

DELHI DECLARATION on Incessant Ganga 2017

Outcome of Conference on

“SEDIMENTATION, A COLOSSAL IMPEDIMENT TO INCESSANT FLOW OF RIVER GANGA – PROBLEMS AND SOLUTIONS”

Held on 18th-19th May 2017 at India International Centre, New Delhi

A Conference on “Sedimentation, a Colossal Impediment to Incessant Flow of River Ganga – Problems and Solutions” was organized by the Government of Bihar, Water Resources Department at India International Center on 18th – 19th May 2017 at New Delhi, to discuss various aspects of the problems caused by Sedimentation

- to the flow of the river,
- to the purity and natural health of the water in the river and
- to the life of the people in the river basin, upstream as well as downstream.

There was a consensus that the problem caused by Sedimentation is gigantic in nature as well as multi-dimensional and that - to find a comprehensive understanding and to design a set of solutions, in long-term strategy as well as in step by step implementation - is the need of the hour.

India's socio-cultural ethos is such that it is impossible to perceive the nation without the river Ganga. The basin of river Ganga consists of 26% of India's land mass and supports 43% of the country's population. The river carries 28% of the nation's surface water resources. The Ganga river basin covers 11 states viz. Uttarakhand, Uttar Pradesh, Madhya Pradesh, Rajasthan, Haryana, Himachal Pradesh, Chattisgarh, Jharkhand, Bihar, West Bengal and Delhi. With concern for this Ganga River System and population of the river basin at heart, scientists, researchers, policy makers, academicians, social activists, legal experts, NGOs and people's representatives gathered on a common platform to ponder over the issues and to find a common approach and road map to comprehensively understand and then to effectively address, on the field, the problems created by the out-of-control siltation. This Conference is the 2nd Conference in an ongoing series on 'Aviral Ganga', the first conference "Incessant Ganga" having been held on 25th-26th February 2017, at Patna, Bihar. It was recognized in that conference that creating an integrated framework of partnership for the River Ganga Rejuvenation Mission is a priority and that within this Mission the understanding of silt and sediment flows in the entire Ganga River and her tributaries is, now and henceforth, permanently highlighted and emphasized for inclusion and study in all current and future planning and implementation. The second conference was held to further this study, to follow up on the deliberate emphasis on siltation issues, and the findings and outcome thereof are this DELHI DECLARATION on Incessant Ganga 2017.

The conference, starting with a brief documentary highlighting the issue of high sedimentation in the Ganga river and its far reaching ill—effects, was full of lively discussions and brain storming, and was quite successful. The serious unavailability of sufficient data - about all aspects of the silt-load on the River Ganga – was improvingly reviewed during the Inaugural, Technical and Open Sessions. Regulation of sedimentation in the Ganga river basin and her sub-basins through a careful silt management policy, considering its healing impact on erosion and floods in the Ganga river system, was identified as a key imperative that needs special attention in the light of

- Rising demographic pressure on the land
- Sharply rising water use
- Dynamic changes in Land Use and Land Cover
- Global Warming & Climate Change and resulting erratic precipitation, extreme flood droughts

Inadequate carrying capacity in the river, over different return periods in different reaches of the Ganga River, causing sedimentation that brings changes in the river-bed forms, was also discussed.

The following points emerged as key concerns:

- An overview of sediment issues, considering causes and impacts
- Identification of priority issues and areas with respect to inter-basin variation
- Type and scale of sedimentation problems
- Social and Environmental aspects of sedimentation
- Geological and Geo-morphological changes; pre-Farakka and post-Farakka Barrage Scenario

Following strategies and studies for implementations are required:

- Estimation of sediment ingress to Ganga River affecting Bihar
- Spatio-Temporal study of evolution of water depletion in the summer & flooding in the rainy season
- 2-D Bursting Analysis of the Ganga stream flow from Buxar to Farakka (Turbulence Analysis) to comprehend impact of sediment dynamics on critical channel processes of sediment entrainment, transport and deposition
- Flood and flash-flood inundation area mapping through different time-lines. Hydrologic-Hydraulic Modeling for flood prediction and the propagation of early warning to populations with special accounting for the vagaries of climate change and cloudbursts. These hydrological models to be based on information of climate, soil

types, vegetation , precipitation & temperature based on available scientific data and fresh reviews.

