



**PROCEEDINGS OF THE
TWO DAY SENSITIZATION PROGRAMME
ORGANIZED FOR ZONAL WATER PARTNERS ON
FLOOD & DROUGHT MITIGATION AND MANAGEMENT**

(21st & 22nd December, 2010)



Organized by :

**India Water Partnership (IWP), New Delhi
in Association with**



**National Institute of Disaster Management (NIDM)
Ministry of Home Affairs, Government of India, New Delhi**

&



**IWP Host Institution – Institute for Studies in Industrial Development (ISID)
4, Institutional Area, Vasant Kunj, New Delhi**



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Preface

Although water is vital for life but it also brings natural hazards in the form of floods and droughts. These both are capable of destroying millions of human lives, livestock and seriously affect the agriculture and economy of any country. Countries seeking water security need not only access to reliable water supplies but also be prepared to manage floods, droughts and other such unpredictable events.

As India is a large country, India Water Partnership (IWP) is undertaking its activities through its Zonal Water Partners (ZWPs) spread over the country. The ZWPs are the key role players in implementing IWP's activities as per the Global Water Partnership (GWP) mandate. The Strategic Goal-2 of GWP envisages using "Integrated Water Resource Management (IWRM) approaches effectively to address adaptation to climate change and other emerging challenges at National, Regional and Global levels". Keeping this goal in view, IWP in association with its Host Institution-Institute for Studies in Industrial Development (ISID), New Delhi and National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Government of India organized a two day sensitization programme for its zonal water partners on Flood and Drought Mitigation and Management on 21st & 22nd December, 2010 at ISID, New Delhi. Forty one participants including the experts on flood and drought management and zonal water partners participated in the programme.

Our sincere thanks go to Mr. P G Dhar Chakrabarti, I.A.S, Executive Director, NIDM who despite his busy schedule spared his valuable time and made an excellent presentation on past and current flood & drought scenario in India as well as around the World.

We are also thankful to Prof. Santosh Kumar, Head, Policy, Planning & Cross Cutting Issues Division, NIDM, Dr. K J Anandha Kumar of NIDM, Dr. V S Prakash, Director, Karnataka State Natural Disaster Management Centre (KSNDMC), Bangalore, Dr. Rajendra Singh, Magsaysay Award Winner, Tarun Bharat Sangh, Rajasthan and Dr. M P Singh, Director, Flood Control Applications (Central Water Commission), Govt. of India who accepted our invitation, spared their valuable time and enlightened the participants with their valuable contributions with thought provoking presentations.

We also express our sincere gratitude to Prof. S K Goyal, Vice-Chairman, ISID who kindly agreed to be the Chairperson during the two day sensitization programme. Our sincere thanks also go to Prof. M R Murthy, Officiating Director, ISID & General Secretary, IWP for providing his wholehearted support for smooth conduct of this programme.

We convey our sincere thanks to Coordinators/representative of ZWPs who came from different parts of the country and participated actively in deliberations and question/answer sessions.

We place on record the painstaking efforts of Dr. (Mrs.) Veena Khanduri, Adviser, IWP in coordinating and managing the programme and also preparing the proceedings.

The staff of ISID and IWP Secretariat provided support to the programme in every possible way. We thank them heartily.

We trust that the Coordinators/representatives of Zonal Water Partners who benefitted from the two day sensitization programme will carry the messages forward and disseminate their knowledge down to the field level functionaries, farmers and the community in their area of operation.

S R Hashim
Chairman
India Water Partnership

C O N T E N T S

Preface

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ABBREVIATIONS

AFPRO	Action for Food Production
CPR	Common Property Resources
CWC	Central Water Commission
DDP	Desert Development Program
DPAP	Drought Prone Area Program
GWP	Global Water Partnership
IDS	Institute of Development Studies
IMD	Indian Meteorological Department
INSAT	Indian National Satellite System
ISID	Institute for Studies in Industrial Development
IWP	India Water Partnership
IWRM	Integrated Water Resource Management
KSNDMC	Karnataka State Natural Disaster Management Centre
MIDS	Madras Institute of Development Studies
NID	National Institute for Development
NIDM	National Institute of Disaster Management
RSA	Ramnadi Swattchata Abhiyaan
SRI	System of Rice Intensification
STP	Sewage Treatment Plant
TBS	Tarun Bharat Sangh

**PROCEEDINGS OF THE
TWO DAY SENSITIZATION PROGRAMME
ORGANIZED FOR ZONAL WATER PARTNERS OF INDIA WATER PARTNERSHIP ON
FLOOD & DROUGHT MITIGATION AND MANAGEMENT**

I. Background

Geo-Climatic conditions in India make it prone to various natural disasters. India faces both flood due to excess water and drought due to deficit water in different parts of the country or sometimes same part in different periods. India is one of the most flood prone countries in the world. The need to combat the perennial problem of floods and the resultant destruction has been at the forefront of concern. Around 12.0 per cent (40 million hectares) of the country's land area is prone to floods and annually on an average 8 million hectares is affected by floods. Although it is impossible to prevent floods completely, but losses due to floods can be minimized by better preparedness, mitigation, planning and timely response.

Drought is one of the grave hazards affecting India and thus has a major impact on the Indian society and economy. From time immemorial, drought had severe and catastrophic effects on the vital activities of mankind. The Indian agriculture vitally linked to the monsoon performance has suffered several onslaughts from recurring droughts. Drought management is always a measure of responsiveness and resourcefulness of governments at different levels. It requires a strong institutional structure to monitor and provide a timely response to drought. Thus, this calls for efficient management of water resources involving all the stakeholders 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.

In order to cope-up with these challenges, there is an urgent need for better management of water to become more water sensitive to reduce risks and to share water for the life and security of all through capacity building of community by sensitizing them on flood and drought disasters for taking preparedness and mitigation measures.

II. Objectives

The two days sensitization programme primarily focused on enhancement of knowledge and skills of the participants to understand and respond to various core issues in flood risk mitigation and drought mitigation & management. This also gave exposure to the participants to take better preparedness and mitigation measures before/during the time of such disasters.

The key objectives of this programme were:

- ◆ To provide the participants an overview on flood and drought scenario of India and concepts of flood & drought management;
- ◆ To enhance understanding concerning the nature, extent of the threats and the value of counter measures to combat the adverse impact of flood/drought;
- ◆ To mainstream disaster risk reduction in the developmental activities; and,
- ◆ To provide forum for developing the requisite behavioral skills and attributes through exchange of technical and practical ideas and sharing of experiences among the participants.

III. The Sensitization Programme

With the above background and objectives, India Water partnership (IWP), New Delhi in association with its Host Institution, Institute for Studies in Industrial Development (ISID), New Delhi and National Institute for Disaster Management (NIDM), Ministry of Home Affairs, Government of India, New Delhi organized a **Two Day Sensitization Programme for Zonal Water Partners on Flood & Drought Mitigation and Management** on 21st & 22nd December, 2010 at ISID Conference Room, New Delhi. Forty one participants including eminent experts from NIDM; Tarun Bharat Sangh (Rajasthan); Karnataka State Natural Disaster Management Centre (KSNDMC), Bangalore; Madras Institute of Development Studies (MIDS), Chennai; Central Water Commission, Govt. of India, senior faculty members of ISID and Coordinators/representatives of Zonal Water Partners from all the zones actively participated and presented their views. Twelve very important and thought provoking presentations were made during this two day sensitization programme besides panel discussions and question/answers. Prof. S K Goyal, Vice-Chairman, ISID was the Chairperson for this programme. Before organizing the programme, a Concept Note was prepared detailing context and objectives of the programme and the same was circulated among the participants and experts along with programme agenda well in advance through e-mail so that they could come fully prepared for the fruitful deliberations. Copy of the Concept Note is enclosed as **Annex-I**, copy of programme agenda is enclosed as **Annex-II** and list of participants is placed at **Annex-III**.

