



**Report on
Consultation Meet on
“Water, Agriculture and Climate Change”**



Organized by:
India Water Partnership

Under
GWP-South Asia & Asia Pacific Adaptation Network

On
9th February, 2012

At
Institute for Human Development, New Delhi

I. Context

India's population in 2011 was 1220 million. The population is still growing, and may stabilize at 1.6 billion by around 2050. Food security, livelihood and housing for such a massive population, is a challenge which the country has to meet at standards which are much higher than in the past. Urban population of India at present is about 31%. The urban population of the world as a whole has already crossed 50%. In the coming decades, in the wake of fast economic growth, urbanization in India will progress at a much faster rate to catch up at least a 50% mark not in a distant future. Fast growth phase of urbanization generate pressure of various types including those on land, housing, water supply and industrial activities. Growing urbanization has great impact on agriculture. As the economy gets stronger pattern of demand changes – more directly the demand pattern for food will change requiring changes in agriculture systems, cropping patterns, etc.

The natural resource base, including land and water, that support and sustain the livelihoods of masses is degrading at accelerated rates. 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.

Climate change has a profound effect on irrigated agriculture due to floods, droughts and rise in temperature. Therefore climate change needs to be updated to work out adaptation and mitigation strategies. The impact of climate change and adaptation strategies has to be considered in the backdrop of certain other concerns and challenges faced by India.

II. Consultation Meeting

With the above context, India Water Partnership (IWP) organized a Consultation Meeting on “**Water, Agriculture and Climate Change**” on 9th February, 2012 at Institute for Human Development, New Delhi. This consultation meeting was part of the work as per the Terms of Reference signed by GWP-South Asia (GWP-SAS) with Asia Pacific Adaptation Network (APAN). In December, 2011, GWP-SAS was accepted as the Thematic Node (TN) on water of the APAN. Under the TN, GWP-SAS is implementing the sub regional activities of APAN related to water, agriculture and climate change.



The purpose is that the knowledge gained while undertaking the various activities requires effective dissemination for influencing the national policies and strategies. Hence the TN will provide knowledge on water, agriculture and climate change to countries of the South Asia falling under GWP. Mr Upali Imbulana, Regional Coordinator, GWP-SAS is the Thematic node contact person for the region and Dr Veena Khanduri, Executive Secretary, is India's thematic node contact person.

The background of GWP-South Asia and APAN was informed to the participants **(Box-1)**.

Box-1 : GWP-South Asia as Thematic Node for APAN

The Global Water Partnership (GWP) was founded in 1996 to foster integrated water resources management. It is a network of partner organizations committed to support social and economic change processes in developing countries that further the sustainable management and development of water resources. The GWP South Asia is one of the 13 Regional Water Partnerships of the GWP.

The Asia Pacific Adaptation Network (APAN) is the first regional network under Global Adaptation Network (GAN) formed in response to the growing knowledge and capacity building needs in climate change adaptation. The activities of APAN focus on the most vulnerable ecosystems and sectors such as water, agriculture and mountains.

GWP operates in South Asia as a Regional Water Partnership, through Country Water Partnerships (CWP) in Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The CWPs, their Area and Zonal Water Partnerships and Local Water Parliaments which are ground-level mechanisms for multi-stakeholder dialogues, and the partners in public and private sector, provides for a unique network with the ability to reach out to a wide range of stakeholders.

The Regional Hub (RH) of APAN functions as a knowledge center and provides technical assistance for adaptation. The RH assists and collaborates with its sub-regional Nodes (SRN) and thematic nodes to implement the APAN activities. There are SRNs in Pacific and Central, North-east, South-east and South Asia.

Therefore, the GWP South Asia's activities as the APAN thematic node will be to:

- Lead the sub regional activities of APAN in the water sector in collaboration with APAN Regional Hub, Sub Regional Node, Thematic Nodes and national implementing partners
- Make an input to the APAN Regional Hub which serves as the regional knowledge center for adaptation.
- Optimum use of GWP South Asia's comparative advantage of the access to grass-roots level through Area Water Partnerships.

In the consultation meeting, senior officials from National Water Development Agency (Ministry of Water Resources), Planning Commission, Ministry of Agriculture, National Institute of Disaster Management (Ministry of Home Affairs), Government of India, Tata Energy Research Institute (TERI), Sharda University, Indian Institute of Public Administration, experts on water, agriculture & climate change, research institutions & academic institutions and partner organizations from GWP-India participated (**List attached as Annex-1**). The consultation meeting was chaired by Prof. S R Hashim, President, IWP, former member, Planning Commission, Government of India. Before commencement of the consultation, Dr. Veena Khanduri explained about the GWP-South Asia-APAN initiative about focus on knowledge and people with regard to increasing the resilience of water sector to climate change in South Asia and India in particular.