- Vulnerability and risk appraisal of the embanked sections of the Ganga river system and network
- Socio-Economic Mapping of the vulnerability of natural resources and human resources
- Sediment Management prospects using Catchment Area Treatment plans, including prevention of erosion and de-forestation as well as acceleration of existing efforts in greening through afforestation – for the Ganga and all her tributaries
- Reduction of sediment input to the river system in concurrence with its local SEE approach
- Control of the sediment inflows using innovative techniques in high-risk sediment induced flood-prone areas
- Analysis for the prospect of remodeling Farakka barrage system to upgrade its hydraulic performance as well as sustainability by using state-of-the-art design techniques. Special study of alternate and latest technologies and innovations including ‘piano-key’ modification of barrages.
- Inter River basin impact and treatment management plan, specially other rivers joining.
- Sediment inflows due to sewage and municipal solid waste entry which make sediment unhealthy need to be trapped and managed.
- Innovative ideas such as Piano-key-weir system & other techniques and technologies available may be looked at as remedial measures.

Experts - from various institutions of repute like Indian Institute of Technology, National Institute of Technology, NEERI, NIH etc., social and religious institutional forums and individual researchers and personalities of eminence from religious, social, legal, judicial, administrative, river engineering, earth science, climate change and allied fields - participated wholeheartedly in the sessions and expressed their valuable suggestions. The Conference Management Team is thankful for their rich contributions.

The primary concerns and conclusions presented and shared were:

- (1) Life sustaining ecological purity of the river water is not possible without bringing back the incessant flow in the entire reach of the Ganga river and all her tributaries. A minimum situational flow-velocity is required to keep the silt flowing.
- (2) Need of accepting the inter-national and inter-state presence of the Ganga River Basin System thereby creating and sustaining a collectively agreed mutually enriching relationship of heart and mind, without which a comprehensive inclusive approach to rejuvenate and restore the Ganga will be impossible

- (3) There is a need for collective Mission-Mode approach of Government and public to evolve an equitable participation to make the Ganga river incessant and pure, Aviral Ganga and, therefore, Nirmal Ganga.
- (4) The Government of Bihar has resolved to take the lead along with the people of Bihar with all the invited experts from various sectors – to together address the issue of understanding silt and sediment flows in every section of the River Ganga and her tributaries – in order to evolve a thoroughly researched practical view to rejuvenate the river Ganga.
- (5) The entire house was deeply moved and inspired to reinforce and renew the intellectual acceptance of the respect for all river systems as well as the critically motivational emotional respect for all river systems of which the Ganga River System is traditionally considered the highest manifestation. It is agreed that, as we work with nature, we consider the survival and flourishing of the Ganga dolphin as the significant indicator of the health of the river Ganga. It is agreed that, as we give respect to the National Water Mammal dolphin and do our utmost to protect it, we are in effect also giving the highest respect to our National River and doing our utmost to protect her ability to bear and sustain the network of aquatic life which supports the dolphin.
- (6) The Civil engineering syllabus on Water Resources be updated with increased component of River Engineering. Post Graduate courses on River Engineering be started.
- (7) Public opinion of the people living in affected areas be recorded and considered.

The following points emerged as action points in the **Delhi Declaration on “Sedimentation, a Colossal Impediment to Incessant Flow of River Ganga – Problems and Solutions” 19th May 2017:**

- (1) That an interim steering committee, Ganga River and Basin Rejuvenation Council, should be formed consisting of various renowned experts from different disciplines, including NGOs
- (2) State-of-the-art Integrated Sediment Management in Ganga River System for Bihar flood mitigation should be planned. It should be a threefold integrated framework, namely –
 - i. Problem Appraisal-short term, Medium term and long term
 - ii. Quantitative Analyses on multi-faceted problem domain, and
 - iii. Analyses for developing sustainable mitigating solutions
- intertwined to synthesize solutions for mitigation of floods caused by increasing sediment deposits in Ganga River System, with specific reference to Bihar
- (3) That the compilation of works under Ganga River Rejuvenation Mission by different agencies should be integrated at one platform