IV. Technical Session

Day-1 (21st December, 2010)

The Sensitization Programme commenced with the Welcome Address by **Prof. Prem S Vashishtha**, Board Member of IWP. In the Welcome Address, Prof. Vashishtha briefly explained about the role and functions of IWP and its network of zonal water partners striving to promote Integrated Water Resource Management (IWRM) as an active partner of Global Water Partnership (GWP), Stockholm, Sweden. Prof. Vashishtha hoped that through fruitful deliberations, concrete suggestions would emerge on mitigating the twin problems of flood and drought which are recurrent problems in many parts of India.



**Prof. Prem S Vashishtha, IWP Board Member
Welcoming the Participants**

Introducing the themes and objectives of the programme, **Dr. Veena Khanduri**, Adviser, IWP mentioned that IWP is honored to partner with NIDM and ISID in organizing this event as NIDM is the dedicated body formed specifically to tackle disasters, whose most manifestations are drought & floods and ISID is engaged in research work. The severity of these twin extreme climate events are on the rise in the context of global climate change.



**Dr. Veena Khanduri, Adviser, IWP introducing
the Theme & Objectives of the Programme**

She said that India's disaster management programs rank as one of the most comprehensive ones in the World and have achieved considerable success in countering the most severe effects of extreme events. Highlighting that there are a

Zonal Water Partners of IWP have an important role to play in harnessing opportunities and building appropriate capacities for employment security and asset building, while ensuring the effective use of such assets in reducing the adverse impacts of droughts and floods.

large number of central and State sponsored programs for addressing drought risks which are under implementation by various agencies, she emphasized that synergies between these programs require considerable institutional co-ordination to synchronize diverse programs managed at different levels of Central Government and State Governments within a common framework.

Community employs various measures to deal effectively with the consequences of climate change. These include; looking at reactive and pro-active models of response. Also there is a need to identify and incorporate these measures into the enhancement of communities' adaptive capacities. The purpose of this workshop was to sensitize the zonal water partners of IWP on various facets of the problem of flood and droughts so that they in turn can sensitize and organize the communities they are working with to cope with and mitigate the effects of these adverse climate events.



Dr. Rajendra Singh, Magsaysay Award winner & Founder of Tarun Bharat Sangh, Rajasthan giving the Inaugural Address

Dr. Rajendra Singh, (Magsaysay Award winner) and founder of Tarun Bharat Sangh (TBS), Rajasthan in his ***Inaugural Address*** argued for the need for a paradigm shift in understanding and management of drought and floods. He said that the starting point for this is to understand how Indian society coped with floods and droughts for centuries. In the Hindu epic Mahabharata, droughts

and floods had been indicated as manifestations of nature's fury and due to which Lord Krishna took his

community to the mountain to appease nature's anger. Ancient Indian wisdom is that when man interferes with nature too much, it erupts with anger and humankind has to make remedial measures. After independence droughts and floods have increased 10 times. There are hundreds of instances of communities successfully tackling drought and floods through community management, but Government does not want to learn from these experiences. Today disasters are disasters of development and they are frightening. Through development we have converted Ganga and Yamuna into big sewers by destroying bio-diversity and ecology of these majestic rivers through industrial and urban pollution. Decentralized community driven water management was never given a chance to succeed. People's wisdom was without commerce so planners and implementers did not find them attractive.

Rajasthan faces the maximum fury of floods. In the areas served by Tarun Bharat Sangh, the effects of drought were not felt during the last 27 years, though the area faced severe drought conditions for 5 years during the period. For economic progress we must learn conservation and

Government, Society and Scientists have equal responsibility for drought management. Tarun Bharat Sangh has revived 7 dead rivers through people's participation.

disciplined use of water by the people. Rain water has to be recharged. Presently there is no system to separate river and sewage. First we pollute the river and then try to clean it by spending crores of rupees. How will we manage disasters when we convert rivers into sewer drains? Yamuna, Ganga and Musi are no more rivers but sewages. Look at the encroachment on Yamuna banks by Government agencies themselves. So my personal question is who are the encroachers and over-exploiters of the river?

Dr. Rajendra Singh expected this workshop to deliberate on how NGOs, Government, Industry and people can work in an integrated manner to tackle drought in a holistic manner.

The **keynote address** was delivered by **Mr. P.G. Dhar Chakrabarti, IAS**, Executive Director, NIDM. He initially explained the work of NIDM, established in 2003, through its 30 Centres spread across the country. One of its main roles is capacity building. So far 3000 people have been trained.



**Mr. P G Dhar Chakrabarti, I A S,
Executive Director, NIDM delivering
the Keynote Address**

Mr. Chakrabarti further said that the disasters can be grouped into two categories – natural and man-made.

Cyclones, avalanches, floods, winds, droughts, etc. are natural disasters.

We have failed to understand nature in the context of climate change. Climate change is essentially man-made. Rainfall pattern is changing. Cherrapunji, once the World's largest area of precipitation is now facing drought.

Man-made disasters includes industrial disasters, accidents, nuclear, chemical mishappenings, etc. There is a paradigm shift in the approach to disasters. The difference in natural and man-made disasters is blurred. Actually there is no natural disaster without some kind of human

intervention. We must understand the principles of nature and learn to live with them and understand the causes of disasters. Disaster occurs due to certain natural hazards which have to be understood.

Floods happen when there is excess of water, which cannot be carried by the existing drainage/river system. Flood prone areas get inundated. If rivers and reservoirs get silted, they cannot store water as per their actual capacity. Deforestation reduces the capacity of reservoirs and raise riverbeds by carrying silt from the catchment.

Karnataka had floods which never seen before. In July, 2005 there was 900 mm rainfall in just one hour. Disaster happens not merely due to natural hazards but due to vulnerabilities. Climate modeling is an important tool for tackling disasters. Two of the important vulnerabilities are densification and poverty. 78.0 per cent of disasters relate to water.

Disaster mitigation may be of two types – structural measures and non-structural measures. It is encouraging to note that death and injuries due to disasters are now on the decrease, probably due to quick response by authorities due to the effectiveness of early warning systems. Six million people were affected by Kosi floods in India and Nepal but only 300 deaths were reported. Still, lives may have been saved, but livelihoods were damaged.

Till 2002, Ministry of Agriculture, Govt. of India dealt with drought. We had severe droughts in 2002 and 2009. The 2009 drought was more severe, but impact on economy was lower. This was due to improvement in early warning systems, buffer stock of food grains. One key element of disaster management is an effective prediction system through radars, rain gauges, etc. The Indian Meteorological Department (IMD) has undertaken a massive programme of modernization of early warning systems.

With regards to impact of climate change, Mr. Chakrabarti said that our major perennial rivers will not be perennial any more unless remedial measures are taken. Glaciers melt is an important factor affecting Ganges, which has been declared as threatened by the United Nations. Some of the solutions contemplated are inter-basin transfer of water, artificial recharging of aquifers, de-salinization of sea water, etc.

Prof. S K Goyal, Chairperson said that with the pressures of rapid growth, urbanization and land scarcity coupled with drought and floods, there is a need for better and careful planning. Land use planning and water management therefore calls for better coordination between various departments of State Governments and Central Government. Besides this, greater challenge is for proper implementation of a plan that would affect many interests and would need good implementation mechanisms and stakeholders' engagement.



