

## India Water Partnership (IWP)

### **Summary of the Activities undertaken during November & December, 2009**

IWP had undertaken the following activities in the month of November and December, 2009 :

**Activity-1** : Meeting of GWP-SAS with ADB on 2<sup>nd</sup> & 3<sup>rd</sup> November, 2009 at New Delhi

**Activity-2** : 15<sup>th</sup> Regional Council Meeting on 4<sup>th</sup> & 5<sup>th</sup> November, 2009 at New Delhi

**Activity-3** : Round Table Conference on “Water, Livelihood and Adaptation to Climate Change” on 5<sup>th</sup> & 6<sup>th</sup> November, 2009 at New Delhi

**Activity-4** : Brief Summary of the Study on “Water Saving Technologies in Eastern India”

Details of the above activities are given below.

#### **Activity-1 : ADB-GWP Conclave on 2<sup>nd</sup> & 3<sup>rd</sup> November, 2009 at New Delhi**

In continuation of persistent dialogue by GWP, the 2<sup>nd</sup> meeting was held at ADB Delhi office on 2<sup>nd</sup> and 3<sup>rd</sup> of November, 2009.

The ADB team led by Mr. Arjun Thapar, DG/SERD and GWP-SAS team led by Mr. Martin Walshe, Dy Secretary, GWPO held detailed discussions on the various possible areas for ADB's investment in diverse projects across the Asia. They also discussed possible areas of collaboration for executing water related programmes in South Asian region in future. Mr. Suresh Prabhu, Chair, GWP-SAS, Dr. A Perumal, Regional Coordinator, GWP-SAS and Dr. Veena Khanduri, Regional Council Member from India actively participated in the Conclave.

Before the Conclave took place at New Delhi, Dr. Veena Khanduri with the support of Dr. Mercy Dikito, Network Officer, South-East Asia, South Asia & Caribbean summarized all the project proposals of Country Water Partnerships (CWPs) on behalf of GWP-SAS which were finally submitted to ADB for their consideration. During the meeting, Dr. Khanduri briefly mentioned about these proposals which included food security, livelihood, climate change, river basin management etc, that could be funded by the ADB for implementation by the respective CWPs.

The list of these projects are given below :

S.No.	Proposal No. & Title	Countries involved
1.	Regional Proposal No.1 : Improving governance and management of water resources under Climate Change conditions in the Indus basin	India, Nepal, Pakistan & Afghanistan (Can be extended to include China)
2.	Regional Proposal No.2 : Regional Initiative for Meeting Increased Food Grain Demand in South Asia through better Water Management Techniques	Bangladesh, India & Nepal
3.	Country Proposal No.1 : Up-streaming Micro Basin Water Allocation / Management to Basin/Sub Basin Level. (Upper Mahaveli- Area Water Partnership)	Sri Lanka
4.	Regional Proposal No.3 : Institutionalization of the Area Water Partnership (AWP)	Bangladesh, India & Nepal
5.	Regional Proposal No.4 : Regional Cooperation on Adaptation to Climate Variability and Climate Change	Bangladesh, Pakistan, Nepal, India & Sri Lanka
6.	Regional Proposal No.5 : South Asia Network of River Basin Organizations	Sri Lanka, Pakistan, Nepal, Bangladesh & India
7.	Country Proposal No.2 : Dialogues to review and evolve frameworks and mechanisms for Inter-State Trans-boundary Water Distribution and Management	India
8.	Regional Proposal No.6 : Gender and Water Initiative in South Asia	Nepal, India, Pakistan, Sri Lanka & Bhutan

The outcome of the meeting was that the Country Water Partnerships will closely work with the ADB projects in the water sector in their respective countries. ADB will look into those proposals and will associate with the respective CWPs wherever the common interest lies. The ADB and GWP-SAS will associate and complement each other wherever required. It was agreed that the technical support also will be provided by the GWP wherever required.

