area.

Another recommendation was the use of decentralized renewable energy in rural areas to improve energy access, given that millions of individuals in India and Pakistan still do not have access to electricity due to significant logistic, financial and environmental costs of distributing electricity in rural areas. To give an example of how this could be done a case study of a project in rural India was presented. In this project, a few villages with a high dependence on diesel as the primary source of energy were identified and provided with a solar grid. A single grid supported up to 30 households. Women from these villages where then given technical training and organized into a leadership body to oversee the running of these grids. This project reduced and in many cases replaced the dependence on diesel as the primary source of energy with a far cleaner more reliable and affordable energy source while also empowering women and generating green jobs. Additionally, it also led to an enhancement in the irrigated land area thereby increased agricultural yield

While both solar and wind, are great sources of renewable energy, it was pointed out in the discussion that they are not without their own environmental costs. These include their material costs, the land that needs to be cleared to support these energy sources etc. These costs need to be taken into account in order to conduct a fair cost benefit analysis.

It was also mentioned that while off-grid solutions exist and that technology is advancing, it has some drawbacks as off grid solutions have a narrow reach, don't operate at economies of scale, and are expensive.

Finally it was also said, what while energy generation is important and receives a lot of attention, it is equally prudent to highlight the challenges of distribution and focus energies on improving distribution efficiencies.

CLIMATE INDUCED DISASTER LOSS AND DAMAGE IN THE REGION

Background

South Asia is exposed to a variety of hazards due to the geo-climatic characteristics of the region. Hazard exposure is primarily due to two geographic features of the region, the Himalayan mountain belt and the coastal waters of the Indian Ocean, including the Bay of Bengal and the Arabian Sea. Since many countries in the region share common geological formations and river basins, and natural hazards frequently transcend national boundaries. The annual monsoon is a significant hydro-meteorological threat in the region. A good monsoon brings strong harvests and financial security, but a poorly timed monsoon, can result in human suffering and economic loss due to either flooding or drought. Additionally, intense rainfall over short periods of time can have serious effects. Flooding is the most common disaster event in the region and impacts the greatest number of people. Cyclones are the second most commonly occurring hazard in the region. With over 600 million people living along the fault line across the Himalayan belt, earthquake exposure is very high. Also, there are many major population centers that live in cyclone prone areas. Disasters derail the development process and affect resource availability for future development. India and Pakistan are prone to all major natural hazards and experience the highest number of disasters in South Asia. While India is particularly exposed to earthquakes (and associated tsunamis), floods, droughts and cyclones, Pakistan is most vulnerable to floods and earthquakes (Disaster risk management in South Asia, 2012).

Climate Change Linkage

It is predicted that climate change will increase the incidence and intensity of disasters. Changing climate extremes can be traced to rising global temperatures, increases in the amount of water vapor in the atmosphere, and changes in atmospheric circulation. Warmer temperatures directly influence heat waves and increase the moisture available in the atmosphere to supply extreme precipitation events. Expanding sub-tropical deserts swelling out from the equator are creating larger areas of sinking, dry air, thus expanding the area of land that is subject to drought. The expansion of this sub-tropical circulation pattern also is increasing heat transport from the tropics to the Arctic and pushing mid-latitude storm Tracks, along with their rainfall, to higher latitudes. While it is difficult to say with certainty that a single event is a direct effect of climate change, it is possible to link climate change to extreme

weather trends. For example 2010 was recorded to be the warmest year globally since 1880. It was also the wettest year since 1900. That same year a large number of weather disasters took place all over the world these include, Pakistan's biggest flood and the Leh cloudburst (Center for Climate and Energy Solutions, 2011).

Resilient Solutions

Both India and Pakistan have a National Disaster Management Authority (NDMA) to deal with these disasters as well as a State/ Provincial Disaster Management Authorities. Pakistan also has a District Disaster Management Association as well as an Earthquake Reconstruction Rehabilitation Authority. However, it was pointed out that disasters management is not only the responsibility of governments but requires collective action by all stakeholders. Additionally, the need for a South Asia Disaster Management Center was also discussed.

Both countries are also signatories to the Sendai Framework. The Sendai Framework is a 15-year; voluntary, non-binding agreement which recognizes that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. It is the successor of the Hyogo Framework Action (2005-2015) and aims to substantially reduce disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. However, given that to date, little progress has been made by India and Pakistan to integrate this framework into their existing plans it was recommended that steps be taken to address this.

It was also recommended that disaster risk management be integrated in all state level policies and plans, which should be implemented in collaboration with local communities. A reflective case study was presented at the dialogue in which the state of Madhya Pradesh in India built up its capacity for strengthening performance management in governance to adapt to climate change to demonstrate how a similar exercise could be undertaken to build disaster resilience. In the case of Madhya Pradesh, the state mainstreamed their State Action Plan on Climate Change (SAPCC) into other plans and programmes. This was done using a technical partner who provided planning support, conducted research and knowledge development, provided training and capacity building and engaged in communication and outreach. In the case of disaster resilience an approach like this could result in roadmap to integrate disaster risk reduction into sectoral strategies, enhance capacities of government officials, decision makers and policy makers on disaster planning and a strengthen the knowledge repository on disaster management.

Further, a lot of emphasis was laid on the need to develop better early warning systems, as they can significantly help prevent damage. To illustrate this, the example of Karachi's

Metrological Department was given which issued advanced warnings of a heat wave last year and was thereby able to mitigate the loss of lives. In connection with this, another suggestion made was to create a vulnerability atlas to map the disaster prone zones in the region. The need for digitalizing and sharing this kind of information both across the border and with local communities was highly stressed.

CONCLUSION

The dialogue was concluded with closing remarks by representative of the organizing institutions. The key take away of these remarks was that while the official Indo-Pak relations may be strained for some time to come, civil society organizations must continue to build on their long standing bilateral relations in order to promote peace and trust between the two nations. Some of the recommendations to build climate resilience in India and Pakistan that emerged from the event organized are as follows:

- Facilitate timely access to public data
- Focus on taking small concrete steps rather than setting unattainable goals.
- Scale up and share information on best practice cases
- Create a bilateral consortium of water stakeholders
- Look into the possibility of creating a regional energy grid
- Develop better early warning systems and communicate risk signals in the region
- Facilitating people to people interaction including youth, journalist, local governments, research institutions, private sector and civil society organizations to build trust and foster peace

DELHI DECLARATION

The last session of the India-Pakistan Track II dialogue on building climate resilience endeavored to summarize the events main take backs and build consensus on how to take its recommendations forward. This resulted in the **Delhi Declaration** that was mutually agreed upon by all present participants. This declaration is intended to act as the base for a follow up meeting, which will be held in Islamabad later this year. The final recommendations of both dialogues are expected to be presented at the 19th SAARC Summit to held in Pakistan in November 2016.

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ANNEXES

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Indo-Pak Track-II Dialogue on Building Climate Resilience
Energy-Water Resilience and Disaster Risk Reduction

12-13 May 2016, Yantra Hall, The Park Hotel, New Delhi

Speakers Profile

Dr. Abid Qaiyum Suleri, Executive Director at SDPI, earned his Ph.D. in Food Security from the Natural Resources Institute (NRI), University of Greenwich, United Kingdom. He represents the civil society of Pakistan in various working groups, task forces, steering committee, and technical committees formed by the Government of Pakistan at the Planning Commission; Ministry of Commerce; Ministry of Food, Agriculture, and Livestock; Ministry of Environment (MOE); and Pakistan Agriculture Research Council. He also represented the Pakistani civil society at the Doha and Cancun Ministerial Conferences of WTO as well as the World Food Summit (FYL).

Ms Aditi Chadha Kapoor, Board Member of CAN-SA, is a researcher, communication professional and trainer, working on issues of environment, climate change, gender, agriculture, livelihoods and development. Aditi focuses on policy research and advocacy linking it with the grassroots. She worked from 2002 to 2010 with Oxfam GB and before that with UN agencies, government organisations, civil society groups like Self-Employed Women's Association (SEWA), and as a journalist on The Times of India for over a decade.

Ms Aisha Khan is the founder and CEO of the Mountain and Glacier Protection Organization (MGPO), which has an impressive record of working in mountainous areas of the country in challenging circumstances to rehabilitate, provide relief, and deliver basic social services to marginalized segments of society. Ms Aisha Khan is committed to mountain communities and works to promote social, economic, and environmental security of the disadvantaged communities living in the remotest areas of Pakistan.

Mr Anand Kumar, is the National Project Manager at UNDP India. He was previously the Programme Director at Development Alternatives. His area of expertise lies in natural resource management. He has an M.Sc. in Geology and specializes in remote sensing. His experience ranges from evaluation and assessment of regional and national sustainable development actions and capacity building integrated environment assessments; participatory planning of natural resource management; watershed management, risk management, development of environment management plans, etc.

Dr. Ashok Khosla founded and was president of the thirty-year-old Development Alternatives Group and now chairs its Board. Headquartered in New Delhi, the DA Group was among the first civil society organisations set up to address the issues of sustainable development as a whole. Globally, he helped to design and teach the first university course on the environment (as an assistant to Professor Roger Revelle at Harvard University, 1965); to set up and head the first governmental agency for the Environment in a developing country (under Prime Minister Indira Gandhi, 1972).

Mr Awais Qasim Khan is a politician and member of provincial assembly Punjab Pakistan. His current official positions are that of a Member of Home Affairs, Social Welfare and Bait-ul-Maal. An agriculturist by profession, he was also associated with the Library Committee, Labour and Human Resource.

Dr. Axel Harneit-Sievers is the director of the Heinrich Böll Stiftung / Foundation's (HBF) India Office in Delhi. He heads the India office since March 2011. By professional background, Axel Harneit-Sievers is a historian and political scientist specializing in the area of African Studies. Among his fields of interest and expertise are political analysis, development and resource policy, as well as gender issues. He has a strong interest in developing political dialogue within the Global South, such as the "China - Africa Civil Society Dialogue" project organized jointly by HBF Beijing and HBF Nairobi since 2008, and, more recently, engagements on issues relating to the BRICS group of countries.

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Speakers Profile

Ambassador Chandrashekhar Dasgupta, Distinguished Fellow at TERI, was an Indian Foreign Service officer from 1962 until his retirement in 2000. Among other posts, he served as Ambassador to the European Union (1996–2000) and as Ambassador to China (1993–1996). He is presently a Member of PM's Council on Climate Change; Member of the UN Committee on Economic, Social and Cultural Rights; and Co-Chair of the India – EU Round Table. Recently he served as Chairperson of the China Task Force. He is the author of numerous essays and articles on international affairs and global environmental issues. Amb. Dasgupta is a Padma Bhushan recipient, India's third highest civilian honour.

Mr George C Varughese is the president of the Development Alternatives and has undertaken the task of building a trans-disciplinary group, capable of addressing issues related to environment and sustainable development. He has coordinated or actively participated in nearly all the assignments undertaken by the group. Mr Varughese has nearly two decades of experience in various facets of environment and development, including activities related to national and international policy formulation, technical support to programmes and projects, conducting training programmes, building partnerships and managing large-scale field programmes, involving community participation.

Mr Harjeet Singh, International Climate Policy Manager at ActionAid, supports countries across the world on policy advocacy related to climate change. Prior to this, he managed disaster resilience programme globally and coordinated emergency response and preparedness work in Asia and the Americas. Until 2007, he led the tsunami response programme in the Andaman and Nicobar Islands for ActionAid India. Mr Harjeet is closely associated with the Global Network of CSOs on Disaster Reduction (GNDR) and Climate Action Network (CAN) International as well as its South Asian node.

Mr Jitesh Khosla, Former Chief Secretary of Assam, is an Advisor in Development Alternatives. In his three decades as a bureaucrat, Mr Khosla has held several key positions, spending over twelve of these years in the central government in two stints separated by a five-year hiatus. Between 1994 and 1999, he was at the department of Economic Affairs under the finance ministry as Joint secretary. He was also part of several high profile committees that were instrumental in framing public policy. Between 2004 and 2010, he served as a director on the board of the Bombay Stock Exchange.

Ambassador Lalit Mansingh is currently in the Executive Committee of Institute of Peace and Conflict Studies, a Defence, Foreign Policy and Security Studies think tank in India. Amb. Mansingh is considered one of the most distinguished Indian diplomat ever. He has the unique distinction of having served as the Foreign Secretary in the Ministry of External Affairs as well as the High Commissioner of India to UK and the Ambassador of India to USA. He has also served as the High Commissioner of India to Nigeria.

Mr Mayukh Hajra is an Assistant Programme Director at Development Alternatives. He has been coordinating the nationwide community environment action based CLEAN-India programme, being responsible for programme events and documentation. He has created IEC material, training modules and interactive tools for student's programmes on climate change and biodiversity conservation. As lead member in the Evaluation Study of Environment Education, Awareness & Training Schemes of the MoEFCC, he has been responsible for project methodology design, field surveys, analysis and reporting and documentation.

Speakers Profile

Ms Mome Saleem, Program Coordinator, SDPI, earned a master's degree in anthropology from Quaid-e-Azam University in the year 2005. Previously, she had been engaged in health related assignments as a consultant with WHO, UNOPS and Green star. She has working on the issues of Gender as cross cutting theme her activities have included field work for data collection, holding policy advocacy activities such as presenting on seminars, writing newspaper articles and media talks for larger dissemination of thematic and cross cutting issues and solutions. She has also been convening think tank led "Women Parliamentarians' Council and Non-Muslim Parliamentarians' caucus.

Mr Muhammad Zeeshan Ashfaq is currently employed at the World Wind Energy Association as Policy and Research Analyst. He is responsible for association's activities portfolio in Pakistan ranging from policy research to capacity building. He is implementing a demand-driven project that aims at conducting a comprehensive analysis of country's institutional capacities for policy making and effective implementation along with renewable energy (RE) market regulations.

Mr Nisar Memon is a member of the Senate of Pakistan, belonging to Pakistan Muslim League (Q). As Senator, he was the Chairperson of the Parliamentary Committee on Water Resources. He was a member of the Standing Committees of Senate on Foreign Affairs, Finance and Economic Affairs and Housing and Environment Committee. He continues to be a Member, Board of Governors National University of Computer and Emerging Sciences, Islamabad.