**Prof. S K Goyal, Chairperson & Vice Chairman, ISID
addressing the participants**

During the discussions, there was emphasis on successful implementation of water harvesting systems, ground scanning of aquifers through remote sensing, mapping out underground water storages and enhanced use of technology for aquifer recharging. A question was raised by Mr. Vinod Bodhankar, representative of Western Zonal Water Partnership from Pune about filling-up of abandoned quarries extending to 27 acres by the stone mining lobby and how to prevent it. Mr. Chakrabarti advised that Ministry of Environment & Forests, Govt. of India can be approached to stop the practice. Mr. Tapan K Padhi of National Institute for Development (NID), Bhubaneswar & Coordinator, Eastern Zonal Water Partnership remarked that the primary focus of the Orissa State Disaster Management Authority is relief. Whether mitigation is a later addition? Mr. Chakrabarti responded that other countries call the programme as Disaster Reduction but we call it Disaster Management. Management is a holistic approach. Unfortunately, disaster mitigation fund has not been set-up as yet due to objections from Ministry of Finance, Govt. of India, which wants to fund specific projects of disaster mitigation. He advised the audience to read the World Bank report entitled "Natural Hazard: Unnatural Disaster". Mr. Bilal Ahmad Pandow, Coordinator, Jammu & Kashmir Region Zonal Water Partnership, remarked that nothing much has been done for aquifer recharge in Jammu & Kashmir. Mr. Chakrabarti responded that the programme is to be managed by the State authorities and NIDM has no much role in it. Prof. K Sivasubramanian of Madras Institute of Development Studies (MIDS) and representative of Southern Zonal Water Partnership mentioned that a large number of community tanks in various parts of South India have been encroached upon and many of them still are not maintained properly. He raised a question about whether NIDM can take up the responsibility of rejuvenating community tanks, which are the lifeline of irrigation in South India. The response of Mr. Chakrabarti was that this is the responsibility of local bodies and Central Government has provided adequate funds for this.



**Presentation by Shri S C Jain,
AFPRO, New Delhi & Representative,
Northern Zonal Water Partnership**

Mr. S C Jain from Action for Food Production, New Delhi and representative of Northern Zonal Water Partnership made a presentation on ***"Vulnerability Assessment and Drought Risk Reduction through enhancing Adaptive Capacity to Climate Change in Semi-arid Regions"***. Semi-arid regions are characterized by precipitation lower than evapo-transpiration, lower rainfall in the range of 25-60 cm, scrubby vegetation with short coarse grasses.

Adaptation and coping strategy play key role in reducing the vulnerability to climate change.

Knowledge on adaptation at grassroots, combined with experiences on coping mechanism is the key intervention strategy along with awareness generation.

These are exacerbated climate change, accompanied by drought and floods. The potential risks include; depletion of resources, frequent disasters and desertification, increased conflicts over resources and

increased vulnerability of the poor. Mr. Jain then made a presentation on the Amda-Kundai project area of Udaipur district, Rajasthan and Kothur- Srirangpur of Mehboobnagar district of Andhra Pradesh.

- **Energy:** Biomass based energy production offers an alternative coping strategy for households vulnerable to climate change impacts in semi arid areas.
- **Water:** Community's access to weather monitoring and prediction data combined with community managed water resource systems can lead to greater water use efficiency and improved adaptive capacities.
- **Land Use:** Village level land use maps can provide a basket of options for different rainfall scenarios (drought, normal, excess). They can lead to stabilisation of yields from rain-fed farming, greater food and economic security.
- **Livestock:** Livestock rearing is an important coping strategy in the face of enhanced climate variability. Buffer stocks of fodder (including tree fodder) and good breeds of livestock can be important risk reduction strategies and can enhance adaptive capacities.

Mr. Jain further said that in the project, adaptive capacity for water was enhanced through agro-met observatory, lining of diversion based irrigation systems, groundwater monitoring and awareness generation on water depletion trends and judicious use of community based systems, renovation of water harvesting structures, introduction of concept of water bank and water quality for defluoridation and water harvesting. Land use based interventions tackled the problem of erosion losses, crop advisories

based on weather forecast, testing of option sets like System of Rice Intensification (SRI), mixed cropping, varietal trials and kitchen gardens for nutrition security. The learning was that community participation enhances adaptive practices, traditional knowledge is vital to design appropriate adaptive interventions, generating social capital through network of mutually supportive farmers helps in adaptation; other important processes are information and awareness generation, demonstration of successful technology and resource sharing.

Dr. V.S. Prakash, Director, Karnataka State Natural Disaster Management Centre (KSNDMC), Bangalore gave a lucid presentation about "**Monitoring and Early Warning System in Drought and Flood Management**". He started with the remarks that on several occasions NGOs widen the gap between Government and the people, whereas their main role is to strengthen the relationship. He further said that drought and flood cannot be prevented and we must, therefore, learn to live with them. Anything that cannot be measured cannot be managed properly. Hence there is importance of early warning systems to manage disasters. In this connection, he highlighted the initiatives taken up by Govt. of Karnataka. These include; improved rain gauges, radars and various other modern measures. He further highlighted the importance of maintaining the instruments properly for example, ensuring that rain gauge instruments are kept free from obstructions (building, shades, etc.).



Presentation by Dr. V S Prakash, Director, KSNDMC. On the dias Dr. M P Singh, Director, Flood Control Application, CWC & Dr. Veena Khanduri, Adviser, IWP

In the afternoon, Dr. Rajender Singh gave a brief presentation on **Tarun Bharat Sangh (TBS)** in achieving drinking water security in water-stressed Alwar district, semi arid area of Rajasthan. The intervention area comprised of 600 villages in Alwar district. The area has a harsh, semi-arid climate with temperatures fluctuating from 7^o C in winter to 43^o C in summer. Rainfall is 600 mm per annum, 90.0 per cent of which is received in July-September.

In 1985, when TBS made entry into the area, degraded and barren lands in the catchment area of Arvari river and the extended drought had forced the people to migrate from their villages. The main problem of the area was acute scarcity of water for drinking, agriculture, livestock, erosion & silting during the monsoons. As a result women had to spend 4-8 hours per day in fetching water, drop-outs of girl child from school to attend to household chores, low agricultural production, distress migration, low standard of living, unemployment and mal-nutrition.



Rainwater Harvesting Structure (Locally called as Johad)

The TBS, through peoples' participation built a series of rain water harvesting structures and undertook forest conservation activities. 10,000 structures have been built in the area. For 40.0 per cent of the structures TBS provided financial support to the community and in the rest of the cases only social mobilization and technical support was given. Soon the benefits of these structures began to be visible. These included increased water availability for irrigation, drinking and other domestic purposes, increased bio-mass and fodder availability, more time to women for child care, increased milk production, good health and increase in micro-enterprises.

In the TBS approach, the work begins with community awareness building regarding water management, respect for culture and traditions. Therefore, Village Councils are constituted which meet monthly. Traditional technology moderated by new technology is relied upon to the maximum extent. All decisions, including technology choice are taken by the Village Councils through consensus. 30.0 per cent of the total cost of the work is borne by the community. The entire responsibility of Operation and Maintenance (O & M) rests with the community. River Basin Organizations have been formed to plan for sustainable use of water, particularly for agriculture. Types of structures include; *Ani-cuts*, *Bandhs*, *Zohads* (ponds) *Talabs* (big ponds), *Medhbandies* (field bunds) and *Tankas* (underground structures to collect and store rain water for drinking purpose). The cost effectiveness of these structures are known by the fact that over 70.0 per cent of their cost is less than Rs. 45,000/- .

There is reduction in monsoon run-off by 25.0 per cent as the rainwater harvesting structures are able to arrest and share the run-off, leading to recharge of groundwater. The incremental recharge has been 15.0 per cent, increasing the total recharge to 30.0 per cent. Increase in well water levels has helped to solve drinking water scarcity.

Water resources are among the most vulnerable sectors to be affected by the climate change. Change in rain-fall pattern is believed to exacerbate the scenario. The TBS experience reveals that promotion of traditional water harvesting structures through appropriate institutional mechanisms and financial arrangements would be the best intervention or adaptive mechanism to reduce the adverse impact of climate change on groundwater resources as well as farm economy based livelihood.

Employment generation has increased due to intensification of farming and allied activities. Agriculture has diversified into floriculture, vegetable cultivation, etc. due to increased availability of irrigation water.

River Aravari which had completely dried-up, have been revived and Bhagani river disappeared in 1940s was also revived in 1997 through the efforts of TBS. Other rivers benefitted are Ruparel, Sarsa and Jahajwali. The most conservation water management systems consist in compensatory agricultural crop patterns, in which a farmer can devote only 25.0 per cent of his land for water intensive crops. Most have

substituted sugarcane with mustard; discouraging sale of agricultural land to industries in water based enterprises such as; brewery soft drinks, mineral water, etc.