The main objective of the consultation meeting was to **identify and prioritize the major issues and challenges regarding water, agriculture and climate change at sub-regional**

and national level. The discussion started on the already prioritized/identified major issues on water, agriculture and climate change (**Box-2**).

**Box-2 : Major Issues already prioritized/identified
on Water, Agriculture and Climate Change**

- About 70% of the population lives in rural areas, a large number of whom are poor. Most of the rural poor depend on rain-fed agriculture and fragile forests for their livelihoods (World Bank,2011). Combined with high population density, this exerts pressure on the eco-systems.
- Since the beginning of new millennium, there is a slowdown in agricultural growth which is a major cause for concern. India's rice yields are low compared to some of the major rice producing countries. While the productivity is fairly high in sugarcane, potato and tea, improvements are possible for most other agricultural commodities (World Bank, 2011), which will reduce the demand for water
- India's economy is closely tied to its natural resource base and many livelihoods are based on sectors such as agriculture, forestry and fisheries which are climate-sensitive. Climate change could alter the distribution and quality of India's natural resources and affect the livelihoods.
- Many river basins in India are predicted to face water stress conditions due to climate change. The reasons are changed rainfall-runoff patterns and alterations to snow and glacier melt contributions to river flows (APAN, 2012). Eventually, the impacts would transfer to agriculture.
- Institutional arrangements for water resources management are required to be improved. MWR (2009) recognizes this need and recommends setting up legally empowered basin authorities representing all stakeholders, including Governments and departments of the Government, water users and consumers of different types surrogates for environmental ecological interests.
- There is a need to improve efficiencies of individual irrigation systems for optimum use of developed water resources, control water logging in irrigation commands, and non-beneficial water uses such as evaporation/evapo-transpiration of the swampy areas. Improvements to drainage systems in water logged areas are required as well. MWR (2009) recommends bench-marking and annual performance evaluation of irrigation systems on annual basis, participatory management and eventual transfer of downstream sections of irrigation systems farmers.
- About 65% of the net cultivated area is rain-fed, and this makes the agriculture and related livelihoods more vulnerable to change of rainfall pattern. High intensity rainfall and floods would increase the risk to high-value and horticultural crops, affecting both national and individual economies (APAN, 2012).
- Poorly planned ground water development is already leading to over-exploitation of the available ground water resulting in a fall of ground water levels (MWR, 2009).
- It is noted that the settlement of inter-state water disputes takes a very long time. MWR (2009) recommends implementing the reforms to settlement process.
- There is a need to improve the institutional arrangements in the water sector. It is recommended to internalize the climate change concerns in the current institutional structure with necessary modifications (MWR, 2009).
- Modified programmes for data collection, capacity building, working procedures and research are required to accommodate climate change concerns.
- Among the other issues related to water management and Inequitable allocation of water and deteriorating irrigation infrastructure. It is noted that many states lack the incentives, policy, regulatory, and institutional framework for the efficient, sustainable, and equitable allocation of water. The, existing infrastructure has rapidly deteriorated as operations and maintenance is given lower priority (World Bank, 2011).
- There is a need to improve research and development, concentrating on integrated research on water and climate change (APAN, 2012)

The experts were requested to identify further issues need to be highlighted in the Indian context. The major gist of the discussions is presented below:

1. Rain harvesting is crucial for water and food security due to short time span of annual rainfall

India gets rainfall (on average) on less than forty days a year. Climate change is likely to result in high and low intensity rainfall. This may happen even without changing the number of days of rainfall availability. In India, much attention is paid to the use of river waters and it has its own merit. However, if rain water is treated as a natural resource and properly harvested, it can make significant contribution to food and drinking water security. Since, at present, less than 30 percent of rain is being harvested, it is imperative that rain harvesting is given a high priority. The availability of technology is not a constraint.