#### **Activity-2 : 15<sup>th</sup> Regional Council Meeting on 4<sup>th</sup> & 5<sup>th</sup> November, 2009 at New Delhi**

The 15<sup>th</sup> Regional Council (RC) Meeting of GWP-SAS was conducted on November 4 & 5, 2009 at Institute of Studies for Industrial Development, the host institution of India Water Partnership (IWP). The RC meeting was attended by representatives of all the Country Water Partnerships (CWPs) of the GWP-SAS. Two representatives namely ; Dr. Mercy Dikito, Network Officer, South-East Asia, South



Asia & Caribbean and Mr. Martin Walshe, Dy Secretary, GWPO from GWP-SAS also participated in the meeting. The meeting was chaired by Mr. Suresh Prabhu, Chair, GWP-SAS and Prof. S R Hashim, Chair, IWP welcomed the participants.

Dr. A Perumal, Regional Coordinator, GWP-SAS made a brief presentation on GWP-SAS activities and the Work Plan for 2010 during the meeting. Dr. Mercy also made a detailed presentation on major issues like ; (i) GWPO and UNDP cooperation, (ii) strategy update of climate change and GWP, (iii) communication & knowledge sharing function, and (iv) the Agricultural Water Management Solutions Project.



Mr. Martin Walshe highlighted on the role of technical functions of GWPO. He also briefed the Regional Council about the regional activities and prospective collaboration of GWP, ADB and GWP-SAS.

All the RC members and Country Chairs, Country Coordinators and Mr. Martin profusely thanked and appreciated Mr Suresh Prabhu, the Regional Chair for the contribution he has made for South Asia. Special mention was made for his active role in establishing contact with ADB.

The RC recorded the contributions made by the IWP-ISID, Prof. S R Hashim, Chair, IWP, Dr Veena Khanduri, R C Member and Prof. Prem Vashishtha, Hon. Executive Secretary, IWP for successfully organizing the RC and RTC at New Delhi.

Mr Suresh Prabhu, the Regional Chair, GWP-SAS formally invited Mr S M Tariq to take over the Regional Chair and wished him all the best.

### **Activity-3 : Round Table Conference on “Water, Livelihood and Adaptation to Climate Change” on 5<sup>th</sup> & 6<sup>th</sup> November, 2009 at New Delhi**

India Water Partnership with the support of GWP-SAS organized a Two Day Round Table Conference on “Water, Livelihood and Adaptation to Climate Change” on 5<sup>th</sup> & 6<sup>th</sup> November, 2009 at New Delhi. A brief report on the same is hereunder:

#### **Context**

Climate change is arguably the most severe long term threat to development facing present and future generations across the globe. The past 50 years have witnessed unprecedented changes in the eco-system. Climate changes on global and regional scales have already affected natural resource base in diverse eco-systems and environments. It adversely affects not only the living conditions of people who depend upon these eco-systems for their livelihood but also influence the whole socio-economic system at the macro level.

The natural resource base, including land and water, that support and sustain the livelihoods of masses is degrading at accelerated rates. Melting Himalayan glaciers pose a direct threat to the water and food security of 1.6 billion people in South Asia region as per recent estimates of Asian Development Bank (ADB). The situation is likely to worsen in the water scarce regions in terms of severe drought and floods. Such conditions are likely to disrupt the balance in the pattern of water supply and demand for water across agriculture, domestic and industry sectors. This will lead to reduction in the choice of crops and cropping system, posing threats to food security and increasing frequency of water induced disasters. The recent estimates of World Bank (WB) also indicate that the global warming of two degree Celsius above pre-industrial temperature – the minimum the World is likely to experience - could result in permanent reduction in Gross Domestic Product (GDP) of four to five per cent for South Asian region. Hence, region's vulnerability to climate change has extremely serious implications in general and for agriculture in particular in rain fed conditions. In such emerging situation how are the livelihood opportunities going to be affected in the region? Keeping this in view, it is essential to understand the implication of changes at both micro and macro levels and find out the possible solutions which would help in policy formulation for adaptation to climate change in context of water.