Site of Disappeared Bhagini River during 1940s



Bhagini River in 1997 after revival

Prof. K N Joshi of Institute of Development Studies (IDS), Jaipur gave a lucid presentation on “**Remote Sensing and Disaster Management**”. He informed the participants about the use of remote sensing satellites to monitor the change in land surface, oceans and the atmosphere. They can provide information on earthquakes, volcanoes, cyclones, floods, droughts, forest fires, landslides, thunderstorms and oil pollution. Different types of satellites provide data and information rapidly in emergencies as well as in situations where disasters are imminent and action is required for disaster preparedness. This is very important, especially in an area affected by an earthquake, flooding or forest fires, especially when there may not be enough time to prepare for such disasters. Satellites also help to assess the damage through conventional ground or aerial surveys.

He further stated that drought results from non-occurrence or delay of monsoon and its intensity, and they may extend for weeks to several months. Its severity index is 9.3 in a scale of 10. Floods last for a few hours to several days and occur during July-September and have a severity index of 10. Data from satellites provide real-time and accurate information for identifying, mapping and managing natural hazards of geographical origin and helps in prediction of their occurrence and provide warning to people who are at risk to take preventive measures.

Prof. Joshi explained the concept of meteorological, hydrological and agricultural drought. Remote sensing applications in agricultural drought studies focus on area under crops. Crop classification and distribution, identification of crop diseases and pests, assessment for loss of agricultural land due to calamities, crop condition/stress assessment and yield estimation.

In floods, they help in damage assessment, flood plain mapping, flood risk zone mapping, bank erosion information and pre & post flood information. Towards the

end of his presentation, Prof. Joshi dealt with the use of remote sensing application in Barmer (Rajasthan State) flood disaster, which occurred in a drought prone area with average rainfall of 277 mm.



**Presentation by Prof. Santosh Kumar,
NIDM, New Delhi**

Prof. Santosh Kumar of NIDM made a succinct presentation on ***"Too Little Water in Changing Climate"***. He started by mentioning that the only disaster officially declared is drought, whereas in United States of America every natural disaster is officially declared. Elements of risks in natural disasters can be analyzed as an intervention between hazard, exposure, vulnerability and location. Losses may be direct, indirect or secondary.

In the latter half of the 19th century, there were 25 major famines in India, which killed 30-40 million people. Green revolution in the 1960s, helped to reduce famine though the population has tripled since independence. Drought in 2009 affected 15 States of India (352

The questions that need answers are; (a) Why we are in drought path?; (b) How climate change will change hazard profile?; (c) What would be the intensity and frequency of further risks and whether we need to revisit our development programmes and policy?

districts) including Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Nagaland, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Orissa, Rajasthan and Uttar Pradesh. Prof. Santosh further said that seven different types of relief funds are currently available. The total expenditure on calamity relief from 2001 to 2007 has been to the order of Rs. 39766.94 crores.

Climate variability is evident in the Karnataka Floods of 2008, Jodhpur Cloud burst in 2007, emergence of new flood prone areas in Krishna-Godavari river basins (2004, 2007 and 2008), reduced winter time, increased summer period, unpredictable rain behaviour, increase of drought prone States from 6 to 13, emergence of new insects, etc. Such changes introduce new unknowns. Government initiatives include; formulation of National Water Policy-1987, Sustainable Agricultural and Rural Development Programmes (as part of Agricultural Development Strategy-1999), Soil and Water Conservation Programmes, Watershed Development Projects, etc.

Early warning of drought is based mainly only on rainfall predictions – long range prediction of seasonal total rainfall by IMD, medium range prediction by National

Centre for Medium Range Forecasting and short range prediction by IMD based on Indian National Satellite System (INSAT) data supported by weather and agro-met observations.

Another major programmes of drought mitigation are; (a) Desert Development Programme (DDP) ; (b) Drought Prone Area Programme (DPAP); Accelerated Rural Water Supply Programmes, etc. The mitigation focus relies on improvement in agriculture, management of range land, development of water resources and animal husbandry, etc. The challenges of the future are evident from the fact that Cherrapunji which receives 11,000 mm of rainfall faces drought for 9 months of the year. Drought is not just a matter of the quantity of rainfall but the policy and practices of holding water where it falls. With less than 100 hours of rainfall in a year in the country, the key challenge is to store this precious water for early dry season period. Today individual and communities have given up managing their water and want government to take over the entire function. We need a paradigm shift from dependency to empowerment. We also need to ensure water entitlement along with food entitlement.

80-90 per cent of drinking water and 50.0 per cent of irrigation water comes from groundwater. Spread of tube wells and their dependency is affecting the aquifers. Water is still considered as a private resource; it should be treated as a common pool resource.

In the panel discussions that followed, there was discussion on the need to give voice to the people in terms of their right to water. One participant pointed out that the right of life is automatically the right of water. But there was a counterpoint that empowerment cannot be through the stroke of a pen or a legal dictate, but is a process that must emerge out of sensitization and education. In this intervention Dr. Sivasubraminaiuam of MIDS talked about the need to conserve water that is going waste at present, the need for weekly forecasts on climate, a T V channel devoted to climate and related agricultural know-how, and a proper policy that makes rainwater harvesting compulsory. In order to tackle encroachment on tanks and other Common Property Resources (CPRs), he suggested verifying the status of the CPR from settlement registers and taking legal action to vacate the encroachments. Prof. K J Anandha Kumar of NIDM in his intervention informed the house that a dedicated channel for agriculture is on the anvil but viewership may be a problem. He also informed that there is no dearth of funds for creation of new storage structures and revival of old ones. Prof. Prem Vashistha posed a question whether IWP and its partners need to strive to influence the National Water Policy. On this query, Dr. Veena Khanduri mentioned that the IWP Zonal Water Partners have already provided suggestions to Ministry of Water Resources, Government of India in a consultative meeting held at New Delhi on 26th October, 2010.

Day-2 (22nd December, 2010)



**Presentation by Dr. K J Anandha Kumar,
NIDM, New Delhi**

The second day of the workshop was dedicated to a comprehensive discussion on floods. The day got off with a presentation on the “**National Perspective on Floods**” by **Dr. K J Anandha Kumar of NIDM**. He said that both floods and droughts are faced in several parts of India. Of the major disasters in the World, 32.0 per cent relates to floods, 22.0 per cent to droughts and 30.0 per cent to tropical cyclones. Among

people affected, 32.0 per cent suffer due to floods and 33.0 per cent due to drought. Of the total water available on earth, World fresh water accounts for only 3.0 per cent (37.5 million cubic km) and the rest is saline water. Groundwater accounts for 22.0 per cent of fresh water, glaciers and ice caps account for 77.0 per cent and lakes, rivers and streams for only 1.0 per cent. Flood is an overflow or accumulation or expansion of water that submerges land. Floods are aggravated by the loss of river plain, which is also the domain of the river just as the river channel. River flooding is caused by inadequate capacity within banks of rivers to contain height flow, river bank erosion and silting of river beds, landslides, poor natural drainages and flow retardation due to tidal and backwater effects. The primary effects of flood relate to physical damage of bridges, buildings, sewer systems, roads, etc. to loss of lives of humans and livestock and spread of epidemics and water borne diseases. The secondary effects include; contamination of drinking water, loss of harvest, food storage, and damage to vegetation. The long term effects are distress migration, school dropouts, rebuilding costs, inflation, decline in tourism, etc.

In India, an area of 40 million ha is under flood prone and every year, 8 million ha is affected by floods. Brahmaputra and Ganga basins being the most flood prone. The other flood prone region is the North-West part of the West flowing rivers such as Krishna, Cauvery and Mahanadi. Flood is usually controlled through levers, bunds, reservoirs and weirs to prevent rivers from breaking their banks. When these fail, sand bags are used. Flood

- **40 million hectares are prone to flood**
- **8 million hectares affected by flood every year**
- **Brahmaputra and Gangetic Basin are most flood prone areas**
- **North-west region of west flowing rivers – Krishna, Cauvery and Mahanadi – are other flood prone areas**
- **Floods in the Indo-Gangetic-Brahmaputra plains are an annual feature. On an average, a few hundred lives are lost and millions are rendered homeless**

management measures include; structural measures (physical works for modifying flood damage) and also non-structural measures (planned activity to modify susceptibility to damage).