Dr Prodipto Ghosh, Distinguished Fellow at TERI, is involved in research and teaching at the interface of science, economics, philosophy, and public policy. He has earlier been member of the National Security Advisory Board, PMs Council on Climate Change, G 20 Advisory Group of the Ministry of Finance, and the CAGs Audit Advisory Committee. He is Adjunct Faculty at the Carnegie-Mellon University, Pittsburgh (where he lectures on Indian macroeconomic policy and public finance), TERI University (where he teaches a post-graduate course on Normative Ethics), and Visiting Fellow at the Smith College, Oxford (with whom he is engaged in collaborative policy research).

Mr Ram Kishan, is the Country Director at Christian Aid. He was previously associated with ActionAid India as a Programme Officer for 5 years.

Ms Rowena Mathew is a Manager at Development Alternatives and looks at applied policy research. Her sectoral focus areas are Climate Change and Renewable Energy where she works across the board with innovations, implementation and influence through an on-ground approach of practice-to-policy connect. She has experience working in rural electrification projects in Uttar Pradesh and Bihar, and technical support in implementing the State Action Plan on Climate Change in Madhya Pradesh.

Mr Sanjay Vashist is an advisor to the Climate & Resources Programme of Heinrich Böll Foundation in India since February 2009 and Director, Climate Action Network in South Asia (CAN-SA). Prior to this he worked with TERI as a Climate Change expert. He has also worked as the International Coordinator for Climate Action Network International (CANI) in Bonn, Germany coordinating the activities of ENGOs network and acting as the focal point for ENGOs constituency of observers under UNFCCC.

Speakers Profile

Ambassador Shafqat Kakakhel, Chair of the Board, SDPI, has been a member of the SDPI Board of Governors since 2009. He is a former member of Pakistan's Diplomatic Service and also served as Deputy Executive Director of the UN Environment Programme for nearly a decade. He is a member of the Advisory Committee of the M/O Environment, the Task Force on Climate Change. Amb. Kakakhel represented Pakistan at the Rio+5 Conference and the Kyoto Climate Change meeting in 1997. In August 1998, UN Secretary General Kofi Annan appointed him as Deputy Executive Director of UNEP with the rank of UN Assistant Secretary General, a position he held until his voluntary retirement in December 2007.

Ambassador Shyam Saran, Chairman of the Research and Information System for Developing Countries, is a former foreign secretary and has served as the Prime Minister's Special Envoy for Nuclear Affairs and Climate Change and as chairman of the National Security Advisory Board. He is currently a senior fellow at CPR, a trustee of the World Wildlife Fund (India), a member of the National Executive of FICCI, and a member of the Governing Board of the India Habitat Centre. In January 2011. Amb. Saran was awarded the Padma Bhushan, India's third highest civilian honour, for his contributions to civil service.

Shri Suresh Prabhakar Prabhu, Hon'ble Union Minister for Railways, Government of India, is an all India rank holding Chartered Accountant armed with a Law degree. Shri Suresh Prabhu is amongst those admirable names in public life with an emphasis and jest for academics. The same zeal drives him presently to pursue two Ph.D. programs in climate change and economics in Germany and Mumbai,India respectively.

Dr. Tariq Banuri, Professor, University of Utah, has broad experience on the interface between policy, research, and practical actions on the realization of the goal of sustainable development. He has worked in government, academia, civil society, and the international system. He has served on national as well as international forums for policy, advocacy, and research, including as a Coordinating Lead Author on the Nobel Prize-winning Inter-governmental Panel on Climate Change (IPCC), as member of the board of governors of Pakistan's central bank, and of the Pakistan Environmental Protection Council, and member/secretary of Pakistan's Presidential Steering Committee on Higher Education.

Mr Vinod C Menon, Independent Consultant, has served as a member of the National Disaster Management Authority (NDMA) for 5 years. As Member, NDMA, he had the status of a Minister of State in the Government of India.

Dr. Vinod Kumar Sharma, Vice Chairman, Sikkim Disaster Management Authority, has a Ph.D. in Ecology and Environment from Banaras Hindu University, Varanasi, India. He is also a Senior Professor of Disaster Management at Indian Institute of Public Administration. He was instrumental in setting up the National Centre for Disaster Management in the Indian Institute of Public Administration, New Delhi.

Indo-Pak Track-II Dialogue on Building Climate Resilience: Energy and Water Resilience, and Disaster Risk Reduction

Contextual Understanding

It has been predicted that the global population will reach 9.7 billion in 2050, and India and Pakistan will emerge as two among the nine countries that will be home to half the people in the world. The United Nations predicts that Pakistan's population will surge past 300 million people by 2050. The latest global scientific consensus from the Intergovernmental Panel on Climate Change (IPCC) indicates that all of Asia is very likely to suffer consistently rising temperatures this century. The warming of the region will be accompanied by less predictable and more extreme patterns of rainfall. Tropical cyclones are projected to increase in magnitude and frequency, while monsoons, around which farming systems are designed, are expected to become more temperamental in their strength and time of onset.

Cities as Chennai, Delhi, and Karachi which are already being affected by the adversities of climate change with incidences of high air pollution, poor water quality, and disease among others. The aforementioned developments are crucial to both India and Pakistan as they have emerged at a significant time when UN member states have agreed on the UN Sustainable Development Goals (SDGs) and strengthened their commitments at the recently concluded CoP21 Paris. India, along with 100 other nations, is poised to ratify the Conference of Parties (CoP) 21 global climate agreement on April 22, 2016. India vehemently stated that it was responsible for only 3 per cent of global carbon emissions. Therefore, India has positioned itself to emerge as a part of the solution rather than a problem in the climate change discourse. India also observes renewable energy as one of the most significant solutions to mitigate carbon emissions and reduce the impact of climate change. Through its recently implemented policies on renewable energy, the International Solar Alliance, National Solar Mission, and the commitment in Budget 2015-16 to increase renewable energy capacity to 1,75,000 MW by 2022, India strives to emerge as a significant technology solution imparter and also encourages its neighbours to come together and invest and collaborate through bilateral agreements on propagating renewable energy and climate change.

Pakistan too has become one of only two countries piloting a new Climate Change Integration Index (CCII) which enables it to assess its progress towards integrating climate change into public finance, and ensure that its national and provincial budgets are sensitive to climate change issues. It establishes a baseline for countries, and can help develop reform agenda to improve climate change integration. With both countries carrying forward their stringent commitments, leading organizations such as Development Alternatives, SDPI, and HBF have formed the Indo-Pak Dialogue on Building Climate Resilience. The consortium, instituted in 2010, has since transcended to develop key solutions by sharing cross practices on mitigating climate change adversities through engagement of leading civil society, government, academic, and climate experts.

Looming Threats and Regional Commonalities

Pakistan and India are agriculture-dependent countries with over 47 per cent and 58 per cent of their population earning their livelihood from the sector, and contributing 24 and 14 per cent to their GDP respectively. The Indus Valley, which is the cradle of Pakistan's agriculture, is presently threatened by the vagaries of climate change. Pakistan earns 70 per cent of its foreign exchange from agriculture alone. Unless it maintains stable growth rates, its economy will suffer immensely. In contrast, India earns only about 15 per cent of its foreign exchange from agriculture and agri-based services.

Explaining how South Asia is and will be affected by climate change, scientists have warned of considerable increase in the frequency and intensity of extreme weather events, erratic monsoon rains causing frequent and intense floods and drought.

Other risks that the region should brace for include projected recession of Himalayan, Hindu-Kush, and Karakoram glaciers that will threaten water inflows into the Indus River System; increased temperature leading to reduced agricultural productivity; and increased intrusion of saline water into river deltas due to sea-level rise. All of this will lead to water, food and energy insecurities, making India highly vulnerable and Pakistan among the top eight most vulnerable countries to climate change.

Unfortunately, in the case of Pakistan and India, as it is the case in the rest of the world, those worst affected by the multiplying threat of climate change are those with limited assets and limited political voice to enable them to respond

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to the impacts of climate change; and low adaptive capacity. These are those people who depend on climate-sensitive resources and ecosystems for their livelihoods – such as agriculture, fisheries, and forests – or otherwise live in marginalised and hazard prone areas such as deforested hillsides, floodplains, and urban slums.

For the population, immediate and clear hazards to their livelihood trump long-term and still largely invisible threats. In 2007-2008, a Gallup poll found that only 34 per cent of Pakistanis were aware of climate change, and only 24 per cent considered it a serious threat. In stark contrast, about seven-in-ten or more (76 per cent) persons in India expressed significant concerns about climate change. Currently, Pakistan has allocated 58.8 million Pakistani Rupees to combat climate change, a commitment that must be increased. On the other hand, India has become noticeably more progressive on climate change.

Objectives

The upcoming Dialogue will seek the representation of leading members of government, civil society, academia, and unilateral organizations to come together on a neutral platform to address working solutions on issues within the climate change and energy realm. The dialogue will take place in continuation of the preceding dialogues on Track II channel from 2010 onwards. Some of the specific objectives of the dialogues are:

1. To encourage cross-sharing of ideas, perspectives and views across the two countries by leading experts of the representative nations;

2. To emerge with a formal solution-based exchange platform which will showcase realisation of emerging technologies, innovations, and policies that will prove to be vital in the climate change adaptation processes.

Structure of the Programme/Agenda

The workshop will have a defined agenda and will comprise of the following themes:

- Cross-country climate resilience requirements to increase our understanding of the impacts of and adaptive capacity to climate change.
- Sharing of formulated policies or upcoming policies that are required to tackle the multiple vulnerabilities of diverse groups and various impacts of climate change-related factors, especially on women.
- Identification of collaborative spaces and the functionalities of each leading stakeholder - civil society, government, academia, technology expert etc.
- Development of an integrated approach within both countries to leverage the SDG 7 and SDG 13.
- Focus on urban projects that promote low-carbon city development and alternative technologies.

The dialogue also promotes public engagement of both the countries to spread awareness on environment sustainability, climate change issues, and efficient use of resources. The overall outcome of the workshop is to create a democratic platform encouraging voices from all stakeholders to emerge with immediate on-ground and pragmatic solutions that can be applied to resolve the emerging climate change crisis. These will be beneficial in creating sustainable and climate resilient communities in both the countries.

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Indo-Pak Track-II Dialogue on Building Climate Resilience
Energy-Water Resilience and Disaster Risk Reduction

Agenda

12th and 13th of May, 2016

Mantra Hall / Yantra Hall
The Park Hotel,
Parliament Street,
New Delhi,
India

Day 1: 12th May, Thursday

Plenary Session: Inaugural *9.30 am to 11.30 am*
Session Facilitator: Ms Zeenat Niazi, Vice President, Development Alternatives

1. Welcome: *Dr Ashok Khosla, Chairman, Development Alternatives*
2. Setting the Agenda: *Dr. Abid Suleri, ED, SDPI and Mr. Sanjay Vashisht, Advisor, Climate and Resources, HBF*
3. Overview of Past Dialogues: *Amb. Mr. Shafqat Kakakhel, Chair of the Board, SDPI*
4. Special Address: *Mr. Nisar Memon, Senator, Government of Pakistan and Amb. Mr. Shyam Saran, Chairman, RIS*
5. Significance of the Dialogue: *Amb. Mr. Lalit Mansingh, Former Foreign Secretary, Government of India (TBC)*
6. Keynote Address: *Dr Ashok Khosla, Chairman, Development Alternatives*

Tea Break *11.30 am to 12 pm*

Technical Session 1: REGIONAL CLIMATE CHANGE COOPERATION: EXPERIENCES AND KNOWLEDGE SHARING FOR PROMOTING CLIMATE RESILIENCE *12 pm to 1.30 pm*
Co-chair: *Amb. Mr. Shyam Saran, Chairman, RIS*
Co-chair: *Dr. Tariq Banuri, Professor, University of Utah*

1. *Presentation:* Climate-induced Vulnerabilities and Impacted Stakeholder Groups in South Asia: *Mr. Harjeet Singh, International Climate Policy Manager, Actionaid*
2. *Presentation:* Current Climate Resilience Framework/Policies in India and Pakistan: *Ms. Aditi Chadha Kapoor, Board Member, CAN-SA and Dr. Abid Suleri, ED, SDPI*
3. *Moderated Discussion:* Opportunities for Future Cooperative Action: *Moderated by Amb. Shyam Saran*

Lunch *1.30 pm to 2.30 pm*

Technical Session 2: ENHANCING WATER RESILIENCE AND CLIMATE CHANGE ADAPTATION *2.30 pm to 4 pm*

Co-chair: *Dr. Ashok Khosla, Chairman, Development Alternatives*
Co-chair: *Mr. Nisar Memon, Senator, Government of Pakistan*

1. *Presentation:* Building Long Term Water Resilience through Integrated Water Resource Management: *Mr. Mayukh Hajra, Associate Programme Director, Development Alternatives and Ms. Aisha Khan, CEO, Mountain and Glacier Organisation*
2. *Presentation:* Growing Without Irrigation: Innovative Approaches to Catching and Storing Water: *Mr. Ram Kishan, Country Director, Christian Aid and Dr. Abid Suleri, ED, SDPI*

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Tea Break *4 pm to 4.30 pm*

Sightseeing and Free Time – Connaught Place / India Gate *4.30 pm to 7 pm*

Dinner *7.30 pm onwards*

Mist, The Park Hotel, Parliament Street, New Delhi

Day 2: 13th May, Friday

Recap of Day 1: *9.30 am to 10 am*
Dr. Abid Suleri, ED, SDPI

Tea Break *10 am to 10.30 am*

Technical Session 3: ENERGY SECURITY FOR CLIMATE-RESILIENT DEVELOPMENT *10.30 am to 12 pm*

Co-chair: *Amb. Mr. Chandrashekhar Dasgupta, Distinguished Fellow, TERI*
Co-chair: *Mr. Awais Qasim, MLA, Punjab Assembly, Pakistan*

1. *Presentation:* Promoting Domestic Energy Security through Programmes and Policies: *Dr. Prodipto Ghosh, Distinguished Fellow, TERI and Mr. Muhammad Zeeshan, Policy and Research Analyst, World Wind Energy Association*
2. *Presentation:* Engaging Communities in Low-Carbon Local Climate-Resilient Development: *Ms. Aisha Khan, CEO, Mountain and Glacier Organisation and Ms. Rowena Mathew, Manager, Climate Change and Renewable Energy, Development Alternatives*

Technical Session 4: CLIMATE-INDUCED DISASTERS, LOSS, AND DAMAGE IN THE REGION *12 pm to 1.30 pm*