In order to cope-up with these challenges, it is necessary to take a different perspective on water resource management to make multiple gains in ensuring food security, reducing poverty, creating opportunity for livelihood diversification, conserving eco-system integrity and creating resilience to climate change. To deal with the crisis of climate change; various initiatives are being taken at community as well as state level to enhance the viability of social and economic activities and to reduce their vulnerability to climate, including its current variability and extreme events and longer-term climate change. These initiatives may be institutional reform, choice of options, and adoption of innovative technology in managing water resource in a sustainable manner.

Hence, realizing these challenges which are already a priority subject in Global Water Partnership-South Asia (GWP-SAS) Strategy 2009-13 under Goal-2 that addresses critical development challenges and focuses on contributing to and advocating solutions for critical challenges to the water security such as climate, growing urbanization and food production, resource related conflict and other challenges as they emerge, the theme concept of the Conference was formulated.

## The Round Table Conference (RTC)

With the above background, India Water Partnership (IWP) in collaboration with Global Water Partnership, South Asia (GWP-SAS) organized a two day **Round Table Conference (RTC)** on “**Water, Livelihood and Adaptation to Climate Change**” on 5<sup>th</sup> & 6<sup>th</sup> November, 2009 at Institute of Studies in Industrial Development (ISID), New Delhi which is the current Host Institution of IWP.

RTC envisaged sharing the rich experiences from different parts of the South Asian Region with a view to :

- Identify diverse nature of priority areas in each country ;
- bring out the socio-economic-politico constraints to handle the challenges thrown up by the experience of each South Asian country ;
- highlight the success and failure stories in taking up the adaptation measures to the poor in diverse settings and provide lessons from these experiments ;
- draw attention to the fact that every implementation strategy would demand certain level of investment, private as well as public. How are we going to mobilize these resources, particularly for maintaining food security in the Region ?
- highlight that the sharing of river water/basins is as critical within the country as between the countries. What is the mode to enhance cooperation at different levels under the federal and non-federal structures ? and ,
- focus attention on the dire necessity for developing and seeking consensus on the means and measures to move ahead with the adaptation strategy which accommodates divergent interest groups and takes the Region ahead. What kind of minimum common strategy is needed that incorporates technical and financial inputs and also enlists community and state support ? What are the common priorities in the adaptation strategy acceptable to all the countries in the Region ? How do we go about it to make it functional ?

The Conference was well attended with due participation of climate change experts/ eminent scientists and scholars from South Asian countries namely; Pakistan, India, Sri Lanka, Nepal, Bangladesh & Bhutan. Besides this, officials of Global Water Partnership Office (GWPO), Sweden were also present during the deliberations. In all, there were 60 participants in the Conference.



Prof. S R Hashim welcoming the participants of RTC

The conference commenced with the Welcome Address by Prof. S R Hashim, Chair, IWP which was followed by the Keynote Address by Prof. Y K Alagh, Chairman, IRMA & Former Minister of Power and Science & Technology, Govt. of India.



Mr. Suresh Prabhu addressing the participants

The Inaugural Session was Chaired by Mr. Suresh Prabhu, Chair, GWP-SAS. The Welcome address as well as the Keynote raised the issue of new paradigm in water sector in context to India.

The Keynote address mainly focused on land and water resource management efforts which indicates that there is an intimate relationship between cropping intensity, land use and water development. The economic interest in land and water has to be at the heart of reform process for adaptation to climate change.