The National Water Policy has a special section of flood management. It envisages a Master Plan for flood control and management of each flood prone basin; an adequate flood-cushion in water storage projects. It also talks of strict regulation of settlement in flood prone zones and also modernization of flood forecasting system. On the other hand, much of the river bank of Yamuna in Delhi has been brought under residential buildings or facilities like of Common Wealth Games, 2010. In the ensuing discussions Prof. K N Joshi of IDS, Jaipur wanted to know whether there is a map of flood prone villages in India. The response was that the primary data source is Central Water Commission (CWC) but for micro-level data, State Governments have to be approached as water is a State subject. The All India Institute of Disaster Mitigation, Ahmadabad may also have some information.

Dr. M P Singh, Director (Flood Control Application) in the Central Water Commission, Government of India, New Delhi made a presentation on **"Flood Forecasting and Early Warning System"**. Dr. Singh informed the house that flood forecasting is one of the most important non-structural measures to control and manage floods. It involves estimating future stages or flows, and its time sequence-select points along the river during floods.



Presentation by Dr. M P Singh, Director, Flood Control Applications, Central Water Commission, New Delhi

- **Flood Forecasting & Advance Warning System plays an effective role in reducing the loss of lives and movable properties during floods.**
- **It is one of the effective measures of Flood Management and Disaster Risk Reduction.**
- **In India, Flood Forecasting is done by Central Water Commission (CWC) of Ministry of Water Resources, Govt. of India.**

Flood forecasting is done by the Central Water Commission. It started in 1958 at the railway bridge in Delhi along the river Yamuna. The disastrous flood in 1968 in many parts of India necessitated setting up of forecasting centres on many other inter-state rivers. From one in 1958, the number of centres grew to 175 in 2006. The forecasting stations are located in 9 major river basins covering 70 inter-state rivers. Out of 175 stations, 147 are water level forecasting stations, and

28 are inflow forecasting stations. About 6-7 thousand forecasts are issued during monsoon season and the accuracy of the forecasts is 96.0 per cent.

State-wise Number of Flood Forecasting Stations in India

State	Nos.	State	Nos.
Andhra Pradesh	16	Madhya Pradesh	3
Assam	24	Orissa	12
Bihar	32	Tripura	2
Chhattisgarh	1	Uttar Pradesh	35
Gujarat	11	Uttarakhand	3
Haryana	1	West Bengal	14
Jharkhand	5	Delhi	2
Karnataka	4	Dadra & Nagar	1
Maharashtra	9	Haveli	
Total	175		

Dr. Singh further said that the forecast data is disseminated to user agencies such as Civil Aviation, Defense, Railways, etc. in the flood-prone areas through telephone/fax/e-mail/special messenger. The forecast are also broadcast or telecast through radio, television and print media. The forecasting system is being further modernized. State Flood Control Rooms have the role of flood warning and action. They have to be prepared for flood fighting, take action on flood forecasts, review flood situation and disseminate information thereon and issue flood warning in time. Evacuation/shifting of people to safe places, management of relief camps, maintaining hygiene and rehabilitation are responsibilities of the State Flood Control Rooms. The issues that need to be attended to, are (a) sharing of flood information by the upper riparian with the lower state for release of water from reservoirs; and (b) Inspection of embankments before and during flood season and identification of vulnerable locations. Flood forecasting and early warning is time sensitive and must be faster than the floods. Warning must reach well in advance, time for action must be available and the information must be relevant and accurate. There is also a need to develop large scale maps for preparing inundation maps/flood risk maps, demarcation of flood zones at various levels on the ground. There is also need to create awareness among the people and proper guidance also needs to be given.

Dr. Singh also mentioned that inter-country exchange of information exists between India, Pakistan, Nepal, Bangladesh and Bhutan. There was a question about the occurrence of flash floods as a result of climate change. The response of Dr. Singh was that the Central Water Commission deals only with flood prone rivers. State Disaster Management Authority and District Disaster Management Authority must supplement the work of Central Water Commission by installing more forecasting stations.



**Presentation by Dr. Aneesh Chatterjee,
AFPRO, New Delhi & Representative,
Northern Zonal Water Partnership**

The next presentation was made by **Dr. Aneesh Chatterjee** of Action for Food Production (AFPRO), New Delhi and representative from Northern Zonal Water Partnership on ***"Experiences of Flood management in Dhemaji District of Assam"***. In the chronically flood prone area, crop

production and livelihoods are severely affected by flood. AFPRO is implementing a three years project

supported by National Agricultural Innovation Project, Indian Council of Agricultural Research, Govt. of India to improve the livelihood of rural poor with efficient management of natural resources through which productivity, profitability and diversity of farming systems can be enhanced. A multi-pronged strategy is adopted to address food and crop security through integrated farming system, intensification and diversification of agriculture, land & water resources management, livestock (for example; piggery, fishery, farm mechanization, etc. System of Rice Intensification (SRI) method and early maturing varieties are adopted in paddy cultivation to enable crop to be harvested before floods. To help early planting, rice nursery is developed in poly-houses. For silted areas, potato cultivation has been adopted successfully. Cropping pattern is attempted by convincing farmers through field demonstrations. Alternate income generating activities (e.g, tailoring, women operates rice mills) are encouraged through Self Help Groups. Innovations include using kerosene lamps in poultry yards as there is no power available, provision of information about weather and agro-advisories through SMS (by a Bangalore based company), use of a hand driven weeding machine, introduction of winter vegetables, storage structures for food grains and fodder, capacity building through barefoot technicians, etc.

Appreciating the innovative nature of the project, Dr. V S Prakash lauded particularly the mechanization efforts. He also pleaded for diversion based irrigation system in Jharkhand, Chhattisgarh and Vidarbha, where not rainfall but conservation of rainwater constitutes the major challenge. Water can be made to flow into the fields through gravity by diversion channels. Along with this, improved practices like SRI must be adopted.

The last presentation on ***"Floods in Odisha – the Recent Challenges"*** was made by **Mr. Tapan K Padhi** of National Institute for Development, Bhubaneswar and Coordinator Eastern Zonal Water Partnership. Mr. Padhi said that in Odisha every three out of four years have experienced floods. Delta region and coastal areas is the most flood prone and people have



Presentation by Mr. Tapan K Padhi, NID, Bhubaneswar & Coordinator, Eastern Zonal Water Partnership

developed their own mechanisms to cope with floods. It was a part of agrarian rhythm, as flood rejuvenated land though it also brought distress. The culture of controlling floods through embankments was introduced by the colonial rulers, which is being followed even after independence. Embankments created exclusive flood controlled zones at the cost of increasing flood damage in the non-embanked areas. Flood enquiry committees have found the embankments as harmful, as they have raised river beds due to siltation as year after year height of embankments are being raised. Rivers now flow at higher levels than habitations. Rainwater and flood water after breaching cannot get back to the river as it is flowing at a higher plane. Sun drying or percolation is the only option for waterlogged areas. The embankments were designed for 9 lakh cusecs of flood water, but in 2008 they had to tackle 17 lakh cusecs, causing overflow. It is predicted that future floods may be to the extent of 22 lakh cusecs, and in such as instance, disaster is just waiting to happen. No wonder, villagers are resisting the raising capacity of flood embankments. Today there is absolutely no flood zone planning. Flash floods have become almost a regular feature recently. For example; 2006 floods in Sambalpur, floods in Bolangir which encroached the drain lines of the city. Instead of continuing with structural measures, it is time that we give more attention to watershed management, climate change action plan, dam safety and community contingency plan, drainage, land use planning based on hydrology, etc.