Co-chair: *Prof. Vinod C Menon, Former Member, National Disaster Management Authority, Government of India*
Co-chair: *Mr. Jitesh Khosla, Former Chief Secretary of Assam, Government of Assam*

1. *Presentation:* Disaster Resilience Interdependencies (Sendai Framework and Relevant Metrics for India and Pakistan at Sub-National Level): *Dr. Dhar Chakrabarti, Former Addl. Secretary Ministry of Home Affairs and Dr. Abid Suleri, ED, SDPI*
2. *Presentation:* Planning and Implementation for Resilience to Climate-Induced Disasters: *Mr. Anand Kumar, National Project Manager, UNDP India and Ms. Aisha Khan, CEO, Mountain and Glacier Organisation*

Lunch *1.30 pm to 2.30 pm*

Valedictory Session *2.30 pm to 5 pm*

Co-chair: *Dr. Tariq Banuri, Professor, University of Utah*
Co-chair: *Prof. Vinod Sharma, Vice Chairman, Sikkim Disaster Management Authority*

1. *Presentation* Conclusion and Identification of Collaborative Spaces (Implementation of SDG 7 & 13, Urban Projects, Technology Transfer, Capacity Building of Common Vulnerable Groups etc.): *Mr. Sanjay Vashisht, Advisor, Climate and Resources, HBS India and Ms. Mome Saleem, Program Coordinator, HBS Pakistan*

2. *Talk:* Guidelines and Recommendations for Taking Track II Forward (*3.30 pm to 4.30 pm*): *Shri Suresh Prabhakar Prabhu, Hon'ble Union Minister for Railways, Government of India and Mr. Nisar Memon, Senator, Government of Pakistan*

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3. *Discussion:* Recommendations and Roadmap for Track-III: *Dr. Abid Suleri, ED, SDPI and Mr. George C Varughese, President, Development Alternatives*
4. *Vote of Thanks: Dr. Axel Harneit-Sievers, Director, HBS India*

Tea Break *5 pm to 5.30 pm*

Sightseeing and Free Time *5.30 pm*

Day 3: 14th May, Saturday

Departure for Terminal 3, Indira Gandhi International Airport *10 am*

Integrated Water Resource Management Experiences from Bundelkhand

Integrated Water Resource Management Experiences from Bundelkhand

Presentation by : Development Alternatives, India
Indo-Pak Track-II Dialogue
12th May 2016

Development Alternatives

Climate Vulnerability Context – India

India Context

- 70% of population depends directly on agriculture for their livelihood and food security
- 62% of total land area and 56% of cropped area is rain-fed
- Rapidly depleting water tables recorded across the country (average of 1.4 meters per year between 2002-12)
- Reduced recharge rates coupled with over-extraction
- Considerable overlap between climate vulnerable areas and poverty stricken areas

Climate Vulnerability

- Annual mean temperatures have shown a warming trend of 0.56°C per hundred years with accelerated warming in the last 50 years
- Increasing and decreasing trends in rainfall observed on regional basis
- Projections:
  - 3-7% increase in summer monsoon rainfall by 2030 as compared to 1970;
  - Decreased rainfall during winter and pre-summer in all regions except Himalayas
  - Frequency of rainy days will decrease in most parts of the country
  - Annual mean surface air temperature will increase from 1.7°C to 2°C by 2030

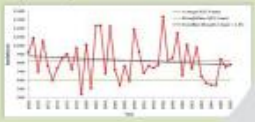
Development Alternatives

Climate Vulnerability Context – Bundelkhand

Bundelkhand Context

- 80% dependence on agriculture and 96% of farmers' income
- Receives 75% of national average of rainfall; thus drought prone
- More than 70% of area is rain-fed
- Aggregated HDI amongst lowest in the country
- 20% jump in migration rate recorded during drought years (from 20% on to 40%)

Owing to four consecutive drought years since 2013, the region has now moved from situation of ***meteorological drought*** *(reduced rainfall) to* ***hydrological drought*** *(reduced availability of water) and onto* ***agricultural drought*** *(reduction in production)*



Climate Vulnerability

- Shift in monsoon onset date
- Declining trend of rainfall observed over last two decades
- Projections:
  - Average surface temperature slated to rise by 1.8°C to 2°C
  - Minimum and maximum temperatures slated to rise by 3.4°C to 4.4°C
  - Decrease in winter rainfall over next 30 years

Development Alternatives

Integrated Water Resource Management (IWRM) in India

IWRM

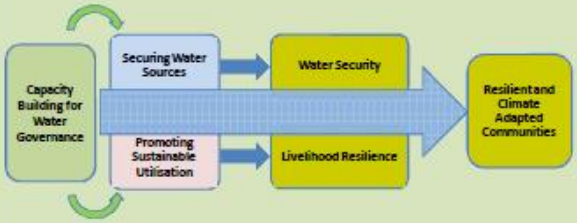
- Various models being innovated and implemented by Government (IWMP/PMKSY), Research Organisations and Civil Society (NGOs)
- IWRM projects are prioritised for rain-fed and drought prone areas
- The Integrated Watershed Management Programme (IWMP) is the second largest in the world (after China)

IWMP/PMKSY

- Target (need): 116 MHa – 85 MHa rain-fed + 31 MHa cultivable wasteland
- Outlay for 2012-17: INR 29,296 Crores
- Initiated till 2014: 1/3 of target (8,214 projects with INR 30,739 Crores)
- Investment: INR 12,000 per Ha
- Average project: 5,000 Ha
- Planning : At the level of watershed
- Implementation: At the level of micro-watershed (as per village)
- Drinking water not addressed directly

Development Alternatives

The "Integrated" Approach



Create enabling systems and build capacities for water resources management and livelihood enhancement

Development Alternatives

Securing Water Sources

Approach

- Ridge to valley approach followed
- Participatory net planning process – scientific planning using state of art GIS tools coupled with participatory process
- Simultaneous emphasis on both water harvesting and soil loss prevention infrastructure
- Plantation works for improved recharge potential
- *'khet ka pani khet mein'* approach of capturing every drop that falls on the farm

Benefits & Impact

- Maximises runoff capture and water recharge potential
- Secures buy-in and ownership of the village stakeholders enabling sustainability
- Brings water-logged/unirrigated land under cultivation
- Analysis reveals that on average, leads to a 50% increase in cropping intensity and 25% increase in production (in the average Bundelkhand context)

Development Alternatives

Promoting Sustainable Utilisation

Approach

- **'more crop per drop'** approach of optimizing water use efficiency
- Water efficient crops and varieties
- Water efficient irrigation practices
- Water budgeting to plan crop pattern according to availability of water and balance of competing demands
- On-field demonstrations, trainings aligned with agri-seasons
- Adaptation technologies such as dry sowing, short duration varieties etc
- Contingency plans against delay in monsoon
- Dissemination through farmer institutions

Benefits & Impact

- Reduced impact of decrease in water availability on livelihood security.
- Reduced extractive pressures on water table
- Improvement in farm productivity levels
- Equitable allocation of limited water resource between competing demands



Development Alternatives

Capacity Building for Water Governance

Approach

- Community institutions for planning and management of watershed development activities and management and maintenance of watershed infrastructure
- Capacity building of institutions
- Watershed development fund for maintenance
- Mainstreaming water resource management within local governance (panchayat) and planning (*gram sabha*) process

Benefits & Impact

- Water resources get acknowledged as common resource
- Communities' resource management decisions sensitive to long term sustainability concerns
- Resource mobilization through convergence with existing development funds to aid watershed development action



Development Alternatives

Science-Practice-Policy Connect for Stakeholder Synergy

- Platforms for scientists to engage with village communities for responsive technology innovation and adaptation
- Communication as key thread across the three poles; feedback systems for informing amplification of efforts
- Communication in the language and medium of the person in the village; peer to peer learning through success stories; risk communication
- Mainstreaming of water resource management and planning within local development planning system
- Platforms for engagement between scientists (research organisations) and policy actors for effective mainstreaming of appropriate technologies within government programmes


Development Alternatives

Case Study - Datia

Location: 8 villages in a cluster (8 Km radius) in Datia, MP

Implementation Period: 2011-2015

Watershed Area: 5500 Hectares

Investment: 6.6 Crores

Indicators /Years	2011	2012	2013	2014
Net Irrigated Area in ha	1340	1520	1600	2000
Water Availability (Irrigation) in %	44	50	58	66
Agriculture Production (Total food grain in Q)	8	10	12	14
Crop Diversification	311	80 Ha	100 Ha + 180 Ha	80 Ha

Development Alternatives

Our Impacts

50 villages in 2 states in central India

11,000+ farmers engaged

18,000+ hectares of land treated

Over 10 million litres of water conserved every year

30% increase in agricultural productivity

50% of land under single cropping converted to double cropping

70% reduction in water runoff leading to reduced soil erosion

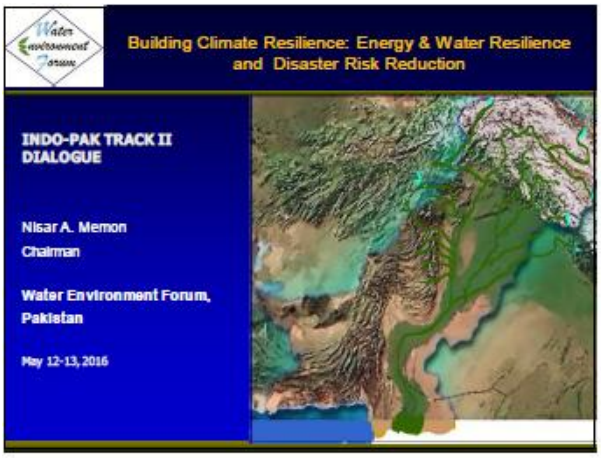
5 years is the programme implementation time

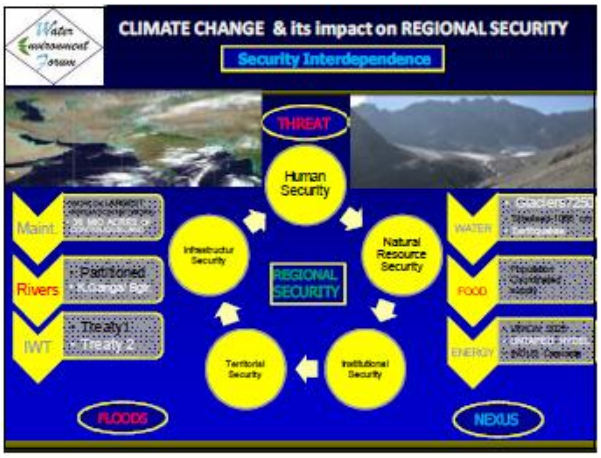
Cost Benefit Analysis

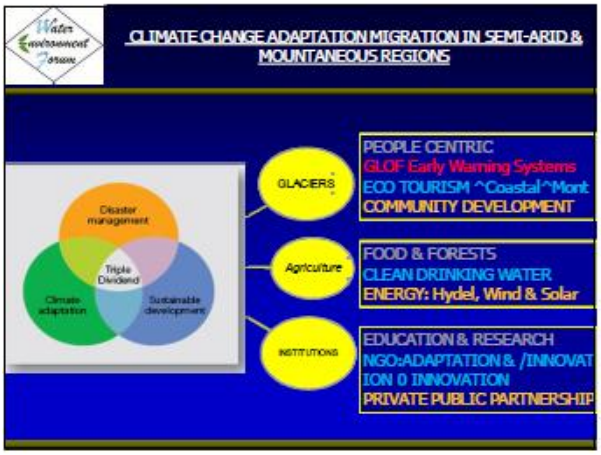
As farmer with 1 hectare of land and cultivating only 60% of it can improve the cropping intensity from 120% to 182% and in addition bring 10% of the previously un-cropped land under cultivation. This translates into an improvement in the annual income to the tune of about INR 20,000. The average investment per hectare is INR 12,000 including cost of infrastructure, capacity building and establishment of institutional systems.

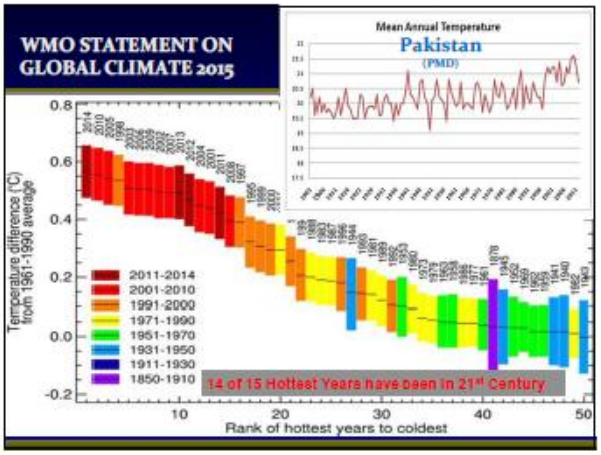
Development Alternatives

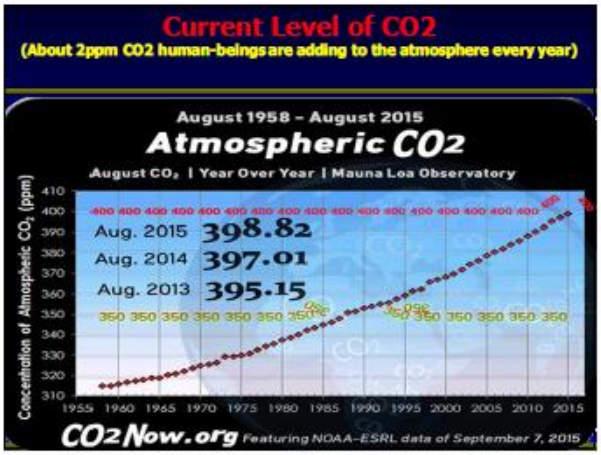
Development Alternatives

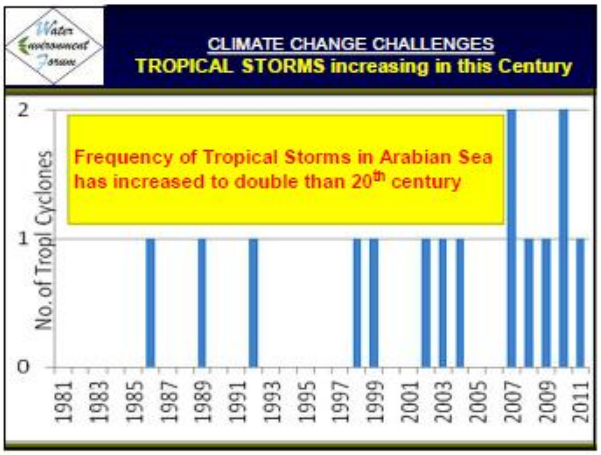

Building Climate Resilience: Energy & Water Resilience and Disaster Risk Reduction
INDO-PAK TRACK II DIALOGUE
Nisar A. Memon
Chairman
Water Environment Forum, Pakistan
May 12-13, 2016