2. Water Storage and Recharging of Underground Aquifers

While precise impact of climate change in terms of variability in rainfall and temperature, droughts and floods etc. are not predictable for different parts of the country, it firmly indicate that these patterns in terms of these variables will change and there will be large variability in rainfall. This will make things difficult. Therefore much larger concentration of water storages will be needed. Underground water aquifers provide the best possible storages, available almost everywhere. Thus, massive plans for recharging underground aquifers in variety of ways, including through water harvesting systems, and recharging using the flood waters are required to be prepared and implemented.

3. The contribution of Rain Fed Area (RFA) to food security and poverty alleviation is significant. The critical issue is to raise water use efficiency in these areas and develop drought-resistant crop varieties

RFA contributes to 45 percent of rice production and a major proportion of small millets and oilseeds too. However, water use efficiency is low. It is therefore, important to increase both availability and water-use efficiency through (a) soil moisture conservation; and (b) water storage at suitable locations. In addition development of drought resistant crop varieties is also required. The latter is basically an R & D issue. The storage of water involves issues relating to conflict of interest between upstream and downstream stakeholders. At the same time, it offers complementarities too. The resolution of conflict and exploitation of complementarities needs direct involvement of all the stakeholders/community.

4. Creation and implementation of appropriate incentives for conservation and efficient use of water is necessary and needs to be supplemented by suitable regulatory measures

Demand side management of water use as well as conservation is extremely weak in India. A user has hardly any incentive to use water efficiently. Over-exploitation of ground water in the absence of appropriate pricing policy for its optimal use is absent. In fact, on the other extreme, the price structure of ground water use for irrigation is *ad-hoc*, irrational and perverse. In spite of a model bill for ground water use suggested by the Government of India, no meaningful progress has been made at the State (sub national) level to enact proper laws

for use of ground water. A few States have attempted to bring ground water laws and, there too, a direct involvement of community or water users' association is either missing, or minimal (This has happened even in Maharashtra, one of the few States to take initiative to formulate laws on ground water use). Similarly, conservation of soil moisture needs proper incentives to encourage it to happen on a large scale.

5. Water quality management needs to be taken up on priority basis

Apart from the issue of augmentation of water availability (conservation, storage, etc.), the issue of water quality management deserves serious attention. Some of the known measures are: (a) discouraging over-exploitation of ground water leading to salinity; and (b) prevention of pollution of river waters due to discharge of untreated sewages and industrial wastes into the rivers. Improving quality of water is a major issue closely linked with the apathy towards the environmental issues in the present system and lack of serious concern to developing futuristic urban systems.

6. Link incentives with implementation of various programs that focus on economic and social reforms and creation of synergy among different programs

Some of the examples are worth giving serious attention:

- Award of Minimum Support Price (MSP) for water intensive crops in water scarce areas may be conditional upon carrying out certain reforms such as delaying sowing of paddy in summer to save water when it is most scarce. This was suggested by the Cost and Prices Commission (CACP) in the case of Punjab and Haryana to delay planting of paddy in late summer and it was successful to a great extent in putting pressure on State Governments.
- Leaving residue to help raise fertility of soil in the fields is labor intensive. This kind of activity can be integrated with the implementation of MNREGA. It is important to explore the additional elements in the on-going programs for adaptation to climate change.

7. Transferring water from Surplus basins to deficit basins

Most river basins in India do not have surplus water. Brahmaputra- Ganga river basin is the only basin left with surplus water. It needs to be linked with other water deficit basins to meet the future challenge of growing demand for water on a big scale. The GOI may like to consider and expedite the interlinking of rivers to achieve the objective of making water available in deficit areas. However, while implementing such a scheme, it is imperative to take a holistic view of flow of water in the Ganges with precision of technical details of minimum water required at different locations over time for the very survival of the river.

8. River Basin Planning and Holistic Water Management

Climate proofing cannot be confined in a river reach within one state boundary rather it can be achieved in the whole basin which could be located in several states. River Basin planning and preparation of Master Plan studies on holistic approach is essential both for flood management and optimal water resources utilization. Pollution abatement of human activities shall be part of the Master Plan studies.

Ganga River System is particularly in bad shape. Population density in this basin is high, and agricultural activity is also very high. Water in this river is drying up and its quality has deteriorated. Glaciers which feed the system are melting. Alpine forests have been disappearing fast, modifying the catchment area in very adverse way. Streams feeding Ganga are drying up. Aqua-food is also in distress. Many species of fishes and water animals have disappeared and are vanishing at fast rate. Ganga system needs to have a special plan for regeneration.