Prof. Y K Alagh receiving the Bookie from Dr. Veena Khanduri, RC Member, India prior to Keynote Address

A total of 17 presentations were made during the four Technical Sessions. Brief details of each session are given below :

<p><b>Technical Session - 1</b></p> <p><b>Climate Change and Impact on Water Resources : South Asian Perspective</b></p> <p><i>Five speakers made presentation in this session. All speakers suggested that there is an urgent need to link the "Science" behind climate change and how it impacts the lives of poor, vulnerable and socially excluded population. This session was Chaired by Sardar Muhammad Tariq, Chair, Pakistan Water Partnership.</i></p>
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All presentations affirmed that climate change is a reality and has been happening with or without our knowing from time immemorial. However, of late the impacts of climate change has been manifested in form of rising temperature, glacier melts, floods, landslides, drought, scanty rainfall, rise in sea levels, threatening floods and water intensity, epidemics and its effects on the eco-systems.

Two of the papers highlighted that the South Asia Region is obligated to face the dilemma of twin distinctly different pressures. Also, the type of water and land use decisions are to impact one or more aspect in context of South Asia such as macro economy and familial poverty ; high technology and local knowledge; enhanced

productivity and lesser water use ; National policies & State priorities and programmes

**Stressing on flood disaster and other vulnerabilities occurring in South Asia, particularly in Bangladesh,** it was discussed that these diverse effects pose great challenge to networks like GWP-SAS to position water at a centre of all climate change debates taking place at sub-national/International and global level without which we will not be able to unite and prepare ourselves with adequate responses to understand and address the impact of climate change. It was also mentioned that research and data collection is required to understand the issue and its impact on communities, should be made a priority. In context of South Asia perspective on water and food for eradicating poverty and hunger, the suggestive strategy focus on brining more lands under agriculture, enabling best practices to enhance productivity.

**In a presentation made by one of the participant from Nepal** it was indicated that due to fragile environment and high level of poverty, Nepal urgently needs capability to assess climate related vulnerabilities and develop appropriate strategies for adaptive measures. He further suggested that farmers need to be oriented about crop diversification, development of micro-irrigation schemes, appropriate technologies for land and water management.

**The way forward approach for preparedness of climate change hazards** considers possible solutions such as ; interlinking of irrigation projects, Integrated Water Resources Management approach for river basins development, flood water utilization through Master Plain studies, reworking of reservoir operation schedules, future planning of reservoirs. Innovative approaches for accommodating rare floods and drought events, approaches for drought and flood proofing measures for agricultural production, development of appropriate crop stains for sustaining over and under stress of water conditions, reduction of paddy cultivation and social acceptance of coarse cereals, a change in food habits, grafting techniques, adaptive measures.

<b>Technical Session-2</b> <b>Adaptation to Climate Change : Agriculture (Food Security)</b>
<i>The second session was devoted to Adaptation to Climate Change focusing on agriculture and food security. Three very important and thought provoking presentations were made by the eminent water/agriculture experts. This session was Chaired by Md. Shahidul Hassan, Chair, Bangladesh Water Partnership</i>

All the presentations focused on better water management through technology intervention which would be essential if communities have to adapt successfully to climate induced changes in their water resources.

**Presenting the case of Green Revolution in India** which was fueled by irrigation, groundwater and infrastructure development, however, areas benefited most by Green Revolution technologies now suffer with receding water tables in fresh water aquifer zones. This grave situation pose the question that what are the opportunities to save water for sustainable agriculture. It was explained that the future requirements of food grains and water have to be met through vertical growth by intensification, resource conservation, mechanization and introduction of new genotypes for sustaining the growth of food production in the region. The

presentation cited the example of rice-wheat systems of the Indo-Gangetic plains wherein Rice-Wheat Consortium in collaboration with its NARS partners is working on several water saving technologies for water short irrigation environments. One such technology is laser-assisted precision land leveling which saves irrigation water, nutrients and agro chemicals. It also enhances environmental quality and crop yields. The presentation also highlighted that adoption of precision land leveling system to just two million hectare of area under rice-wheat system could save 1.5 million hectare meter of irrigation water and improve crop yields amounting to US \$ 500 million in three years.