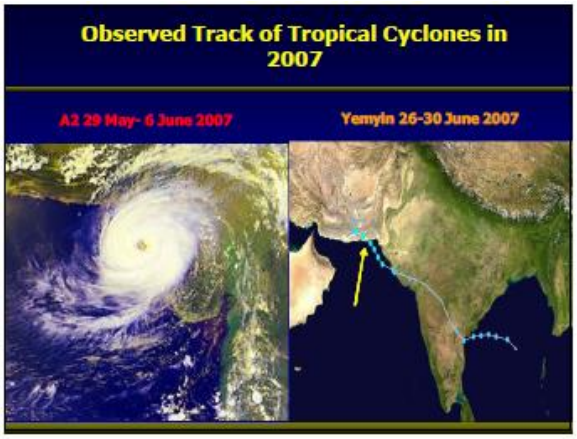

CLIMATE CHANGE & its Impact on REGIONAL SECURITY
Security Interdependence
THREAT
Human Security
Natural Resource Security
Infrastructur Security
Territorial Security
Institutional Security
REGIONAL SECURITY
Maint
Rivers
Partitioned
IWT
Treaty 1
Treaty 2
WATER
FOOD
ENERGY
FLOODS
NEXUS

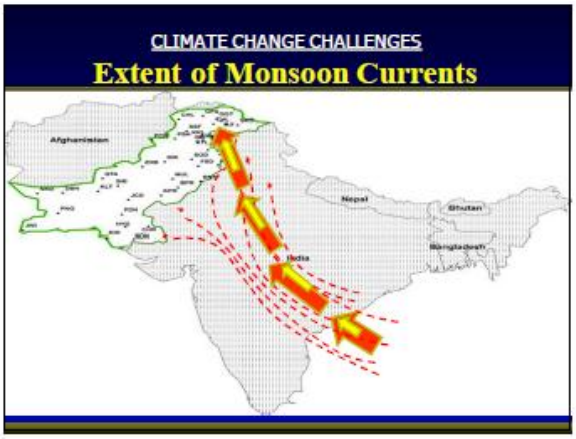

CLIMATE CHANGE ADAPTATION MIGRATION IN SEMI-ARID & MOUNTANEOUS REGIONS
Disaster management
Triple Dividend
Climate adaptation
Sustainable development
GLACIERS
Agriculture
INSTITUTIONS
PEOPLE CENTRIC
GLOF Early Warning Systems
ECO TOURISM ^Coastal ^Mont
COMMUNITY DEVELOPMENT
FOOD & FORESTS
CLEAN DRINKING WATER
ENERGY: Hydel, Wind & Solar
EDUCATION & RESEARCH
NGO:ADAPTATION & /INNOVAT
ION 0 INNOVATION
PRIVATE PUBLIC PARTNERSHIP

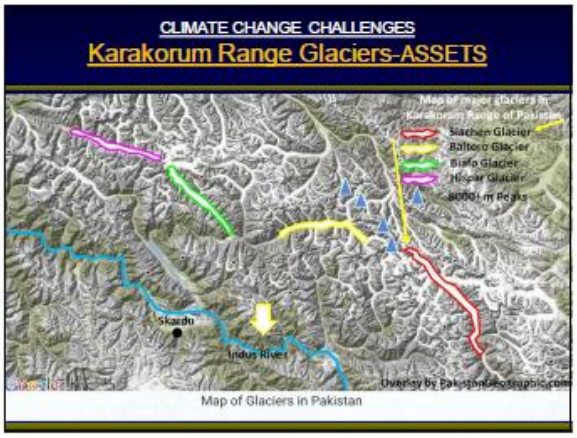

WMO STATEMENT ON GLOBAL CLIMATE 2015
Mean Annual Temperature
Pakistan
(PMD)
Temperature difference (°C) from 1961-1990 average
2011-2014
2001-2010
1991-2000
1971-1990
1951-1970
1931-1950
1911-1930
1850-1910
14 of 15 Hottest Years have been in 21st Century
Rank of hottest years to coldest


Current Level of CO2
(About 2ppm CO2 human-beings are adding to the atmosphere every year)
August 1958 – August 2015
Atmospheric CO2
August CO2 | Year Over Year | Mauna Loa Observatory
Aug. 2015 398.82
Aug. 2014 397.01
Aug. 2013 395.15
Concentration of Atmospheric CO2 (ppm)
CO2Now.org Featuring NOAA-ESRL data of September 7, 2015

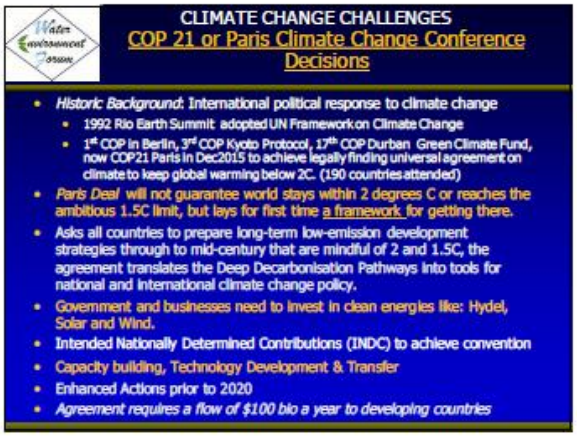

CLIMATE CHANGE CHALLENGES
TROPICAL STORMS increasing in this Century
Frequency of Tropical Storms in Arabian Sea has increased to double than 20th century
No. of Tropl Cyclones

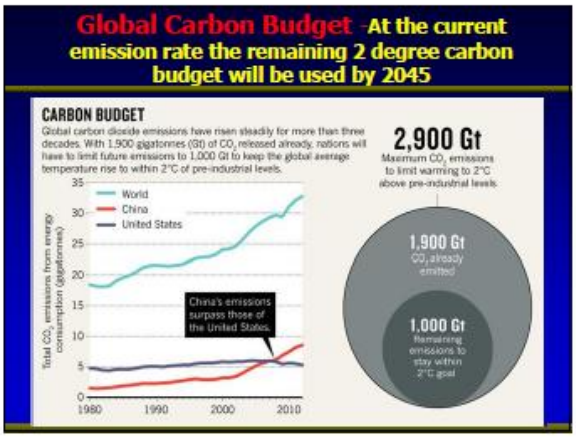

Observed Track of Tropical Cyclones in 2007
A2 29 May- 6 June 2007
Yemyin 26-30 June 2007

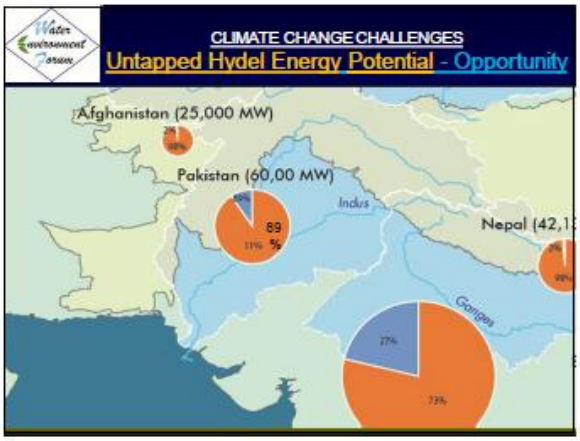

CLIMATE CHANGE CHALLENGES
Extent of Monsoon Currents
Afghanistan
Nepal
Bhutan
India
Bangladesh

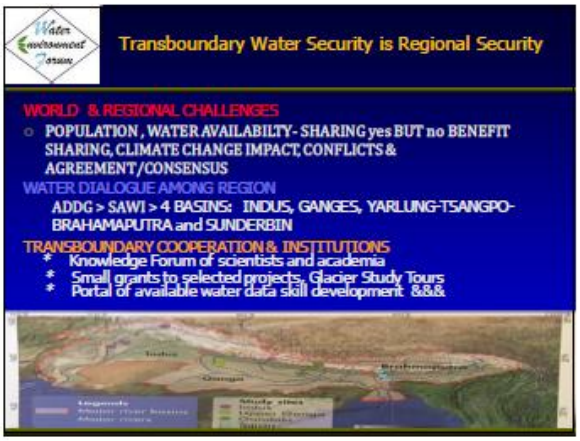

CLIMATE CHANGE CHALLENGES
Karakorum Range Glaciers-ASSETS
Siachen Glacier
Baltoro Glacier
Biafo Glacier
Hispar Glacier
8000+ m Peaks
Skardu
Indus River
Map of Glaciers in Pakistan

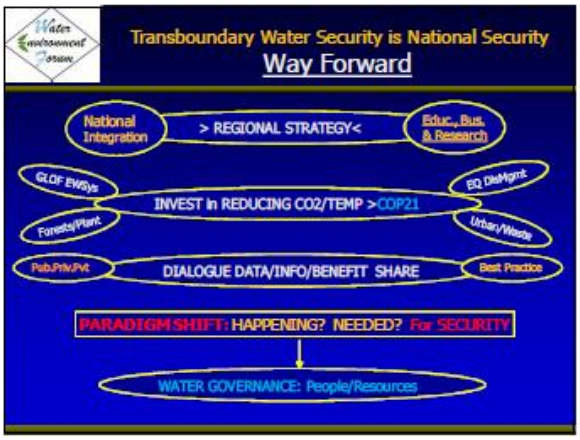

Recurring Floods since 2010
A challenge for sustainable development
Sindh 2010
Sindh 2011
Balochistan 2013
'greatest humanitarian crisis in recent history' UN
Punjab 2014
Chitral 2015


CLIMATE CHANGE CHALLENGES
COP 21 or Paris Climate Change Conference Decisions
Historic Background: International political response to climate change
1992 Rio Earth Summit adopted UN Framework on Climate Change
1st COP in Berlin, 3rd COP Kyoto Protocol, 17th COP Durban Green Climate Fund, now COP21 Paris in Dec2015 to achieve legally binding universal agreement on climate to keep global warming below 2C. (190 countries attended)
Paris Deal will not guarantee world stays within 2 degrees C or reaches the ambitious 1.5C limit, but lays for first time a framework for getting there.
Asks all countries to prepare long-term low-emission development strategies through to mid-century that are mindful of 2 and 1.5C, the agreement translates the Deep Decarbonisation Pathways into tools for national and international climate change policy.
Government and businesses need to invest in clean energies like: Hydel, Solar and Wind.
Intended Nationally Determined Contributions (INDC) to achieve convention
Capacity building, Technology Development & Transfer
Enhanced Actions prior to 2020
Agreement requires a flow of $100 blo a year to developing countries

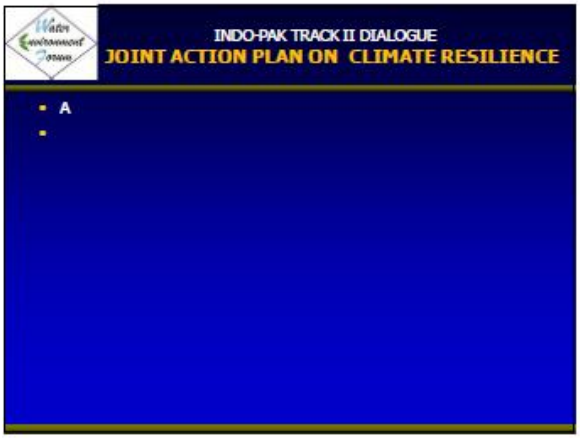

Global Carbon Budget -At the current emission rate the remaining 2 degree carbon budget will be used by 2045
CARBON BUDGET
Global carbon dioxide emissions have risen steadily for more than three decades. With 1,900 gigatonnes (Gt) of CO2 released already, nations will have to limit future emissions to 1,000 Gt to keep the global average temperature rise to within 2°C of pre-industrial levels.
2,900 Gt
Maximum CO2 emissions to limit warming to 2°C above pre-industrial levels
World
China
United States
China's emissions surpass those of the United States
1,900 Gt
CO2 already emitted
1,000 Gt
Remaining emissions to stay within 2°C goal
1980
1990
2000
2010


CLIMATE CHANGE CHALLENGES
Untapped Hydel Energy Potential - Opportunity
Afghanistan (25,000 MW)
Pakistan (60,00 MW)
Indus
Nepal (42,1
89
%
Ganges
27%
73%


Transboundary Water Security is Regional Security
WORLD & REGIONAL CHALLENGES
POPULATION, WATER AVAILABILTY- SHARING yes BUT no BENEFIT SHARING, CLIMATE CHANGE IMPACT, CONFLICTS & AGREEMENT/CONSENSUS
WATER DIALOGUE AMONG REGION
ADDG > SAWI > 4 BASINS: INDUS, GANGES, YARLUNG-TSANGPO-BRAHAMAPUTRA and SUNDERBIN
TRANSBOUNDARY COOPERATION & INSTITUTIONS
Knowledge Forum of scientists and academia
Small grants to selected projects, Glacier Study Tours
Portal of available water data skill development &&&


Transboundary Water Security is National Security
Way Forward
National Integration
> REGIONAL STRATEGY<
Educ., Bus. & Research
GLOF EWSys
EQ DisMgmt
INVEST in REDUCING CO2/TEMP >COP21
Forests/Plant.
Urban/Waste
Pub.Priv.Pvt
DIALOGUE DATA/INFO/BENEFIT SHARE
Best Practice
PARADIGM SHIFT: HAPPENING? NEEDED? For SECURITY
WATER GOVERNANCE: People/Resources


INDO-PAK TRACK II DIALOGUE
SUGGESTED JOINT ACTION PLAN ON CLIMATE RESILIENCE
Coastal Flood Risk Reduction
Changing Ecosystems & Infectious Diseases
Health Care Resilience
Food and Water related threat management
0: Study, Adopt and Implement all previous engagements
1st: Joint Public declaration by governments to face challenges together
2nd: Prioritise water issues & identify joint projects in real time data collection, analysis and result sharing
3rd: Undertake joint environmental studies
4th: Recognize natural concerns of LOWER RIPARIANS within region, countries, states/provinces, districts
5th: Fight Terrorism jointly.
Phase1: India-Pakistan>>>>>> Phase 2: SAARC