9. Educating farmers about appropriate use of inputs and farm practices to meet the challenge of sudden and significant variation in weather conditions is crucial for adaptation to climate change: need for suitable institutional structures and ICT system

An important issue is how to sensitize farmers about climate change, its impacts and micro-level steps that farmers should take in their day-to-day work. For this purpose, the available knowledge should be broken down into its simplest component, written in simple language understandable to farmers/or broadcast in simple language as to reach large numbers of farmers. Some or many agencies should undertake this work. Early warning systems should be installed at village/block level for weather forecasting (rainfall/temperature/ drought) so that the farmers can take decision in time for sowing of crops or going for crop diversification.

Micro level management assumes a great significance in this context. Farmers need to be advised to take-up the necessary measures under conditions of sudden change in weather conditions. For example; passing on information to farmers to delay sowing for couple of days under certain conditions can be very beneficial to the farmers. Creation and dissemination of knowledge through PORTALS need institutional support of both Government and NGOs. Ministry of Agriculture is already delivering this service by using the existing institutions such as Krishi Vigyan Kendras (KVKs). Such institutions need to be strengthened.

10. Promotion of Conservation Agriculture and Crop Management

Impact of climate change is not just a one-sided phenomenon. What we do also impacts climate change and hence a lot of attention needs to be paid. How we do things and how much energy we use up or how we generate energy and wastes, etc. We need to practice conservation agriculture and introduce small changes in crop management. Besides this, mechanization and introduction of new genotypes for sustaining the growth of food production in India should be promoted.

11. Inter-ministerial/inter-departmental coordination

- Water related issues cut across various ministries and departments without an effective coordination and creation of synergy. As a result, the implementation of various programs is inefficient and causes undue delays. Creation of synergy would also help gender mainstreaming in different sector programs.
- Studies of impacts vulnerability and adaption being conducted focus on some sectors. The essential linkage of impacts on one sector with changes in other sectors needs to be taken up.
- Users (or Users Associations) need to be empowered to take up the issues to impress upon the concerned authorities to expedite coordination and bring transparency in decision making and implementation.

12. Developing Core Competence in Research and Facilitating Data availability

- Coordinated efforts are needed to make the relevant data for research available for long periods.
- The present status of data availability in a centralized institution is far from satisfactory.
- The available models on the impact of climate change are too restrictive in terms of boundaries of different disciplines such as hydrology, agronomy, economics, etc. What is needed is the interlinking of this kind of models to address the policy issues and bridge the gap between science and policy. This would require development of core competence in the relevant areas of research. This undoubtedly, is a very challenging task before the government and the academia. But a concerted effect is needed.

13. Addressing vulnerability, contingency plans and management challenges

- **Vulnerability:** Climate change / variability make agriculture highly vulnerable, especially in the disadvantaged areas subject to draught and floods. This requires contingency plans to be ready for implementation at the district and sub-district levels. A precondition for success of supplementation of such plan is making appropriate technology and information available to farmers and local administration, creation of supporting structures and making full use of the existing structures and institutions.
- **Policy intervention:** Fortunately, such issues are being addressed under the National Initiative on Climate Resilient Agriculture (NICRA) project in 100 most vulnerable districts of 27 States and one Union territory (Andaman & Nicobar Islands). The approach is to focus on demonstration of available climate resilient technologies at farmer's field level. The institution of Krishi Vigyan Kendra (KVK) is being used extensively for these activities. In addition, the focus is on promoting secondary agriculture and encouraging entrepreneurial talent (e.g., custom hiring of seed sowing drills, tractor, etc).

14. Gender Mainstreaming – Climate Change

The role of women in water, agriculture and climate change needs to be emphasized as women are typically responsible for their households with water, food, fodder and firewood and they are less likely to have the education, opportunities, authority and resources they need to adapt to climate change impacts. Their perspectives and needs are often not heard in processes leading to policy formulation.

15. Role for IWP

IWP can assume a leading role in the following activities:

- To undertake translation of available information for dissemination to farmers and ground level workers.
- To undertake programs for sensitizing people on issues of adaptation to CC.
- To carryout and coordinate different pilot projects on best practices on adaptation to CC.
- To bring about convergence on programs being implemented by different agencies/institutions.
- To act as a think tank on major areas of research on water, agriculture and climate change.
- To bring out a portal on water and agriculture and be an important agent of knowledge management.

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Water, Agriculture and Climate Change
(9th February, 2012)**

**Organized by
India Water Partnership, New Delhi
under GWP-South Asia & Asia Pacific Adaptation Network**

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