Mr. Padhi also remarked that Asian Development Bank's Integrated Water Resource Management (IWRM) document was prepared by external consultants without consultation with the stakeholders. He also mentioned about new water policy initiatives in Odisha which include 25 times increase in water cess for industry on the other hand legalizing groundwater extraction by industry and also on the other hand provision of 90.0 per cent subsidy for groundwater extraction. He also said that a draft Groundwater Bill was framed in 1994, reframed in 2006 and enactment is planned only in 2012.

Recommendations emerged during Experience sharing

The presentations made by the participants suggested that there is a need to advocate for a more holistic view on adaptation to climate change, where climate is one driver of many. There is no single adaptation solution. Effective and sustainable adaptation to climate variability and change requires a combination of measures that must be taken-up at community, local, national and global level. The discussions and consultations with researchers, Government officials and Zonal Water Partners suggested the following recommendations that would be helpful for Zonal Water Partners to build adaptive resilience in their respective area of operation.

- **Water Resources Management : Resilience Measures**

There is a need for more emphasis for pursuing water conservation measures across drought prone states by shifting in agriculture system i.e, growing of more productive and less water absorbing crops. For example; water efficient process for paddy cultivation, promotion of oilseeds and pulses, promotion of millets and use of low external inputs in agriculture. Besides this, there are other ways in which rain fed farming system can be made more sustainable in semi-arid areas. Some innovative methods shared by participants include non-pesticide management, water saving, composting methods, seed production, livelihood opportunities associated with agro-forestry and livestock based production systems.

In flood-prone zones of the country, flood-resilience agriculture provides a way to cope-up with livelihood security against flood damage. Aquaculture is one option with considerable scope of income generation and livelihood activities. However, investments in addressing both the research and supply chain need to be strengthened.

- **Strengthening Forecasting Information Systems and Mechanism**

Generating quick and correct high resolution climate information is an important first step to project climate risk into development decisions in the States. Hence with more localized meteorological data (generated at district level and block level) and climate models, Government can help to better identify areas at risk. Hence strengthening climate information systems & mechanisms and related management tools to match current and future needs is a priority.

While technologies can help in forecasting floods in advance, the information needs to be integrated into planning that reduces the magnitude of the flood and vulnerability to the flood.

- **Strengthening Institutional Capacity and Programme linkages**

There is a large number of Central and State sponsored programmes for addressing drought that are being implemented under different guidelines and by various implementing agencies. These include rural livelihood projects, Drought Prone Area Program (DPAP) under Ministry of Rural Development, Government of India, Farmers' School under the Department of Agriculture, Government of India. Integration is needed for facilitating the greater synergy with ongoing programmes.

V. Valedictory Session

The valedictory session was chaired by Prof. S K Goyal. Dr. Veena Khanduri gave broad outline of the deliberations that took place during the two day sensitization programme. **Mr. Vinod Bodhankar** made presentation on **"Ramnadi Flooding 2010 and Significance of Devnadi-Devrai and Ramnadi People's Initiatives**. On his experience on Ramnadi Swatchata Abhiyaan, Mr. Bodhankar said that in the last week of September, 2010, after unusually heavy rains the Ramnadi river in Pune was flooded and this resulted in loss of 10 lives and crores worth of property. While this was not a disaster of epic proportions, nevertheless, it was an early warning to Pune, and other urban areas of what can happen if current patterns of contractor driven development are allowed to continue by the people. Citing the Ramnadi people's initiative, he said that the Dev-nala in Baner, Pune has a section of 100 meters adopted by the resident families (200 in number) of the housing societies Concorde Proxima and Gera Emerald. Over 2 years they have taken back the walls on bank of nala to the mandatory 7 meters on both banks thereby respecting Green-Zone law of no-construction in green-zone of nala. They created a garden there which enhances the purity of nala water by the vegetation eating away the organic wastes in the water. They created a Green-Bridge bund which filters the organic impurities and traps plastic etc, which is removed. They cleaned the banks of the nala once a week and planted and created a nala-garden there on both banks.

When the City Government earth movers and diggers came to uproot the nala-garden, which is an eco-restoration of the Dev-Nadi banks, the residents and supportive NGO members from across Pune blocked the JNURRM project of concretizing the Dev-nala which they have renamed as Dev-Nadi. Now the Zonal Commissioner will re-study and re-structure the whole project of concretizing the Dev-Nadi and involve the Initiators of the Dev-Nadi Dev-Rai Project in the entire planning and eco-restoration of 5 km long Devnadi. (Devnadi = Sacred River; Devrai = Sacred Grove).

The Ramnadi Swattchata Abhiyaan (RSA), is today into its fourth year. After one year of planting and sustaining survival and growth of 7000 saplings on Tukai hill (in catchment area of Ramnadi) RSA has continued this Tukai-Hill plantation and also begun bank cleaning and tree planting on banks of Ramnadi. The work has extended itself for 2 kilometers on Ramnadi banks and involves local residents as volunteers who visit river banks to clean them manually for 1 hour every week. Once the bank is clean they plant trees and reclaim the banks for the river so that the river can enjoy her earlier beauty and richness of nature.

The work-model of Ramnadi River-eco-Restoration is replicable. Similar work is initiated on 11 tributaries/nala-banks and two more river-banks and the Devnadi Devrai Project is one such people driven initiative.

In the Ramnadi Eco-Restoration work a construction company which had Ministry of Environment, Govt. of India permission to build a private Sewage Treatment Plant (STP) inside the River-Bed-STP has responded to lobbying by Ramnadi Activists and has built the STP above the flood line. This is because the construction company owner had the knowledge that the activists have been working every week for years together in that section of the river and river bank to create a garden there. In essence he was inspired to join the river-eco-restoration drive called Ramnadi Swachata Abhiyaan. The success of the Ramnadi experiment has attracted to it well known activists and mentors such as Dr. Rajendra Singh (Magsaysay Awardee and founder of Tarun Bharat Sangh and Rashtriya Jalbiraadari) and Prof. Vijay Paranjpye (of IWP, Gomukh and West Zone Water Partnership) to guide and help synergize the people's movement further.

It is a movement in which it is not just the river water quality and river banks ecology which is uplifted but the very activists who volunteer are uplifted and growing towards a successful City-Wide Network (67 NGOs) which is affecting Governance and Policy, Current and Future.

Prof. Goyal in the valedictory address expressed happiness on the theme of the two day sensitization programme and the nature of discussions. He said that it was a learning experience for him to understand the basics of drought and flood and how community has evolved mechanism in management of floods and droughts. Prof. Goyal further mentioned that among the agricultural and rural development programmes launched by Government of India, nearly 50 per cent are based on water and this provides a tremendous opportunity for the role to be played by IWP with the help of zonal water partners to sensitize the community about how to manage and mitigate the effects of flood and drought.

The session concluded with the vote of thanks by Dr. Veena Khanduri.

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**Concept note
on
Two day Sensitization Programme for Zonal Water Partners on
Flood & Drought Mitigation and Management**

Context

Geo-Climatic conditions of India make it prone to various natural disasters. India faces both flood due to excess water and drought due to deficit water in different parts of the country or sometimes same part in different periods. India is one of the most flood prone countries in the world. The need to combat the perennial problem of floods and the resultant destruction has been at the forefront of concern. Around 12% of the country's land area is prone to floods which means around 40 million hectares are prone to flood and annually on an average 8 million is affected by floods. Although it is impossible to prevent floods completely, losses due to floods can be minimized by better preparedness, mitigation, planning and timely response.

Drought is one of the most costly hazards affecting India and thus has a major impact on the Indian society and economy. From time immemorial, drought had severe and catastrophic effects on the vital activities of mankind. The Indian agriculture vitally linked to the monsoon performance has suffered several onslaughts from recurring droughts. Drought management is always a measure of responsiveness and resourcefulness of governments at different levels. It requires a strong institutional structure to monitor and provide a timely response to drought. Thus this calls for efficient management of water resources involving all the stakeholders 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.

In order to cope-up with these challenges, there is an urgent need for capacity building of community by sensitizing them on flood and drought disasters for taking preparedness and mitigation measures.