**Explaining the importance of rice for the food basket, the another presenter said that rice is a staple food of 2.4 billion people worldwide,** which is expected to reach 4.6 billion by 2050 requiring 70 % growth of production by 2025. Decline in per capita availability of rice will have implication on food and nutrition security. A key challenge is to orient ourselves for alternative cultivation practices to enhance productivity and ensure sustainable production. One such innovative technique is SRI. The presenter also highlighted SRI adoption, gains of SRI, farmers' perception on usefulness, SRI governance in India and pathways of SRI.

**One of the presentation focused on "Adapting Indian Agriculture to Global Climate Change".** Defining the aspects of climate change scenario for India with implications for agriculture, the presenter narrated that the climate change adaptation in agriculture is a continuous process. Referring the results of controlled environment facilities at Indian Agricultural Research Institute (IARI) used for evaluating model performance in future climate change scenarios, the presenter indicated that climate change is likely to reduce yields of most crops in long term. In long term, better adapted varieties are needed to adapt to multiple stresses linked with climate change. The presenter also concluded that costs of adaptation are less understood but likely to be high. However, costs of inaction could be even higher. Adaptation practices take time to become effective. This is the time to act.

<b>Technical Session-3</b> <b>Adaptation to Climate Change – Agriculture II</b> <b>(Innovative Low Cost Water Saving Technologies)</b>
<i>This session was devoted to adaptation to climate change focusing on agriculture and innovative low cost water saving technologies. The session was Chaired by Mr. S.B. Niyangoda, Chair, Sri Lanka Water Partnership. In this session five presentations were made, the details of which are summarized below.</i>

The Technical Session 3 focused on impacts of impending climate change which need a different and innovative response. In this session five presenters shared their field experiences in response to water management challenges which are as old as civilizations, but in new environmental circumstances (drought & flood) needs innovation and fresh thinking.

**One such experience was based on the Bundelkhand (Uttar Pradesh)** where leading NGO is working for adaptation and mitigation of climate change impacts through community mobilization and capacity building of communities on planning

and management of water resources through innovative technologies which can save energy and water. The technologies include use of Tara filter for purification of water, use of renewable energy and eco-building services. The adaptation mitigation strategy of Bundelkhand is totally society driven and the case advise that any adaptation or mitigation strategy of climate change should be society driven. By continuing this strategy, the organization has formed green social enterprise under which three grass-root cluster groups namely ; (i) Women energy clusters ; (ii) Farmer adaptation clusters; and (iii) artisans clusters together called community carbon cluster, are using energy efficient low emission technologies, eco-material production for buildings and involved in regeneration of resource base by reducing carbon foot prints.

**One of the presentation highlighted the case of Eastern India which has abundant water (both surface and ground water) and at the same time facing water scarcity.** The withdrawal of excessive groundwater has caused declining of groundwater table in the area during dry seasons which has affected soil, agricultural productivity and income of the farmers. In order to deal with this problem, immediate application of appropriate eco-friendly low cost technologies and management practices for saving water at national, regional and community and household level is an imperative need. Various such technologies have been designed to cope-up with the water crises. For example ; in Gangetic plains of Eastern India, moisture conservation technology, has been used to enhance and sustain farm production. The another technology is Micro Level Water Resource Development through Tank-cum-Well Technology designed by Water Technology Centre, Bhubaneshwar. The technology involves a system of tanks and dug wells in sequence. While tanks store run-off water which is recycled for irrigation, the open dug wells harvest water seeped in from tanks. In Delta region of West Bengal, bunds which used to demarcate plots are raised and broadened and used for vegetable cultivation. The presentation also indicated that various technologies are available but to promote the success of these technologies, very intensive work is required at the grass-root level to improve the water management situation in the area.

**One case study presented on Hamirpur district of Himachal Pradesh (North India) highlighted that how the local wisdom of water harvesting helped a small village to come out of the existing water problems in the area.** The presentation made was based on the National Rural Employment Guarantee Scheme (NREGS), a Government of India program, which has helped revival of traditional water sources involving the local community to identify, building and maintaining water harvesting structures and sources (check dams/Khads/Nallas). The presentation also raised questions that how the reshaping of public programmes with water centric components can help bring prosperity to village life and create synergy between the positive effects of local wisdom and public programmes.