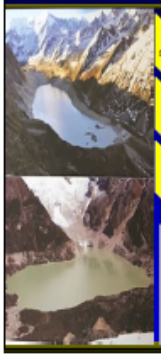

INDO-PAK TRACK II DIALOGUE
JOINT ACTION PLAN ON CLIMATE RESILIENCE
A


THANKS
Silk Route
PMD
Ataabad Lake

Key Findings
From
IPCC's Fifth Assessment Report (2013) for South Asia

1 South Asia's Climate is already changing and the impacts are already being felt	2 Further Climate Change is inevitable in the coming decades	3 Climate Change poses Challenges to growth and development
4 Adaptation will bring immediate benefits and reduce the impacts of Climate Change in South Asia	5 Adaptation is fundamentally about risk management	6 South Asia has many adaptation options
7 Some low-carbon development options will be less costly in the long run and offer new economic opportunities for South Asia	8 South Asia stands to benefit from integrated climate adaptations, mitigation and development approaches	9 International Cooperation is vital to avert dangerous climate change and South Asian governments can promote ambitious global actions

Transboundary Water Security is National Security
Vulnerability to Climate Change



SEA LEVEL
- INTRUSION of SALINE WATER to CULTIVATED LANDS
- AGRICULTURE & FOOD

TEMP
- HUMAN, ANIMAL & PLANT LIFE
- CO2 & DEGRADATION

GLACIER MELT
- GLOF, FLOODS, DROUGHTS
- LIFE, INFRASTRUCTURE

"Key risks for Asia are increased riverine, coastal and urban flooding, leading to widespread damage to infrastructure, livelihoods and settlements *(medium confidence)*, increased risk of heat-related mortality *(high confidence)* and increased risk of drought-related water and food shortage causing malnutrition *(high confidence)*" IPCC

CLIMATE CHANGE CHALLENGES
SDC RECOMMENDATIONS ON CLIMATE CHANGE

- South Asia Environment Outlook (SAEO) 2009 must be taken forward and updated in real time with outcome of COP 21 Paris.
- Technical Committee on Environment should meet to develop short term 2 year, mid term 5 years and long term 10-15 years plan of action on environment.
- Develop SAARC Climate Change Strategy & Plan by integrating strategic plans of member countries. Create SAARC body for its monitoring and implementation.
- SAARC Agreement & Protocol be signed for creation of Meteorological Stations for sharing weather data and Information.
- Regional INDCs be developed and implemented
- GLOF Early Warning Systems installed in SAARC countries must share data and information under a SAARC Environment Portal.
- Share best SAARC Environment Practices through SAARC Portal
- Create SAARC Environment Fund

CLIMATE CHANGE CHALLENGES
SDC RECOMMENDATIONS ON CLIMATE CHANGE

- Develop SAARC Environment Education & Training Program
- Develop public private partnership projects which should be people centric solutions.
- Create SAARC Environment Institute to undertake joint research projects for award of SAARC Ph.D degrees.
- Conference Organizers should form an Environment Group of all 8 countries to develop comprehensive plan for submission to SAARC as way forward on these recommendations and act as Advisory body to SAARC Environment Technical Committee.

Phase1: India-Pakistan>>>>>> Phase 2: SAARC

ADDG ——> SAWI ——> INDUS FORUM EVOLUTION

ABU DHABI DIALOGUE 2006:

Afghanistan, Bangladesh, Bhutan, China, India, Nepal & Pakistan:

Mission: *'continue to build trust and promote cooperation on water resources in the Greater Himalayan region" , and agreed*

Core Function: *to provide advice and support to achieve objectives of SWAI*

SAWI 2009:

SAWI is a regional initiative of the World Bank funded by the Governments of Australia, Norway and the United Kingdom.

Objective: *'to increase regional cooperation in the management of the Himalayan River System to deliver sustainable, fair and inclusive development and climate resilience"*

Achievements:

* Knowledge Forum of scientists and academia
* Small grants to selected projects
* Portal of available water data skill development *(continued)*

ADDG ——> SAWI ——> INDUS FORUM EVOLUTION

SAWI (2009)

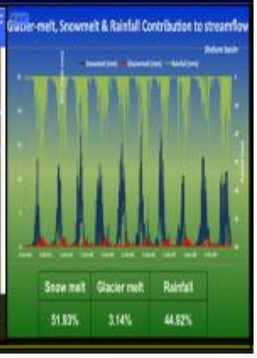
- Basin wide Focus
- 4 Basins are: Indus, Ganges, Yarlung-Tsangpo-Brahamaputra and Sunderbin

INDUS FORUM (2012)

- Objectives: *'To identify strategic opportunities for collaborative actions for on-the-ground results as well as work with national governments in the area of water resource management and transboundary cooperation.'* Achieved so far:
  - Arranged Study our of Glacier Monitoring in Ecuador
  - Formed TASK Force of 4 countries working on specifics & prioritization of activities to improve info sharing and data for decision makers
  - Support in identification of and studies for projects with transboundary
  - > Map Existing Knowledge on Climate Change and Glacier Research
  - > Project Paper Development

CLIMATE CHANGE CHALLENGES
INDIAN PERSPECTIVE

TRANSBOUNDARY WATER ISSUES IN INDUS BASIN: NEED FOR COOPERATION



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Kashmir University

CLIMATE CHANGE CHALLENGES

H2O ISSUES OF COMMON CONCERN

- CLIMATE CHANGE AND ITS IMPACTS
- SHRINKING CRYOSPHERE AND DEPLETING STREAMFLOWS (IF-WB INITIATIVE)
- WATER USE EFFICIENCY
- WATER QUALITY
- DEPLETING GW RESOURCES
- FLOOD VUNERABILITY
- INEFFICIENT DATA SHARING
- ENVIRONMENTAL FLOWS
- CUMULATIVE IMPACTS OF HP PROJECTS
- J&K Concerns

A few Thoughts

- Significant decline in the streamflows since 1990s due to the melting of cryosphere under climate change
- Indian usage of Water on the western rivers as per the entitlement under IWT is under-utilized
- Water use inefficiency, GW over-exploitation, lack of storage capacity.
- Lack of transparent mechanism on data sharing
- REVISTING THE TREATY?
- Water woes of Pakistan have nothing to do with the sharing of waters under IWT
- Water issues if not understood in the right perspective have potential to complicate the relations
- IF-WB initiative on Understanding CC impacts on Cryosphere

- In the long term, there can be no replacement for water provided by the glaciers that could result in water shortages on an unparalleled scale in the region and adversely affect the livelihoods and economy
- The two countries need to cooperate to bridge the gaps in knowledge about the status and health of cryosphere under changing climate in the region. IF-WB initiative is an effort in this direction
- Need to cooperate on monitoring and assessing the development of Glacial lakes in the higher reaches of the Himalaya

PAKISTAN

DEMOGRAPHY

- 6th most populous nation in the world - about 192 million people
- Wide gaps of income distribution - 1/3rd population living in poverty
- Spending on health is less than 1 % of GDP
- Young population : (3rd largest in Asia), 71%< 30 and 33% <15 years
- 30 million internet subscribers; Mobile penetration: over 72%

KEY ECONOMIC INDICATORS

- Largely a domestic economy. Self sufficient in food
- GDP growth FY 14-15 – 4.2% ,
- Sector of GDP – Services:58.8%, Agri: 20.9% & Industries: 20.3%
- Inflation: CPI in FY 2014-15 was 4.5%
- Balance of trade unfavorable mainly due to energy deficit
- Sizeable undocumented economy – about 50% as per Vision 2025
- Record level of inward remittances in FY2014-15: $18.5 billion
- Foreign Exchange Reserves $18.7 billion – *July 2015*
- Fiscal Deficit: FY 14-15 estimate: 3.8%
- Low National Saving: 14.5% of GDP in FY 2014-15

PAKISTAN

INTERNATIONAL

- A vital trading hub for Central Asia and South Asia.
- Relations with India, challenging but improving
- Under pressure due to instability in the region

POLITICAL & ECONOMIC STABILITY

- Despite pressure on stability, state institutions continue to function.
- Security concerns/perception affects business and investment

OUTLOOK

- **Generally positive,** looking forward to improved governance
- Economic growth, currently below potential, will improve as the recently signed China-Pakistan Economic Corridor Project is expected to add US$ 46 billion to the economy in the next 2-3 yrs.
- Business/economic challenges continue
  - **…. but within these challenges lie opportunities**

INTRODUCING WATER ENVIIRONMENT FORUM
WEF, Pakistan

Mission & Objectives

- **Mission:** To acquire, disseminate and manage knowledge, policy making in relation to Pakistan's water resources, contribute to public discourse through a programmatic approach in integrated management of Pakistan's water resources and providing a platform for professionals to come together and take actions to achieve sustainable development of water environment.
- **Key Objectives:**
  - Sustainable Development of water environment and develop solutions through research.
  - Act as think tank in water environment area including climate change and creating public awareness of challenges
  - Networking amongst water environment community in country, region, world
  - Provide services and consultancy in skill development, arrange workshops, seminars and conferences at national, regional and international level.
  - Support food security efforts by preserving glaciers and increasing water availability

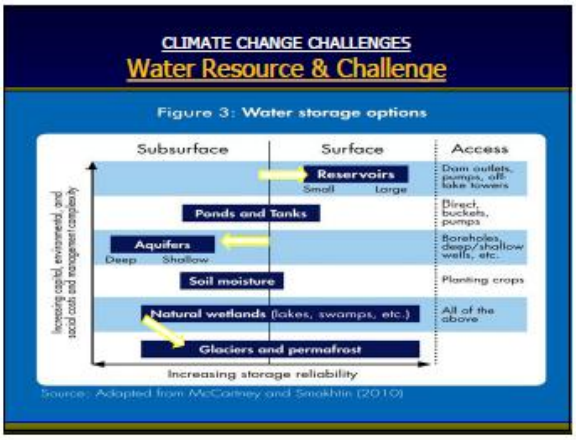
CLIMATE CHANGE CHALLENGES
WATER ENVIIRONMENT FORUM (WEF), Pakistan
ACTIONS .....

CLIMATE CHANGE CHALLENGES CAMPAIGN / DIALOGUE

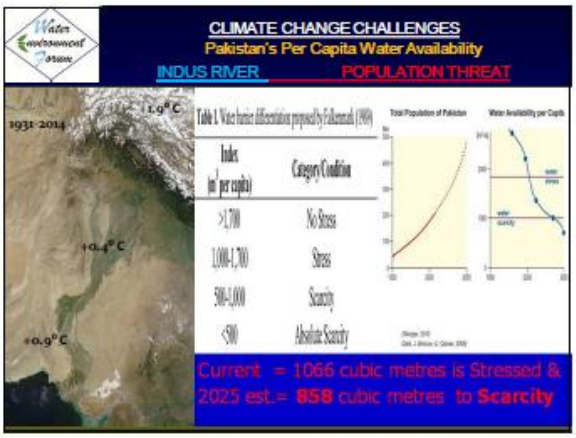
- 1st Karakorum International University, Gilgit
  - Early Warning System Inaugurated By PMD at Bagrot, Gilgit
- 2nd Agriculture University of Peshawar
  - Climate Change Centre & Inter Cooperation
  - Chitral Community Dialogue & Visit this month
- 3rd University of Agriculture, Centre of Excellence, Faisalabad
- 4th MUET, Centers for Advanced Studies in Water, Jamshoro
- 5th Balochistan
- 6th AJK and now 7th FAST NUCES
- Rotary Clubs: Islamabad & Karachi
- Chambers: OICCI

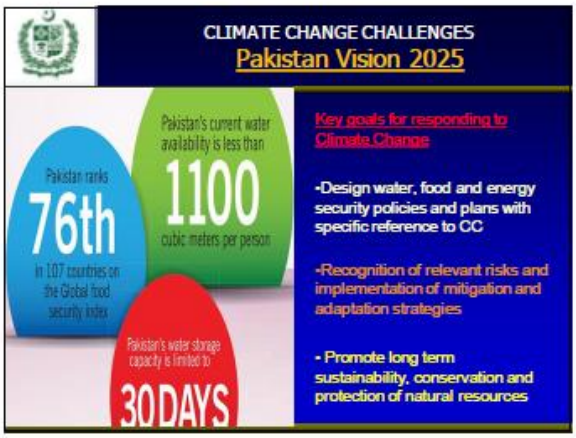
***** WEF CONFERENCE, Islamabad 17-20 Oct 2016 *****

>>Universities >> Colleges >> Schools >> Public >> Media


CLIMATE CHANGE CHALLENGES
Water Resource & Challenge
Figure 3: Water storage options
Subsurface
Surface
Access
Reservoirs
Small
Large
Dam outlets, pumps, off-lake towers
Ponds and Tanks
Direct, buckets, pumps
Aquifers
Deep
Shallow
Boreholes, deep/shallow wells, etc.
Soil moisture
Planting crops
Natural wetlands (lakes, swamps, etc.)
All of the above
Glaciers and permafrost
Increasing storage reliability
Source: Adapted from McCartney and Smakhtin (2010)


Climate Smart Solutions
Security & Private Sector Technology Investments
Innovativeness – CC Institute
SOLAR
WATER
ECO CITIES
Leaf powerd Dishwasher
Warka Water Tower
Tianjin China
GLOF WARNINGS
CO2
Switch gears, Trash to Gold, Smart Grids, Kirbati Island Relocation- BEST PRACTICES


CLIMATE CHANGE CHALLENGES
Pakistan's Per Capita Water Availability
INDUS RIVER
POPULATION THREAT
1931-2014
1.9°C
+0.4°C
+0.9°C
Table 1. Water barrier differentiation proposed by Falkenmark (1989)
Index
Category/Condition
>1,700
No Stress
1,000-1,700
Stress
500-1,000
Scarcity
<500
Absolute Scarcity
Total Population of Pakistan
Water Availability per Capita
Current = 1066 cubic metres is Stressed &
2025 est.= 858 cubic metres to Scarcity


CLIMATE CHANGE CHALLENGES
Pakistan Vision 2025
Pakistan ranks
76th
in 107 countries on the Global food security index
Pakistan's current water availability is less than
1100
cubic meters per person
Pakistan's water storage capacity is limited to
30 DAYS
Key goals for responding to Climate Change
•Design water, food and energy security policies and plans with specific reference to CC
•Recognition of relevant risks and implementation of mitigation and adaptation strategies
• Promote long term sustainability, conservation and protection of natural resources

The Climate Challenge

- IPCC AR5 - 0.85 deg C warming between 1850 - 2012
- Available budget for limiting temperature increase below 2 deg with 66% probability is 3760 GtCO2, of which 1890 has been used by 2011.
- Assuming emission stabilize at 2010 levels, the available budget will be consumed within 40 years.
- Limiting the increase to below 2 deg implies peaking of global emissions between 2015 - 2020 and sharp decline thereafter.
- The remaining carbon budget is smaller if we want to ensure higher probability of limiting the increase in temperature to below 2 deg C.
- Estimated global reductions by 2030 under strong 2 deg path is about 26% below 1990.