- (4) That a time-bound comprehensive study be undertaken concerning siltation and its ill-effects due to the Farakka Barrage:
- i. All the gates and sluices should be made functional round the year
 - ii. To ensure representation of Bihar Government officers in operation, maintenance & monitoring of Farakka Barrage
 - iii. To analyze the remodeling prospects of Farakka barrage system to upgrade its hydraulic performance as well as sustainability using state-of-the-art design techniques in the existing installation and, if possible, an alternative solution may be explored
- (5) That a compilation of all initiatives of professionals, scientists, environmentalists, ecologists, NGOs be done, keeping in view the health of the Ganga River System
- (6) That a modular approach with a mapping of every aspect of the Ganga River Basin from source of the river and all her tributaries to the confluence with the Bay of Bengal, be created as shared-reference maps and documents at basin, sub-basin, macro-basin, micro-basin and watershed levels – to enable the setting of grades and Mission Implementation Priorities with respect to studying everything which positively or adversely affects the goal of ensuring an incessant flow. The maps will be based on remote sensing, geological, geo-morphological and geophysical data. The Data gathering and integration will be guided by a Real Time, Inclusive and Integrative ‘Data Driver Decisions’ (DDD) Model.
- (7) That release of requisite e-flows should be done by all dams and barrages upstream of Bihar as decided by scientific and systemic assessment
- (8) Dredging of National Waterways-1 is increasing erosion in Bihar. The project should be put on hold until a scientific study of impact of dredging on erosion is done
- (9) To ensure fair share of the water of the Ganga basin, originating from Gomukh and Badrinath, for Bihar and Bengal. It should be a joint responsibility of the Ganga Basin States to provide water to the Ganga to meet India’s obligation to Bangladesh
- (10) To ensure discharge at different sub-basin terminal points in the upper riparian States of River Ganga giving due consideration to the needs of population, agriculture, industry and other sectors. A thorough research and review of constitutional provisions with respect to water must be sought and renewed in the drafting of appropriate legislations and amendments as may be needed in the pursuit of Aviral and Nirmal Ganga. We must therefore guide our planning and implementation with supreme respect to guidelines in our Constitution such as:
- i. As envisaged in the Directive Principle of the State Policy, under Article 48 A. Protection of and improvement of Environment and safeguarding of forests and wildlife.
 - ii. To discharge Fundamental duty as envisaged under Article 51 A (g) to protect and improve the natural environment including forests, lakes. Rivers and wildlife and to have compassion for living creatures.

- (11) That while de-silting is a major intervention to restore the ecological health of the river we do not lose sight of every anti-pollution measure that can be planned and implemented to prevent the garbage, sewage and effluents of the populations in the Ganga river basin from reaching and polluting the river waters.
- (12) Instead of 'keeping the silt away' the strategy of 'giving the silt its way' should be adopted. Nevertheless, this does not detract from the need to green the catchment areas of the Ganga river and all her tributaries to reduce runoff and soil erosion. There is an equal need to pursue water-efficient agriculture and thus reduce the runoff from fields to the river. There is a need to plant trees from banks of the river to a depth of at least 1 kilometer on both sides of the river.
- (13) In exploring various solutions for de-silting on Upstream of and prevention of erosion Downstream of the Farakka barrage, structural modification measures or decommissioning are the possible alternatives
- (14) A comprehensive National Silt Management Policy is required to be formulated for Himalayan and alluvial rivers, keeping in view the alarming situation prevailing in Ganga River as well as the effect on the ecological health of the river.
- (15) That we draft and create policy regarding matters of siltation and sedimentation in the light of UNESCO guidelines as applicable to the rejuvenation of Ganga within the parameters agreed upon in this DELHI DECLARATION on Incessant Ganga 2017

This conference has paved a way forward to take actions on the issues discussed which will bear fruit for finding an amicable solution so that a comprehensive and effective silt management policy can be framed to maintain "AVIRAL GANGA NIRMAL GANGA"

The Government of Bihar conveys it's thanks to all distinguished participants for making this conference a grand success.