**One presentation was made on Nara Canal Area Water Partnership (NCAWP)** which is located in rural areas of Sindh province of Pakistan. The

presentation focused on up-scaling grass-root interventions at National and International level. Nara Canal AWP was established in 2001. The partnership include active partners from Government Departments, Non Governmental Organizations, Community Based Organizations, Local Counselors, etc. to address the water related issues in the area through facilitating integrated use of water resources, gender sensitization and training. Nara Canal AWP has collaborated with Pakistan Agricultural Research Institute (PARC) to evolve synergies among the NCAWP and PARC that are complimentary to each other for improved use of natural resources especially the water resources in Sindh. Recently PARC, Government of Pakistan and Agriculture Ministry of People's Republic of China signed a MoU to assist NCAWP in providing technology and hybrid seeds for increasing agricultural productivity.

**A case study on drip irrigation to combat climate change** was also presented. The author illustrated the difference between conventional use of water for irrigation and drip irrigation for different crops. For example; the percentage yield of Banana crop using conventional method would be 57.5 MT/ha, while by using drip irrigation, it will be 87.5 MT/ha resulting an increase of 52 % yield and water saving to the tune of 45 %. The presentation also indicated that adoption of drip irrigation will solve the problems of energy security, water security, food security and rural to urban migration in global change and population resource imbalance scenario.

<b>Technical Session-4</b> <b>Adaptation to Climatic Change: Role of Institution</b>
<i>The fourth session highlighted the role of institutions for adaptation to climate change" to achieve water security in the region, which needs infrastructure to store and transport water as well as to build the institutions that are equipped with the information and capacity to predict, plan for and cope with climate variability. Prof. V S Vyas, Member, Economy Advisory Council to the Prime Minister, Government of India chaired this session.</i>

Five presentations were made during this session. **The first presentation of this session was made on "Approach for Climate Change Adaptation"** earlier largely focused on physical impacts, science & technology and economic needs. The presenter indicated that already 80.0 per cent of basins with 60.0 per cent of the farm area is facing physical water scarcity. Projecting the food demand in 2050 at 400 metric tons which requires an additional irrigation of 60 Mha, would create livelihood and investment initiatives. In the present context, the presenter stressed that the approach for CC adaptation should be through promotion of National and

local institutions integrating IWRM focusing on Supply Management-Infrastructure, Demand Management-Institutions, etc. However, the present institutions, management system, and infrastructure are inadequate to deal with the exigencies of climatic change. Thus, in addressing potential water shortages, as much attention should be given to managing demands as to increasing supply, by introducing more efficient technologies as well as simply promoting a culture of conservation. He also mentioned that there are institutional linkages among the various institutions which can be strategically exploited. The presentation underlined that current water crises calls for major reforms in water institutions and climate change only adds to the urgency. In this context, the core water strategy for climate change should be the creation of Demand Management Institutions within and IWRM framework.

**A presentation and documentary film on Success story on “Ground Water Conservation”** in Dargah of Ajmer Sherif, Rajasthan-India clearly explains the role of public institutions and community participation in ensuring water supply in the holy Dargah of Ajmer Sherif. The Dargah which is visited by more than 35.00 lakh pilgrims during Annual Urs and Mini Urs in Muharrum requires 17.00 crores litres of water in a year. Against the requirement, only 23.00 lakh litres of water was supplied by the Public Health Engineering Department, Govt. of Rajasthan, leaving a huge gap between Demand and Supply. For years together, this gap was met by a groundwater reservoir which lies in southern part of the Dargah premises popularly known as Jhalra. However, this historically and spiritually attached water body dried in July, 2007. To meet the gap in demand and supply of water, Dargah Committee took up the noble initiative for reclaiming the dried Jhalra through community participation and commenced the work. By December 31 2008, water level in the Jhalra reached 40 feet, making available 63 lakh litres of water per day. An average of 4.75 lakh litres of triple/double filtered water is supplied to the Dargah premises, meeting nearly 99 percent of the demand. Having known the success of Dargah Committee for revival of Jhalra a five minute documentary film was prepared by an NGO with the support of India Water Partnership on this successful experiment in rejuvenating traditional water harvesting systems, for dissemination to other parts of the country to create awareness among the masses to adopt similar model for water restoration and also to act as a motivational tool. The film was also shown to the participants of Round Table Conference.