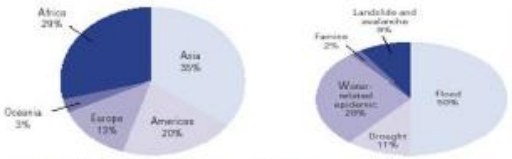
South Asia - the development Challenge

- Countries fall in lower middle income (Bhutan, India, Pakistan, and Sri lanka), LDCs (Bangladesh and Nepal) and lower income group (Afghanistan, Myanmar).(lower middle income country - per GDP less than USD 4000; low income country - per capita income below USD 1000)
- South Asia is the poorest region in the world.
- Region accounts for **1.7** billion population, of which about **1.25** is in India.
- 51% of the world's poor live in South Asia (compared to 29% in Sub-Saharan Africa), as per Multi-dimensional Poverty Index (MPI).
- The study also found there are more poor people in eight Indian states than in the 26 poorest African countries.
- The HDI index of South Asia is **0.558** - low human development and medium human development group.
- **HDI index of south Asia is just above that for sub-Saharan Africa.**

Physical Features

- South Asia houses some of the world's largest river systems
- Fresh water: Most important natural resource shared between nations
- Significant variation in spatial and temporal distribution of rainfall

Type & Distribution of water-related natural disasters, 1990-2001



More than 2,200 major and minor water-related disasters occurred in the world between 1990 and 2001. Asia and Africa were the most affected continents, with floods accounting for half of these disasters.

Water crisis: A reality

- Water scarcity can be defined as the non-availability of required amount of water at the right time and right place for human and environmental use.
- We live on a water planet on which 99 per cent of the water resources are either saline or frozen.
- South Asian's if gets physically scarce, may lead to conflicts in the region.
- Water is an essential component of environment that helps organisms to sustain life.
- In South Asia, the depletion of water resources has become a looming crisis. This may have resulted partly from the climate change, and partly owing to mismanagement of water resources by the countries concerned.

Implication for South Asia

- Climate change in South Asia is expected to lead to significant variations in precipitation patterns, increased incidence of severe weather events, higher temperatures, and sea-level rise in many highly populated coastal regions.
- These changes will negatively impact agricultural yields, biodiversity, forest harvests, and availability of clean water.
- The region is increasingly subject to floods and susceptible to stronger tropical cyclones and storm surges. Extreme weather events are expected to increase in intensity and frequency, causing extensive damage to property, productive assets, human life, and livelihoods.

Water is necessary...

Adaptation to Climate Change: Water Resources

- In South Asia the impacts of changes in climate on water resources are minor compared to the problems being faced already with the present climate variability.
- Coping for present day climate variability' already takes us a long way down the road towards adapting for climate change.
- Scarcity is influenced by factors at global level (climate change), regional level (land-use change), river basin level (water resource management) and household level (access to water).
- Adaptation strategies in the water include
  - Water exploitation methods
  - Water storage methods +rain harvesting
  - Water management and planning

Transboundary water resources management

- Issues in the common river Basins can be divided into three broad categories:
  - sharing of river waters
  - cooperative development of water resources
  - sharing of data and information on common rivers to facilitate flood forecasting and water quality control
- Conflicting interests must be resolved by the integrated approach towards the management of trans boundary water resources

Future Impacts

- Warming would be significant in Himalayan Highlands including the Tibetan Plateau and arid regions of Asia (IPCC 2007)
- Increase in occurrence of extreme weather events is projected in South Asia (Lal 2003)
- Inter-annual variability of daily precipitation would increase in the Asian summer monsoon (Lal et al. 2000; Giorgi and Bi 2005).
- By 2050, the annual runoff in the Brahmaputra is projected to decline by 14 percent and the Indus by 27 percent (IPCC 2001).

Impact on Water...!

The key challenge would be to balance variable water supplies with accelerating water demands.

Water Resources in South Asia: Climate-change issue and Priority Areas

Country	Climate-change Priorities	Scale and Magnitude	Priority Focus Areas
Afghanistan	Glacier melting in the Himalayas	Regional	Himalayan Hindu Kush
	Lake outburst	Local to national	Hill and mountain areas
	Floods and droughts	National to regional	Helmand and Kabul basins
Bangladesh	Floods	National to regional	Ganges, Brahmaputra, Meghna basins
	Increase in natural disasters	National to regional	Coastal zones
	Saltwater intrusion	Local	Coastal zones
Bhutan	Glacier melting in the Himalayas	Regional	Himalayan Hindu Kush
	Lake outburst	Local to national	Hill and mountain areas
	Floods	National to regional	Ganges tributary basins
	Droughts	Local to national	Throughout

Contd....

Water Resources in South Asia: Climate-change issue and Priority Areas

Country	Climate-change Priorities	Scale and Magnitude	Priority Focus Areas
India	Glacier melting in the Himalayas	Regional	Himalayan Hindu Kush
	Floods	National to regional	Ganges, Brahmaputra, Meghna basins
	Droughts	Local to national	Throughout
	Increase in natural disasters (cyclones)	National to regional	Coastal zones
	Saltwater intrusion	Local	Coastal zones
Maldives	Increase in natural disasters (cyclones and sea-level surges); loss and land mass	Local to national	Himalayan Hindu Kush
Nepal	Glacier melting in the Himalayas	Regional and national	Himalayan Hindu Kush
	Lake outburst	Local to national	Hill and mountain areas
	Floods	National to regional	Ganges tributary basins
	Droughts	Local to national	Throughout
	Saltwater intrusion	Local to provisional	Coastline
	Wetland desiccation and degradation	Local to national	The Ramsar Sites

Contd....

Water Resources in South Asia: Climate-change issue and Priority Areas

Country	Climate-change Priorities	Scale and Magnitude	Priority Focus Areas
Pakistan	Glacier melting in the Himalayas	Regional	Himalayan Hindu Kush
	Increased water scarcity and droughts	Local to national	Indus basin
	Saltwater intrusion	Local	Coastal zones
Sri Lanka	Increase in natural disasters (cyclones and sea-level surges)	Local to national	Coastal zones

Source: SARSDD 2009

Agriculture and Food Security

- The changing hydrological characteristics of the extreme events will affect agricultural production
- Sea-level rise would trigger inundation and changes in the sediment balance and salinity profile of coastal areas
- The Terrai plains, which constitute 43% of the total cultivated land, would be severely impacted by recurring natural disasters.
- The economy of South Asia where agriculture employs 65% of the population will be badly hit
- Sri Lanka's rice output would be reduced by 5.91% with a temperature increase of 0.5°C.

What needs to be done

- Widening the knowledge base in terms of technology and best practices
- Integrated water resource management
- Conjunctive use and management of surface and groundwater
- The use of indigenous knowledge for water management
- Risk Management capacity should be enhanced
- Improving Governance and facilitating Finance

Rainwater Harvesting

- Broadly defined as the method of concentrating, diverting, collecting, storing, and utilizing and managing runoff for productive use.
- One of the approaches to integrated land and water management, which could contribute to recovery of agricultural production in dry area as well as provide water for sustainable development.
- Runoff is collected mainly from roof-tops, ground catchments as well as ephemeral streams (flood water harvesting), and road/footpath drainage.
- Different structures are used for storage - tanks, reservoirs, dams, water pans, etc.

Drought mitigation strategies for Irrigation Systems

- Irrigation agencies need a formal water allocation policy that includes contingency plans for different degrees of water shortage
- Allocation rules under both normal and drought conditions should be understood and accepted by farmers- water users
- Under water-short conditions, allocation decisions should be made at basin and system levels rather than at local distribution system levels
- To make systems less vulnerable to drought, irrigation planning must take into consideration changes in the catchment area. Up-to-date data should be used to capture development-related changes in the watershed and climate changes

Drought Mitigation strategies for Irrigation Systems

- Early warning systems that monitor changing conditions and trigger contingency plans at the first sign of water shortage offer water managers and farmers the best chance of avoiding crop failure
- Water saving techniques, such as precision irrigation, zero tillage, raised bed planting and laser leveling of fields, can help farmers make the best use of scarce supplies and improve the productivity of water, even under normal conditions

Drought and Agriculture

- Development, operation and maintenance of a regional drought and flood monitoring and assessment system (s) and associated tools, methods, databases and models;
- Research on droughts and floods as related to agriculture and the environment, with a special view to improving the capacity of natural resources managers to deal with droughts and floods
- Capacity building and advice on drought and flood monitoring and assessment, and their impact on agriculture and environment, for the countries in the region
- Dissemination of information on droughts and floods and the accuracy of drought prediction in terms of time and space

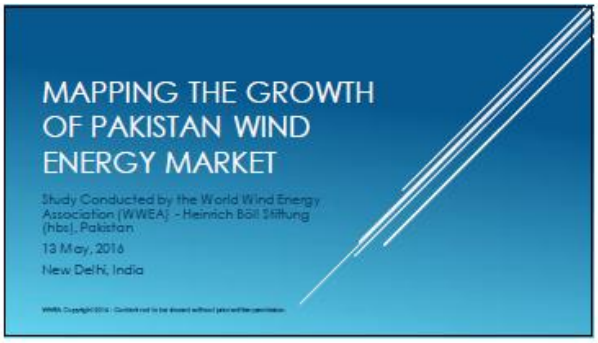
Conclusions: How to mitigate Droughts

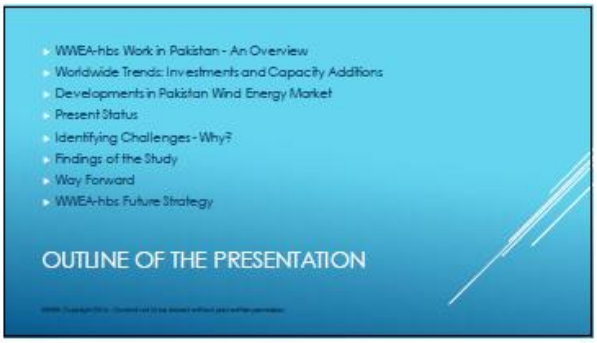
- Drought is the serous issue for whole Asia and particularly for the South Asia
- Most effective means of coping drought are water conservation and water productivity improvements at the different levels
- Institutional aspects of coping with drought in irrigated areas: new water institutions at different levels

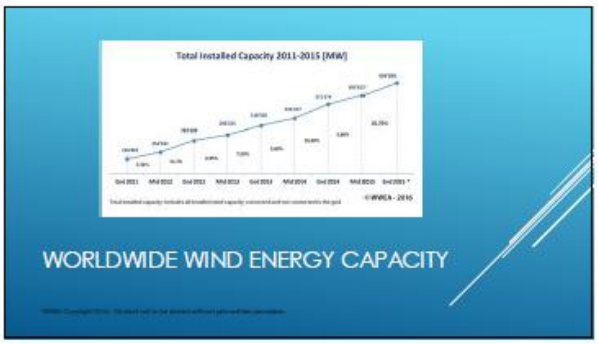
Lot more needs to be done!

Thank you!

Mapping the growth of Pakistan wind energy market







Project Name	Installed Capacity (MW)	Expected COD Achieved
Yunus Energy Limited	50	August 2018
Rachel Energy Development Pvt. Limited	49.9	June 2018
Metro Power Company Limited	50	August 2018
Tapal Wind Energy Pvt. Limited	50	June 2018
United Energy Pakistan Pvt. Limited	50	September 2018
Hydro China Dawood Power Pvt. Limited	49.9	September 2018
Master Wind Energy Limited	49.9	September 2018
Tenaga Generasi Limited	49.9	September 2018
Dut Ahmed Wind Power Ltd	50	September 2018
Total Commissioned Project capacity	477	

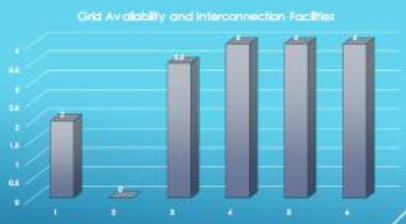
PRESENT STATUS

- Learning curve: What do the trends tell us?
- Diagnosis process
- Participatory policy-making
- Whose job?

IDENTIFYING CHALLENGES - WHY?