Objectives

The proposed two days sensitization programme will primarily focus on enhancement of knowledge and skills of the participants to understand and respond to various core issues in flood risk mitigation and drought mitigation and management. This will also give exposure to the participants to take better preparedness and mitigation measures before / during the time of such disasters.

The key objectives of this programme :

- ◆ To provide the participants an overview on flood and drought scenario of India and concepts of flood & drought management.
- ◆ To enhance understanding concerning the nature, extent of the threats and the value of counter measures to combat the adverse impact of flood/drought.
- ◆ To mainstream disaster risk reduction in the developmental activities.
- ◆ To provide forum for developing the requisite behavioral skills and attributes through exchange of technical and practical ideas and sharing of experiences among the participants.

The Organizer

India Water partnership (IWP) in collaboration with its Host Institution – Institute of Studies in Industrial Development (ISID), New Delhi and National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Government of India is organizing a **Two Day Sensitization Programme for Zonal Water Partners on Flood & Drought Mitigation and Management** on 21st & 22nd December, 2010.

India Water Partnership (IWP)

India Water Partnership (IWP) is the Country Water Partnership functioning under the overall framework of Global Water Partnership (GWP) headquartered at Stockholm, Sweden. IWP became a legal entity on November 28, 2001 with its Memorandum of Association registered in the State of Haryana under the Societies Act, 1860. It was first hosted by Water and Power Consultancy Services Ltd. (WAPCOS), New Delhi. Institute for Studies in Industrial Development (ISID), New Delhi is the present host institution of IWP.

IWP has been active in promotion of Integrated Water Resource Management (IWRM) principles and practices through IWP network partners to support national development priorities. Some of the core priority areas are: promoting IWRM approach effectively through workshops and consultations to address adaptation to climate change with the support of zonal water partners across the country; encouraging use of innovative low cost water saving technologies by the farming communities; sustainable natural resource management; integrated domestic water management; promoting Area Water Partnership (AWP) for river basin management; conflict resolution on water sharing; inter-state trans-boundary water sharing issues, gender mainstreaming, etc.

Institute for Studies in Industrial Development (ISID)

The Institute for Studies in Industrial Development (ISID) is a multifaceted institution pioneering in many aspects of industrialization and corporate and industrial sectors, trade, investment and technology, trade policy research and building up of research infrastructure. The objectives of ISID include undertaking research, promotion of debates on issues relating to development in general and industry in particular, and building-up of databases. Besides offering its databases and other research infrastructure to scholars, the ISID has also been promoting social science research through special training programmes, advice, seminars, research publications and provision of computing facilities.

ISID is the current Host Institution of IWP. Prof. S R Hashim, (Former Director, ISID & formerly Member Secretary, Planning Commission, Chairman, UPSC) is the President of IWP.

National Institute of Disaster Management (NIDM)

The National Institute of Disaster Management (NIDM) is a premier national organization working for human resource development at national level in the area of disaster mitigation and management. Over a period of time, it has emerged as a premier institution specializing in disaster management in South Asia.

In the backdrop of the International decade for Natural Disaster Reduction (IDNDR), a National Centre for Disaster Management was established in 1995 in the Indian Institute of Public Administration (IIPA) by the Ministry of Agriculture and Cooperatives, then nodal ministry on disaster management in the

country. The Centre was upgraded as the National Institute of Disaster management (NIDM). The Institute was inaugurated by Shri Shivraj Patil Union Home Minister on 11th August, 2004.

The Institute has achieved the status of a statutory organisation under the National Disaster Management Act 2005. Section 42(8) of the Act has made the Institute responsible for 'planning and promoting training and research in the area of disaster management, documentation and development of national level information base relating to disaster management policies, prevention mechanisms and mitigation measures'.

Invitation

IWP cordially invites you to participate in the Two Day Sensitization Programme. Kindly confirm your participation by return e-mail.

Venue

Institute for Studies in Industrial Development, New Delhi , 4, Institutional Area, Vasant Kunj, New Delhi – 110 070 , Phone no.: +91-11-26761600-899, Fax : +91-11-26761631; E-mail : iwpneer@gmail.com

Contact us : In case of any difficulty in reaching the venue, you may contact Dr. Veena Khanduri, Adviser, IWP & Programme Coordinator, Mobile : 9891195806 or Mr. Mangla Rai, Office Assistant, IWP Mobile : 9555489400. Please visit <http://isid.org.in/loca.html> for the location map of ISID.

Accommodation

IWP has arranged accommodation for outstation participants in ISID Guest House from 20th December, 2010 (Night) to 22nd December, 2010 (Evening). In case you would make your own arrangements for stay, kindly let us know while confirming your participation through e-mail. You are also requested to indicate whether would be reaching ISID, New Delhi on 20th December, 2010 (Night) or in the morning of 21st December, 2010.

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**Two-day Sensitization Programme for Zonal Water Partners on
Flood & Drought Mitigation and Management**
(Organized by India Water Partnership in Association with NIDM & ISID)

December 21-22, 2010

at

3rd Floor Conference Hall
Institute for Studies in Industrial Development
4, Institutional Area, Vasant Kunj, New Delhi

PROGRAMME

Day I : 21st December, 2010

Time	Topic	Speaker
<i>Chairperson : Prof. S K Goyal, Vice-Chairman, ISID</i>		
<i>0930-1000</i>	<i>Registration</i>	
1000-1010	Welcome	Prof. Prem Vashishtha, Dean, Board Member, IWP
1010-1025	Inaugural Address`	Dr. Rajender Singh, Tarun Bharat Sangh, Rajasthan (Magsaysay Awardee)
1025-1035	Introduction & Objectives	Dr. Veena Khanduri, Adviser, IWP
1035 – 1120	Keynote Address - Disaster Management & Paradigm shift	Shri P G Dhar Chakrabarti, I.A.S. Executive Director, National Institute of Disaster Management (NIDM)
<i>1120-1130</i>	<i>Tea Break</i>	
1130- 1230	Community level Drought mitigation challenges- upscaling	Dr. Rajender Singh, Tarun Bharat Sangh, Rajasthan (Magsaysay Awardee)
1230 – 1300	Too little water in changing Climate scenario	Prof.Santosh Kumar, NIDM
1300-1330	Drought Risk Reduction & Vulnerability assessment for Climate change adaptation approaches	Shri S C Jain, Programme Coordinator, AFPRO and Northern Zonal Partner
<i>1330-1430</i>	<i>Lunch Break</i>	
1430 - 1530	Monitoring and Early Warning system in drought Management	Dr. V.S. Prakash Director, Karnataka State Natural Disaster Management Centre (KSNDMC), Bangalore
1530-1600	"Remote Sensing in Disaster Management"	Prof. K N Joshi, IDS Jaipur and Coordinator, Northern Zonal Water Partnership
<i>1600-1610</i>	<i>Tea Break</i>	
1610 – 1700	Panel Discussion 'Necessity of Public participation in water resources management'	Dr. V.S.Prakash Prof. Santosh Kumar Prof.K Sivasubramaniyan, Madras Institute of Development Studies (MIDS)- Southern Zonal Water Partnership Dr. Veena Khanduri

Day II : 22nd December, 2010

Session	Topic	Faculty
1000 – 1100	Introducing Flood –National Perspective Audio-Visual Film – A movie on basics of Flood	Dr.K.J. Anandha Kumar, NIDM Film by Govt. of WB
1100-1115	<i>Tea Break</i>	
1115 – 1215	Flood Forecasting and Early Warning System	Shri M.P. Singh, Director, Central Water Commission
1215-1245	Live with the flood – an approach to enhance livelihood of vulnerable community	Dr Anish Chatterjee PSC – AFPRO, Northern Zonal Water Partner
1245-1330	Floods in Orissa- Recent Challenges	Mr. Tapan K Padhi, National Institute for Development (NID), Bhubaneshwar & Coordinator, Eastern Zonal Water Partnership
1330-1430	<i>Lunch Break</i>	
1430-1530	Film on case studies in Maharashtra: Discussion	Film by University of Pune./Dr.K.J. Anandha Kumar, NIDM
1530-1630	Experience Sharing by Zonal Partners	Moderator - Prof. Santosh Kumar, NIDM , Mr.Vinod Bodhankar, Western Zonal Water Partnership Prof. K N Joshi & Prof.K Sivasubramaniyan
1630-1640	<i>Tea Break</i>	
1640 – 1715	Valediction	IWP-ISID