**Highlighting institutional response to climate change at National level, in one of the presentation it was indicated that National Action Plan on Climate Change (NAPCC)** had been launched by the Hon’ble Prime Minister of India on 30<sup>th</sup> June 2008. NAPCC has laid down the principles and identified the approach to be adopted to meet the challenges of impacts of climate change through eight National Missions. Five goals have been identified by the NAPCC viz ; (i) Comprehensive water data base in public domain and assessment of the impact of climate change on water resource ; (ii) Promotion of citizen and state actions for water conservation, augmentation and preservation ; (iii) Focused attention on over-exploited areas ; (iv) Increasing water use efficiency by 20% ; and (v) Promotion of basin level integrated water resources management. The NAPCC requires an additional fund of Rs. 21626 crores to achieve its goal under XI Plan. NAPCC also stresses on some important issues in water sector such as involvement

of many Ministries and Departments and their key role in implementation on various cross-cutting issues.

**In context of Adaptation in Drought Prone and Flood affected Areas,** activities carried out by one of the Delhi based NGO bring the perspective of community in response to climate change. The key message in response to drought and flood affected areas stress upon capacity building of local government and PRIs in the technical and planning disciplines to understand potential climate impacts and devising response strategies in a judicious manner, institutional strengthening, technology and finance resources. Emphasizing, while adaptation must be integrated across existing institutions, focal points are needed at the local levels to garner expertise, develop, coordinate and implement comprehensive programmes. With reference to assessment of vulnerability of the livestock's associated livelihoods due to climate change, adaptation strategies in Rajasthan focus on identification of traditional adaptation practices, mapping of pasture land and fodder availability and adaptation framework for livestock management.

**The last presentation of this session was on "Groundwater Markets"** which points on the role of institutions in the functioning of water markets. Rights on groundwater belong to land owner that governed by the tenancy laws of the state. In such a legal framework, landless and tribes are left out due to absence of ownership rights. As a result, access to this resource is privy to well to do farmers and beyond the reach of poor farmers. The only option left with these farmers is water markets. The presenter indicated that institutional arrangements made to regulate the over-exploitation of groundwater have proved to be ineffective. Generally, such measures are undertaken when situation becomes alarming. Existing institutional set-up both formal and informal behaves in adverse manner in scarce regions and need to strengthen its potential. Unrestricted access makes the situation more complicated by converting common property into open access resources. The presenter recommends that a community-based action is required for the efficient use of water resources in scarce conditions through making the effective functioning of informal institutions.

## THE WAY FORWARD

As the water cycle represents the medium through which climate change will largely be experienced, (especially through floods and droughts), society's adaptation strategies to climate change needs to relate to improved water resources management, and livelihood issues. The special focus areas include floods and drought.

The issue of climate change adaptation highlighted in the presentations indicate that the way forward

necessitates that climate change adaptation strategies address a range of issues at



various levels, namely at ; (i) Sub-national ; (ii) National ; and Regional and global levels.