- Methodology
- Barriers Identification
- List of Barriers
  - Grid Availability and Interconnection Facilities
  - Operational Efficiency of Government Agencies
  - Regulatory and Policy Framework Decisions
  - Availability of Finance
- Relative Comparison

FINDINGS OF THE STUDY



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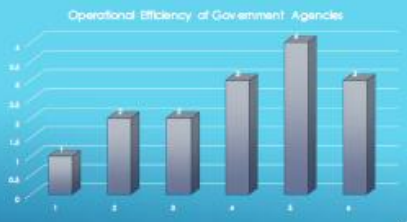

FINDINGS OF THE STUDY

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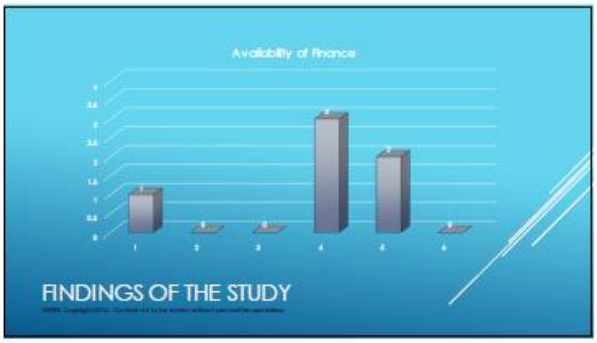
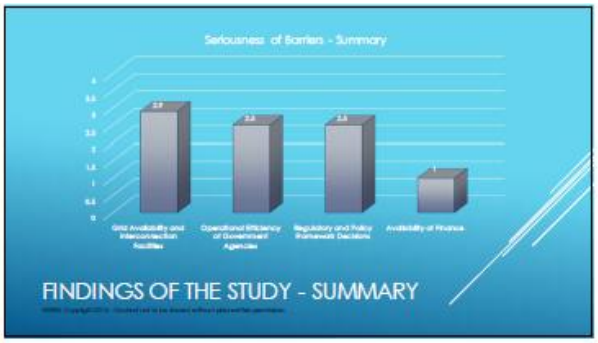

Availability of Finance
FINDINGS OF THE STUDY


Seriousness of Barriers - Summary
FINDINGS OF THE STUDY - SUMMARY


Grid Connectivity
Financing
Soil Conditions
Costs and Baseload
Higher Cost of Renewables
Intermittent Behavior
PUBLIC SECTOR RESPONSES


Capacity Development Needs
Ability to effectively manage high level of RE integration
Better understanding for RE costs and tariff determination
Financial modelling techniques for better financial close
CAPACITY BUILDING


On-going Project
Capacity Development Workshop
Continuous Support
Joining Hands with Other Stakeholders
WWEA-HBS FUTURE STRATEGY


Details about Partners:
http://www.wwindea.org/
https://pk.boell.org/
THANKS FOR YOUR ATTENTION!

Engaging Communities in Low Carbon Development

Development Alternatives

Rowena Mathew
Manager, Development Alternatives

Context and Need

- India's current electricity mix (current capacity: 229 GW)
  - Coal: 59%
  - Hydroelectricity: 17%
  - Renewable energy sources: 12%
  - Others: 12%
- 80 million households in India lack electricity access, of which 75 million are in rural areas
- Decentralized renewable energy could be part of the solution: addresses energy access and local low-carbon development

Low-Carbon Local Development

- TARA*urja* – an energy service business of DA –provides **access to renewable, reliable source of electricity** for the local communities, enterprises and institutions
- **Livelihood and income generation opportunities enhanced** for existing enterprises by providing RE based electricity (conversion from diesel) & supporting the expansion of enterprises
- **New micro-enterprises set-up** for increasing load utilisation, creating more green jobs – thereby fostering local economic development
- **Components include:** local economic development (existing & new enterprises), social inclusion (women based enterprises etc.) & basic needs fulfilment, agri extension services and social marketing

Solar Energy Village – *'Hamari Urja'*

- Intervention to provide **access to renewable, reliable and affordable source of electricity** for the local communities and schools
- **Livelihood and income generation opportunities** also created through enhanced irrigation facilities using solar energy based technologies
- **Decentralized village based approach** – ensuring sustainability through community involvement and engagement
- **Expected Outcomes:**
  - Adoption of RE based village electrification solutions
  - Enhancement in irrigated land area, agriculture yield
  - Increased income level of the farmers

Village Enterprise Zones

- VEZs concept – a **comprehensive response to the energy needs**, with an objective of providing reliable, affordable and clean electricity; thereby improving the quality of life, enhancing livelihood security and driving local economic development
- **Setting up systems for energy infrastructure and service delivery** – through establishment of a renewable energy based "Village Enterprise Zone (VEZ)" – that will power enterprises and electrify households serving a primary village and smaller hamlets in the catchment area
- **Carrying out Integrated Community Development** – through initiatives in the areas of Basic Needs Fulfilment, Employability and Institutional Strengthening

Current status

39 villages / hamlets reached

86 acres land converted from diesel to solar (irrigation pumps)

1050* households– livelihoods enhanced

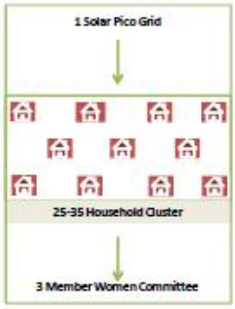
5,800* lives impacted so far!

95% revenue collection from 37/39 villages / hamlets

100% households covered in 15 villages / hamlets through solar based electricity

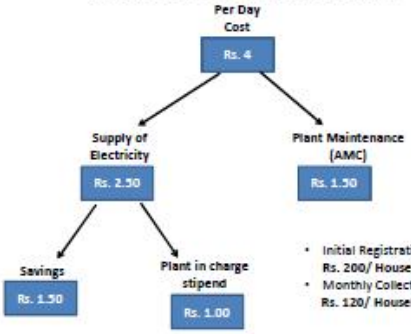
Cluster Management

- 1 Cluster (1 Pico-Grid) = 25-35 HH → 3 women member committee (*Hamari Urja Samiti*)
- 1 Women = 10 Households (in-charge of 10 HH)
- **OPTIONAL:** Appoint / nominate Plant in Charge (PIC)
- Technical Support: AMC
- Battery replacement (reqd. after 3 years) resp. with cluster



- Monthly Payment Collection
- Regular Plant Maintenance
- Small Repairs
- Maintaining Log Book
- Managing Bank Account
- Transfer AMC Money (Monthly)

Revenue System (per Household)



- Initial Registration charge: Rs. 200/ Household
- Monthly Collection – Rs. 120/ Household

Livelihood created for a youth

- **Name:** Vijay (Grid Maintenance In-charge)
- **Village:** Khajra Bujurg (Hamlet Chandranagar)
- Pursuing B.Sc. in Forensic Sciences from Bundelkhand University, Vijay saw an opportunity for livelihood and income enhancement as a Grid Maintenance in-charge in the Hamari Urja intervention. His journey started when TARA began the community mobilisation processes in neighbouring villages and Vijay, owing to his dynamism got associated with the processes. Upon his insistance and demand generated from his village community members, TARA installed a grid in his village too.
- His passion got noticed by the solar panels equipment vendor too, who then trained him and offered the **job of a Grid Maintenance in-charge for all the 20 pico-grids.** His selection was also the result of the highest score he achieved amongst 20 other candidates on a test, conducted by the vendor. **Today he earns Rs. 8500 per quarter as the overall in-charge and Rs. 780 per month for revenue collection** from the Mahila Urja Samiti of his village.

"With electricity in my village and the livelihood opportunity that I have got, my respect in the society has increased multi-fold. Other youth in the village have started seeing me as an ideal. I feel so much more empowered and foresee a new career opportunity that has emerged for me, as I have learnt a new technique of managing grids in rural areas."

Conversion of an Existing DGO

- **Name:** Manoj Kumar Shah (DGO turned REO)
- **Village:** Katsa, Bihar
- 10kWp solar plant plus distribution network worth 20.5L INR
  - Subsidy – 9L INR
  - Loan – 9L INR
  - Own investment – 2.5L INR

Diesel GenSet Operator	Renewable Energy Operator
60 Customers served mostly with lighting loads	60 Customers served with 8-10 enterprises
3 hours of daily service	3-10 hours of daily service depending on type of loads
120 litres of diesel consumption	30 units of electricity produced daily
Rs. 26,000 spent on diesel and maintenance	Rs. 25,000 spent on EMI
Owner of diesel generator	Owner of 10KWp solar power plant

Hamari Urja – Video

1. Local Economic Development

1 Water Purification (RO) Unit Launched at Shivpura, TU UP

Operating Details: RO filtration Unit

- **Owner** – 1
- **Motor size** – 4 HP (2.5 KW)
- **Per hour consumption** – 3-3.5 units
- **Total running time** – 3.5-4 hrs.
- **TARAurja tariff** – INR 18/Unit
- **Market demand** – 240 bottles/day (15ltr each)
- **Production** – 100 bottles/day (15ltr. each)
- **Sales** – INR 30 per bottle or INR 3000 per day
- **Operating cost** – INR 700 per day (approx.)
  - **Per day energy cost** – INR 165-180
  - **Per day labour cost** – INR 250
  - **Per day transportation cost** – INR 200-250
  - **Per day misc.** – INR 20-35
- **Estimated Profit** – INR 57,500 per month (approx.)

Total Investment: INR 2,80,000 approx.
Project Support: INR 44,000
Entrepreneur's Investment: INR 2,36,000
(Technology Package – Rs.175000 + Rs. 7000 Boring Motor; Water Tanks – Rs.25000 (1000 ltr & 2000 ltr.); Ground Boring – Rs. 20000; Construction Work – Rs. 25000; Bottles – 300*100 = Rs. 30000)

EXPECTED BREAK-EVEN TERM: 5 MONTHS

2. Social Inclusion & Basic Needs Fulfilment

Namkeen Making Unit Launched at Kataliya, TU UP

Operating Details: *Namkeen* Making Unit

- Motor size: 2 HP (1.7-2 KW)
- Owners – 2 (women)
- Per Hour consumption – 2-2.5 Units
- Total running time (per day) – 6-7 hrs
- TARAurja tariff – INR 18/Unit
- Market Demand – 150-175 Kg/day
- Production – 10 kgs/hr or 70 kgs/day
- Sales – INR 4900/day @INR 70/kg
- Operating costs –
  - Labour cost/day – INR 250
  - Per day raw material cost (for 70kg) – INR 2500
  - Energy costs – INR 300/day (approx.)
  - Per day misc. – INR 100
- Estimated Profit – INR 43,750 per month (approx.)

Total Investment: INR 1,20,000 approx.
Project Support: INR 84,000
Entrepreneur's Investment: INR 36,000
(Technology Package – Rs.84000; Basic Infrastructure – Rs.25000; Packaging Machine – Rs.3000; Utensils – 5000)

EXPECTED BREAK-EVEN TERM: 4 MONTHS

2. Social Inclusion & Basic Needs Fulfilment cont...

Paper Plate Making Unit Launched at Madhopur, TU Bihar

Operating Details: Paper Plate Making Unit

- Owner – 5 (SHG)
- Motor Size – 1.5 HP (1.125 KW)
- Per hour consumption – 2.75-3 units
- Total running time – 2.5-3 hrs.
- TARAurja tariff – INR 18/Unit
- Market Potential – 40,000 plates per day
- Production – 6,000 plates per day
- Sales – INR 3,000 per day
- Operating Cost – INR 1,700 per day (approx.)
  - Per day energy cost – INR 60-65
  - Per day Raw Material cost – INR 1,500-1,600
  - Per day misc. – INR 20-35
- Estimated Profit – INR 40,000 per month (approx.)

Total Investment: INR 1,15,000 approx.
Project Support: INR 74,000
Entrepreneur's Investment: INR 41,000
(Technology Package – Rs.84000; Basic Infrastructure – Rs.25000)

EXPECTED BREAK-EVEN TERM: 4 MONTHS

3. Agri Productivity & Extension Services

Irrigation Pumps installed across TARAurja UP & Bihar

Operating Details: Irrigation Pumps

- Motor size: 3 HP (1.8-2 KW)
- Per Hour consumption – 2.7-3.0 Units
- Capacity – Summers: 8-10 hrs/day & Winters: 6-7 hrs/day
- Total running time (per day) – 6-7 hrs.
- TARAurja tariff – INR 45/hour
- Sales – INR 600-750/day @INR 100-110/hr
- Land irrigated with 1 pump – 5-6 acres
- Operating costs –
  - Energy costs – INR 275-300/day (approx.)
- Estimated Profit – INR 10,000-12,000 per month (approx.)

Total Investment: INR 40,000 approx.
Project Support: INR 8,000
Entrepreneur's Investment: INR 32,000
(Pump set – INR 14,000; Erection and boring – INR 35,000)

EXPECTED BREAK-EVEN TERM: 5 MONTHS

4. Social Marketing

e-Learning Centre at Shivpura, TARAurja UP

- Model for Centre
- 3 – 4 Hours per day @ INR 18/Unit of electricity
- Required Load – 1 KW
- 4hours/day * 25days = 100 hours per month
- 100 unit * INR18/unit = INR 1800
- Revenue Model
- 10 Students per batch of 1 hour class for 25 days
- Total batches = 2 (20 students)
- Fees / student = INR 450
- Total Income (20 Students) = INR 9000
- TARAurja Electricity Charge = INR 1800
- Trainer Salary (if required to outsource) = INR 5000 - INR6000
- SURPLUS - INR (9000-1800-6000) = INR 1200 per Month

TARAurja – Video

Bundelkhand: Drought prone and water stressed region

Women and girls spend upto 4-5 hours everyday to fetch water from distant sources

In summers, temperatures hovering above 40+C lead to drying up of water sources - water scarcity

This leads to prevalent dehydration , diarrhoea and poor sanitation - severe health ramifications

Villages that use electric or diesel pumps to supply water cannot guarantee regular supply owing to poor grid connectivity and expensive fuel

Green Energy for Drinking Water

- This intervention ensures access to safe drinking water in an environmentally benign manner – through installation of solar pumps
- **Set up of a community owned & managed model** for regular access to safe drinking water through solar water pumping systems
- **Positively influence behaviour change** among communities for safe water use and consumption – awareness campaigns
- **Expected outcomes**
  - Sustainable access to drinking water for the people
  - Increased awareness around safe drinking water and sanitation
  - Reduction in drudgery amongst women

INTERVENTIONS

- Community owned and operated water supply system
  - 1-2 HP solar powered pumps
  - Piped water supply
  - Ground water from a bore well supplied to household and public connections
  - Pay for use model + premium for HH connection
- Behaviour change communication for
  - Clean and responsible water use/consumption
  - Water quality testing

IMPACT

- 550+ families have doorstep service for reliable drinking water in 5 villages
- 9 women and 3 youth engaged in income generation activities
- Women save 4-5 hours per day to engage in household work and productive activities
- Improved quality of life and livelihoods in 5 villages
- Enhanced social capital

THANK YOU

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Planning for Climate Adaptation & Resilience

Experiences in Building capacities for
Strengthening Performance Management in Governance

Indo- Pak Track II dialogue on Climate Resilience

Outline

- Capacity Building Support- Need & Purpose
- SPMG- An Overview
- Project Overview
- Objectives
- Operational Structure
- Conceptual Framework
- Outcomes

Climate Change in MP

- **More than 60% of rural population** is dependent on climate-sensitive sectors for their livelihoods
- **Key Sectors**
  Affected: Agriculture, Forests, Fisheries, Biodiversity, Water, Human Health