**Two-day Sensitization Programme for Zonal Water Partners on
Flood & Drought Mitigation and Management**
(Organized by India Water Partnership in Association with NIDM & ISID)

December 21-22, 2010
at
3rd Floor Conference Hall
Institute for Studies in Industrial Development
4, Institutional Area, Vasant Kunj, New Delhi

LIST OF PARTICIPANTS

S.No.	Name	Designation/Organization
1.	Prof. S K Goyal (Chairperson)	Vice-Chairman, Institute for Studies in Industrial Development (ISID), New Delhi
2.	Mr. P G Dhar Chakrabarti, I.A.S	Executive Director, National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India
3.	Prof. Santosh Kumar	Head, Policy, Planning & Cross Cutting Issues Division, NIDM
4.	Dr. K J Anandha Kumar	NIDM
5.	Dr. V S Prakash	Director, KSNDMC, Bangalore
6.	Dr. Veena Khanduri	Adviser, IWP & Programme Coordinator
7.	Dr. Rajendra Singh	Tarun Bharat Sangh, Rajasthan (Magsaysay Award Winner)
8.	Dr. M P Singh	Director, Flood Control Applications, Central Water Commission. Govt. of India
9.	Prof. K N Joshi	IDS, Jaipur, (Coordinator, Northern Zonal Water Partnership)
10.	Mr. Tapan Padhi	National Institute for Development, Bhubaneswar (Coordinator, Eastern Zonal Water Partnership)
11.	Mr. Bilal Ahmad Pandow	SAVAE, Sri Nagar (Coordinator, J & K Region Zonal Water Partnership)

S.No.	Name	Designation/Organization
12.	Mr. Anand Kumar	Development Alternatives, New Delhi (Northern Zonal Water Partnership)
13.	Ms Neelam Rana	Development Alternatives, New Delhi (Northern Zonal Water Partnership)
14.	Ms Kavita Syal	Development Alternatives, New Delhi (Northern Zonal Water Partnership)
15.	Mr. S C Jain	Action for Food Production, New Delhi (Northern Zonal Water Partnership)
16.	Dr. Aneesh Chatterjee	Action for Food Production, New Delhi (Northern Zonal Water Partnership)
17.	Ms. Arti Gupta	PRAKRITI, Shimla (Zonal Water Partnership of Hill States and Himachal Pradesh)
18.	Mr.Vinod Bodhankar	Gomukh, Pune (Western Zonal Water Partnership)
19.	Mr. L Premananda	Wangjing Women And Girls Society (WWAGS), Manipur (North-Eastern Zonal Partnership)
20.	Ms. L.Mirana Devi	Research Fellow, Jamia Islamia University, New Delhi
21.	Prof. K Sivasubramaniyan	Madras Institute of Development Studies, Chennai, (Southern Zonal Water Partnership)
22.	Dr. Joseph Viruthiyel	Institute for Development Initiatives, New Delhi (Northern Zonal Water Partnership)
23.	Mrs. Anita Rana	Janhit Foundation, Meerut (Northern Zonal Water Partnership)
24.	Ms. Sonakshi	Janhit Foundation, Meerut (Northern Zonal Water Partnership)
25.	Mr. N P Singh	Centre for Environment and Development Study, Jaipur (Northern Zonal Water Partnership)
26.	Mr. Kesar Singh	Water Community India, New Delhi (Northern Zonal Water Partnership)
27.	Mrs. Minakshi Arora	Water Community India, New Delhi (Northern Zonal Water Partnership)
28.	Mr. Matthew Showly	Janhit Foundation, Meerut (Northern Zonal Water Partnership)
29.	Mr. Nisheeth Kumar	Knowledge Link, New Delhi
30.	Prof. Prem Vashishtha	Board Member, IWP

S.No.	Name	Designation/Organization
31.	Prof. Surajit Mazumdar	Institute for Studies in Industrial Development (ISID), New Delhi
32.	Prof. K S Chalapati Rao	Institute for Studies in Industrial Development (ISID), New Delhi
33.	Asstt. Prof. Partha Pretim Sahu	Institute for Studies in Industrial Development (ISID), New Delhi
34.	Asstt. Prof. Satyaki Ray	Institute for Studies in Industrial Development (ISID), New Delhi
35.	Asstt. Prof. Mahua Pal	Institute for Studies in Industrial Development (ISID), New Delhi
34.	Dr. T S Bhatt	Institute for Studies in Industrial Development (ISID), New Delhi
36.	Prof. K V K Ranganathan	Institute for Studies in Industrial Development (ISID), New Delhi
37.	Mr. Sudhir Aggarwal	Institute for Studies in Industrial Development (ISID), New Delhi
38.	Mr. Mangla Rai	India Water Partnership, New Delhi
39.	Mr. P K Rao	Institute for Studies in Industrial Development (ISID), New Delhi
40.	Mr. B Dhanunjai Kumar	Institute for Studies in Industrial Development (ISID), New Delhi
41.	Mr. Jeet Singh	Institute for Studies in Industrial Development (ISID), New Delhi

PARTICIPANTS DURING THE SENSITIZATION PROGRAMME



INDIA WATER PARTNERSHIP

India Water Partnership (IWP) is the Country Water Partnership functioning under the overall framework of Global Water Partnership (GWP) headquartered at Stockholm, Sweden.

IWP started as an informal body first under the Chairmanship of Prof. S R Hashim (the then Member Secretary, Planning Commission, Government of India) (1997-98). Dr. Y K Alagh (former Union Minister of Power, Science & Technology, Government of India) was its next President. Shri Balasaheb Vikhe Patil (former Member of Parliament & Minister, Government of India) was the President during 2004-06. Thereafter, Prof. S R Hashim took over the charge from Shri Patil in 2007 and continues to be its President.

IWP became a legal entity on 28th November, 2001 with its Memorandum of Association registered in Haryana under the Society's Act of India and was hosted by Water and Power Consultancy Services Ltd. (WAPCOS), New Delhi as the Host Institution till mid 2005. Thereafter, Agricultural Finance Corporation Ltd. (AFC), New Delhi became the Host Institution of IWP and continued till October, 2006. Institute for Human Development (IHD), New Delhi had the privilege of being the Host Institution from November, 2006 to till December, 2008. Institute for Studies in Industrial Development (ISID), New Delhi was its next Host Institution from January, 2009 to December, 2010. With effect from January, 2011, IHD is again hosting the IWP.

IWP has been active in promotion of Integrated Water Resource Management (IWRM) principles and practices through IWP network partners to support national development priorities. Some of the core priority areas are ; promoting IWRM approach effectively through workshops and consultations to address adaptation to climate change with the support of zonal water partners across the country; encouraging use of innovative low cost water saving technologies by the farming communities ; sustainable natural resource management ; integrated domestic water management ; promoting Area Water Partnership (AWP) for river basin management; conflict resolution on water sharing; inter-state trans-boundary water sharing issues, gender mainstreaming, etc.

IWP prepared "India Water Vision-2025" during 1999 based on the projections for country's water demand in 2025 on the initiatives of GWP and South Asia Technical Advisory Committee. The Vision Document was prepared after a series of four regional consultations with the senior government officials from Central and State Governments, policy makers, academicians, water experts, donor agencies, UNICEF, World Bank, NGOs and industry representatives.

IWP pioneered the concept of Zonal Water Partnerships (ZWP). Both IWP and ZWP work closely with the relevant water institutions, universities, CBOs/NGOs and other stakeholders at national, state and local level. IWP with the support of ZWPs in India is addressing the water centric issues through Panchayati Raj Institutions (PRIs)/Urban Local Bodies (ULBs) which have constitutional authority in the chain of civil authority structure.

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