As this workshop focused on South Asia, the strategies should focus on regional, national and sub national/area water partnerships levels. The key regional and national level strategies include the following :

**(i) Key Regional Strategies**

- addressing regional priorities regarding climate change adaptation ;
- ensuring that regional priorities are linked to climate change interventions at national level ; and,
- ensuring that regional priorities are addressed in global processes

**(ii) National Level Strategies**

- harmonizing IWRM and other water resource management activities with national economic development plans, national adaptation strategies (e.g, the National Adaptation Plans of Action – NAPAs in LDCs), and National Disaster Management Plans ;
- harmonizing their implementation, where theses integrates climate information into IWRM and development planning frameworks ;
- ensuring that the climate information being made available supports the needs of water managers as well energy, industry, farmers, environmentalists, and other stakeholders in water use and allocation ;
- develop a programme on integrated drought management together with WMO and through input of other knowledge partners ;
- promote activities that strengthen the ability of institutions responsible for water resource management to cope better with the additional challenges to be posed by climate change ;
- develop links with climate information service providers and national, regional and global level to provide detailed information relevant to water resources management ;
- Integrate climate risk management approaches into water-related programmes and projects ;
- Ensure that adaptation funds are linked with the financing of water resources management on both conceptual and practical levels and work with international organizations such as the ADB, UNEP, UNDP, W.B, etc. ;

- Advocacy and awareness raising on climate change and climate change adaptation including a the sub national level ; and,
- Also come up with a simple medium of disseminating information so as to ensure that we carry along communities and other stakeholders.

#### **Activity-4 : Brief Summary of the Study on “Water Saving Technologies in Eastern India”**

Scanty rainfall and over exploitation of groundwater is posing serious threat to India. If the present situation is allowed to continue uncontrolled, sustainability of agriculture, food and livelihood security will be in serious danger. Taking this serious issue into account, adoption of innovative low cost water saving technologies in agriculture was one of the prime agenda of India Water Partnership (IWP) in its Work Plan 2009.

To meet the above agenda of IWP, a study was assigned to one of IWP partner in the East zone to know that how many such technologies have been adopted by the farmers and how these are helpful to the farmers in increasing the agricultural production.

The core of the study plan and activities proposed by the India Water Partnership (IWP) to deal with the problem of water resources consists of the following components: (i) creation of awareness and maintenance of water sources and minimizing wastage; (ii) promotion of water saving sanitation technologies; and (iii) organizing group ownership and management of water resources by the community.

The study was conducted in four major eastern region of India comprising the states of Bihar, Jharkhand, Orissa, and West Bengal. The study explores the need, availability, appropriateness, feasibility and adoption of water saving technologies in the region indicating how far and how many of the technologies have been adopted by farmers and other users, and why some technologies have not been found acceptable. Simple, convincing, need based, location specific, socially and economically acceptable and environment friendly technologies are more easily acceptable to small and marginal farmers.

The study has identified more than 30 low cost water saving technologies. Of that, few technologies which have been adopted by the farmers are discussed in the report in detail.

Following is the summary of conclusions of the study :

- Eastern India is characterized by a contrasting combination of relatively high water resource endowment on the one hand and water scarcity in some areas and seasons. West Bengal is facing serious depletion of ground water reserves while Jharkhand is not using enough of ground water. Rainfall in most states is confined to only three to four months of the year while during the rest of the year, the region suffers from water stress. Another problem is that large proportions of water used are wasted and little attention is paid to saving water resources. Technological and management interventions must be used in order to deal with this situation.

- The study made a review of water saving technologies available and used in the region. It shows that technologies are available for harvesting, saving and management of water in the region. However, only a few of them are used in practice and that also not by all farmers. The study identified the technologies used and the extent of benefits accrued from their use. This leads to the question of why the other farmers are not using the technologies and how they can be made to overcome their resistance.
- The study has discussed this area of weakness in water resources policy by presenting two case studies of management practices in water saving used by farmers and urban water users. The review shows that three aspects of water saving are perhaps more important than the availability of technologies. These are: (a) Creation of awareness of innovative technologies and maintenance of water sources, (b) Promotion of water saving sanitation technologies by users in urban and peri-urban areas, and (c) Creation of group ownership of water resources through participation of local groups and local governments.
- Adoption of such practices is likely to help amelioration of water problem to a large extent. Adequate emphasis needs to be given in water policies in the region for wide application of these suggested management practices