Response to Climate Change in MP

- Initiatives to tackle the impacts of climate change in the State
  - EPCO as State Designated Nodal Agency for addressing climate change issues - *Established State Knowledge Management Centre on Climate Change (SKMCCC)*
  - Developed State Action Plan on Climate Change (MP-SAPCC)
  - Inter-departmental Co-ordination Committee - *for reviewing the activities of SKMCCC and the implementation of SAPCC*
  - Project Oversight Committee – *for overseeing the activities of SKMCCC*
  - Formulation of Climate Change Working Groups (CCWGs)
  - Establishment of Climate Change Pulse Centres (CCPC)

State Knowledge Management Centre on Climate Change (SKMCCC)

- Knowledge center within EPCO to cater to the needs of community masses, policy makers, researchers and practitioners.
- Objectives:
  - Create climate change knowledge repository
  - Improve climate change knowledge access and transfer
  - Manage climate change related knowledge as an asset
  - Create awareness and building capacities to promote adaptation and mitigation strategies in development activities

Strengthening Performance Management in Governance (SPMG) - Overview

- Providing financial and technical assistance to Govt of MP
- Interventions at state, department and district level on:
  - Facilitating and operationalizing private sector investments in MP
  - Reforming public finance management
  - Improving public service delivery by strengthening CSO and citizens' role in governance
  - Improving institutional capacity to facilitate environmental sustainability
    - Implementation of action plan on renewable energy
    - Capacity Development of EPCO

Need and Purpose of Technical Support Organization

- Overall direction exists, but support required to develop:
  - Usable data and information systems
  - Monitoring framework to analyse state strategies from climate perspective
  - Local and state level climate change knowledge
  - Modalities on accessing finances from national and international funds
  - Partnerships for knowledge generation and dissemination
  - Convergence strategy with other state departments
- Support provided in the form of capacity building, planning support, knowledge generation and knowledge dissemination

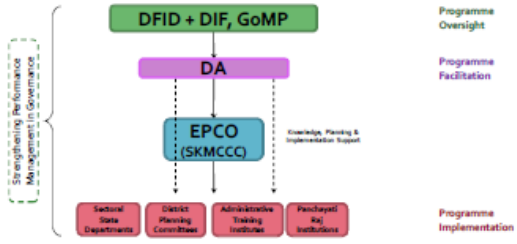
DA as Technical Support Organisation

- Overall Objective: Provide technical support in implementing SAPCC by mainstreaming climate change into GoMP plans and programmes

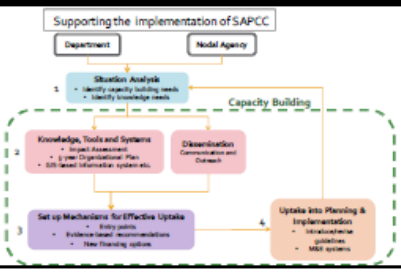
Outcomes

- Defined roadmap for integrating climate change adaptation and mitigation solutions in sectoral strategies
- Enhanced capacities of SKMCCC on implementing SAPCC
- Enhanced capacities of government officials, decision makers and policy makers on climate-integrative planning
- Strengthened knowledge repository on climate change

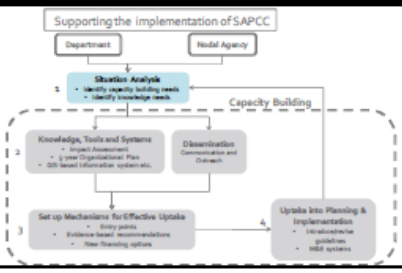
Operational Structure



Conceptual Framework



Conceptual Framework



Situation Analysis

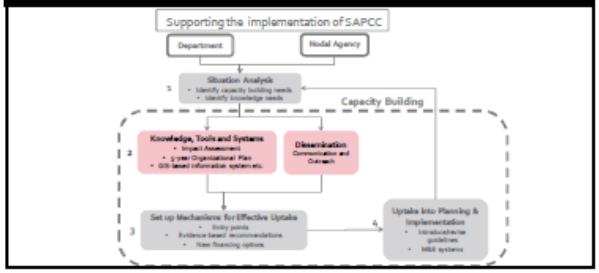
- Participatory and consultative training needs assessment conducted to design capacity building programme

Key Requirements

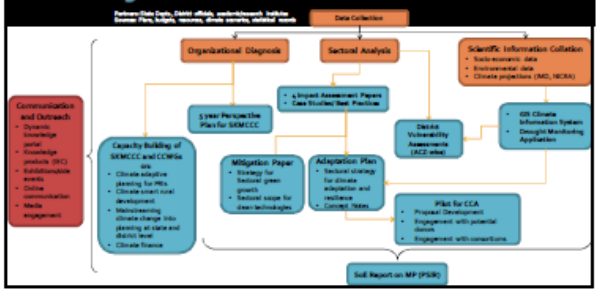
- Usable data and information systems required
- Knowledge and planning support for new project opportunities
- Monitoring and evaluation frameworks required to assess ongoing schemes and activities from climate perspective
- New financial resources/ funds identified to implement strategies of SAPCC

Agriculture	Water	Forests	Urban
Agroforestry/ tree based adaptation strategies for horticulture crops Contingency plans for weather aberrations Adaptation & mitigation opportunities in livestock sector	Groundwater & system management Monitoring systems for droughts and floods Water management systems for water scarce regions	Opportunities for carbon sequestration through forests in MP Adaptation and mitigation potential of bamboo (MP State Bamboo Mission)	Energy saving alternatives Inclusion of alternate products in schedule of rates Resource efficient building materials in municipal construction

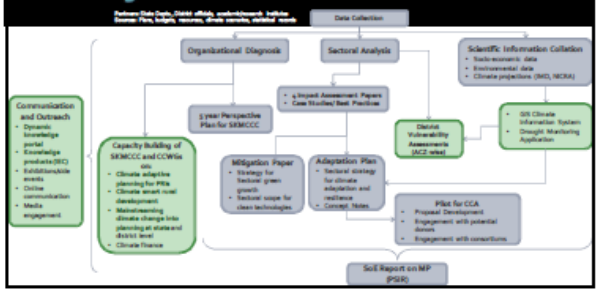
Conceptual Framework



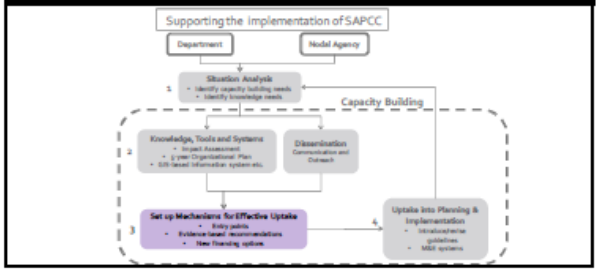
Knowledge Creation and Dissemination



Knowledge Creation and Dissemination



Conceptual Framework



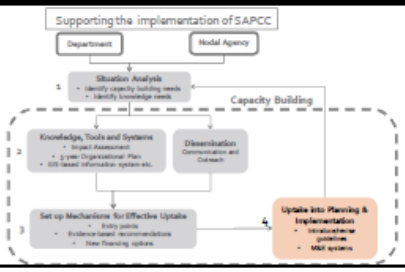
Set Up Mechanisms for Effective Uptake

- **Identify Entry Points**

Agriculture	Water	Forests	Urban
Develop MP Agroforestry Policy Customize existing Agriculture Contingency Plans	Support for WIMI Programme Effective implementation of National Water Mission	Support for Reforestation and Forest Degradation (REDD+) project for earning carbon credits in MP MP State Bamboo Mission	Inclusion of alternate products in schedule of rates

- **Evidence Based Recommendations**
  - Evidences from State of Environment Report, District Vulnerability Assessments, Case Studies, Drought Monitoring Application
- **New Financial Options**
  - International Sources: Green Climate Fund, Adaptation Fund, Multi-lateral & Bi-lateral Donors, Carbon Markets
  - National Sources: National Adaptation Fund, Clean Energy Fund, MoEFCC

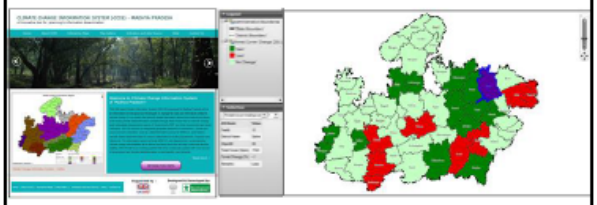
Conceptual Framework



Uptake into Planning and Implementation

Outcome	Indicator
Defined roadmap for integrating climate change adaptation and mitigation solutions in sectoral strategies	• Evidence-based recommendations are integrated into sectoral strategies for 4 sectors in revised SAPCC • Climate-resilient district plans developed and followed in 12 districts • Schedule of rates in urban planning to include clean technologies
Enhanced capacities of government officials, decision makers and policy makers on climate-integrative planning	• 5 districts create climate adaptive plans • 2 projects on climate change adaptation/mitigation are designed and accepted • M&E frameworks are used for effective reporting on ongoing programmes/schemes to MOEFCC
Enhanced capacities of SKMCCC on implementing SAPCC	• 5-year Perspective Plan is followed by SKMCCC • GIS system is updated and managed by SKMCCC staff after project ends • Increased interaction between SKMCCC and CCWGs
Strengthened knowledge data management system on climate change	• Single source climate information system used by state and district officials in decision making • Increased traffic on web portal

Research and Knowledge Generation



GIS-based Climate Change Information System

Research and Knowledge Generation

- **District Vulnerability Assessment** for Tikamgarh
  - Block level analysis
  - Data collection completed; Data analysis in process
- **State of the Environment Report** for Madhya Pradesh
  - PSIR framework of analysis; SoE through climate lens
  - Outline and Indicators finalised; Data collection initiated
- **Drought Monitoring Application**
  - Piloting at ACZ level in Bundelkhand; assess severity of drought in affected areas
  - Advisory partner (IARI) identified

Capacity Building

- **Capacity Building of SKMCCC staff**
  - Week long training session
  - Field visit to Hoshangabad
  - Focus on climate smart rural development

- **Mainstreaming CC into state planning**
  - Recommendations from sectoral experts:
    - **Forests**: Climate change mitigation potential in forests (REDD+)
    - **Agriculture**: Adaptation and mitigation potential in livestock sector
    - **Water Resources**: Managed Aquifer Recharge (MAR) scheme for groundwater recharge in urban and rural areas

Capacity Building

- Module on **"Climate Adaptive Planning"**
  - Target Audience: newly elected PRI representatives
- State Level Training: **"Mainstreaming Climate Change into Urban Planning"**
  - Target Audience: Urban dept. CCWGs
- District Level Training: **"Mainstreaming Climate Change into District Level Planning"**
  - Target Audience: DPCs, Line Depts.

Training Module on Climate Adaptive Planning

Communication and Outreach

SKMCCC Web Knowledge Portal Redesigning

Brochure – SPMG and SKMCCC

Innovations

- **Climate Mainstreaming Package for States:** framework and processes to implement SAPCC at state and district levels
- **Drought Monitoring Application:** guidance document with process and indicators required to pilot application in other ACZs
- **GIS-based Web application:** Climate data in one usable location and format
- Training modules: climate adaptive planning at state, district and PRI levels

Thank You

S. No.	Name	Designation	Organization
1	Chandrashekhar Dasgupta	Distinguished Fellow	TERI
2	Moazzam S Bhatti	Senior Coordinator (Media Advocacy)	SDPI
3	P.G.D Chakraborty	Distinguished Fellow	TERI
4	V.K Sharma (Vinod Sharma)	Vice Chairman	SDMA (Sikkim Disaster Management Authority)
5	Shyam Saran	Chairman	RIS
6	Jitesh Khosla	Former Chief Secretary, Assam	Development Alternatives
7	Vinod C Menon	Former Member	NDMA
8	Lalit Mansingh	Former Foregin Secretary	
9	Harjeet Singh	Internation Climate Policy Manager	Actionaid
10	Ram Kishan	Director	Christian Aid
11	Aditi Kapoor	Board Member	CANSA
12	Sanjay Vashisht	Consultant	HBF India
13	Axel Harniet-Sievers	Director	HBF
14	Sadia Sohail	Coordinator	HBF India
15	Abid Suleri	Executive Director	Sustainable Development Policy Institute(SDPI)
16	Shafqat Kakakhel	Chair of the Board	Sustainable Development Policy Institute(SDPI)
17	Nisar Memon	Senator	Government of Pakistan (PML-Q)
18	Tariq Banuri	Professor	University of Utah
19	Aisha Khan	CEO	Mountain and Glacier Organisation
20	Awais Qasim	MLA	Punjab Assembly,Pakistan (PML-N)
21	Muhammad Zeeshan	Research Analyst	World Wind Energy Association
22	Mome Saleem	Program Coordinator	HBF Pakistan
23	Sarah Weiss	Intern	HBF India
24	Chok Tseing	Program Coordinator	HBF India
25	Swati Vatsayan	Research Assistant	Alternatives Futures
26	Barsha Dutta	Research Assistant	Alternatives Futures
27	Salman Haidar	Former Foregin Secretary	
28	Poonam Dabas	Program Coordinator	DD
29	Kalyani Raj	Member Incharge	AIWC
30	Tariq Karim	Political Counsellor	High Commission for Pakistan
31	Prodipto Ghosh	Distinguished Fellow	TERI

32	Anand Kumar	National Project Manager	UNDP
33	Sarbjit Singh Sahota	Emergency Specialist	UNICEF
34	Anshul Bhamra	Deputy Manager	Development Alternatives
35	Pratibha Caleb	Deputy Manager	Development Alternatives
36	Pravara	Manager	Development Alternatives
37	Rowena	Manager	Development Alternatives
38	Rambha Tripathy	Associate Program Director	Development Alternatives
39	Zeenat Niazi	Vice President	Development Alternatives
40	Rohan Jain	Deputy Manager	Development Alternatives
41	Syed Abdul Aziz	Deputy Manager	Development Alternatives
42	Sonia Cyrus Patel	Deputy Manager	Development Alternatives
43	Ramita Rawat	Assistant Manager	Development Alternatives
44	Abhishek Dubey	Deputy Manager	Development Alternatives
45	Dr. Ashok Khosla	Chairman	Development Alternatives
46	George Varghese	President	Development Alternatives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on
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Energy-Water Resilience and Disaster Risk Reduction


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WWEA-HBS PARTNERSHIP IN PAKISTAN


Conversion of an Existing DGO


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