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GOVERNMENT OF BIHAR  
PUBLIC HEALTH ENGINEERING DEPARTMENT

# STATE WATER POLICY

YEAR: MARCH, 2010

## **Background Rationale**

- 1. Water Supply and sanitation: Availability, access and use**
- 2. Integrated water and sanitation management**
- 3. Water and sanitation Infrastructure**
- 4. Water Conservation and productive use of solid and liquid waste**
- 5. Water Quality**
- 6. Environmental Management**
- 7. Water Pricing**
- 8. Legal Enablement**
- 9. Community empowerment and Capacity Building**
- 10. Institutional Restructuring**
- 11. Research and development**
- 12. Monitoring & Evaluation**

## **Background Rationale:**

Water is life and sanitation is way of life. Water has been described as the matrix and elixir of all life forms. It is so delicately inter-linked with people, Land River, forest, habitat, ecology and environment that any imbalance in equilibrium bring catastrophe to this earth. Therefore, it is needed to have a 'Benign' Water and sanitation Policy for Social political, economical and environmental harmony through efficient, sustaining, harnessing, distribution, pollution prevention and conjunctive usage of all available water resources.

What is needed is to have an integrated, multi-disciplinary approach. An Approach that covers not only technological aspects but also social, economic, legal and environmental concerns. It must recognize "WATER SECURITY" as an overriding objective – both as an inseparable aspect of food security but also in its own independent right.

## **Paradigm shift**

While adopting an appropriate State Water and sanitation Policy a 'Paradigm shift' is needed which is a 'series of peaceful interludes punctured by intellectually violet revolutions and in those revolutions one conceptual world view is replaced by another.'

Bihar, through the ages, has been inspiring the nation and the World. While others advocated for 'the survival of the fittest' Bihar come forward for 'the Survival of the weakest. When many countries started their freedom struggle from harnessing from violence; Mahatma Gandhi started freedom struggle from Champaran Satayagrah on the strength of truth non-violence learning from the teaching of Buddha and Mahaveer. When many other countries were in intellectual darkness Kautilya, the legend could write a definitive directive on economies and government, some 2500 years ago.

So, Gandhian concept of 'Self-governing village republics' and Kautilya's emphasis on sound management principles shall be the basis for creating an enabling environment in the State Water and sanitation Policy.

## **An Overview of State's Water Resources:**

The average annual rainfall in the state is 1200mm. approximately. The intensity can be gauged by the fact that this yield is achieved only in 100 hours. There is regional imbalance in the rainfall ranging from approx. 1000 mm (Patna) to 1800 mm (Purnia).

River Ganga is the main course of drainage dividing the state in two main regions, viz. North Bihar and south Bihar (earliest known as Central Bihar before the bifurcation of the state).

The orgin of the all rivers of North Bihar is Nepal a even further north. The main River begin of north are Ghaghra, Gandak, Bajmati –Adhwara, Kaula-Balan, Kosi for Mahananda. Major rivers of South Bihar are Karamnasha, Saru, Puapeen, Kiul-Haror, Badua, Chandan and Bilaszi, mostly having their origins and linkages in Jharkhand, M.P. and U.P.

The water balance available in the state is approximately 17% of the total national average of surface water the (312 Lakh hectare metered groundwater availability is approximately 27 lakh hectare meter. The state is ravaged with recurring floods and drought. 71% of the states, mainly the northern part, are flood prone.

### **Critical Issues in Water and sanitation Sector in the state:**

- **Uncertainty in availability of water**

Rainfall in large parts of the State is usually adequate but varies from year to year and place to place. The rainfall occurs only during two months of monsoon

- **Low operational efficiency of water resources systems**

The problem of limited water availability is further aggravated by low operational efficiency. Two major users of water namely, drinking and irrigation both show avoidable losses. This situation calls for immediate remedial measures.

- **Depleting ground water resources and deteriorating quality of water**

With increasing dependence on ground water, the ground water resources are depleting at an alarming rate. Over exploitation of ground water has progressively deteriorated water quality affecting human health. High fluoride, arsenic and other chemical contamination is a cause of worry.

- **High cost of service, low cost recovery and low level of expenditure on O&M.**

There is a need to rationalize the O&M charges to move towards full recovery of O&M charges for sustainable development of water resources.

- **Lack of ownership amongst the stakeholders:**

The construction and management in the water resources sector is the responsibility of the Government but with the inadequate resources, it is imperative that stakeholders are involved in construction, maintenance, revenue collection and O & M for sustainable results

- **Low awareness about sanitation and adoption of hygiene practices**

There is low level of awareness amongst the communities about the importance of hygiene practices. Very small segment of the population have toilet in their homes and te usage of the toilets are still very low.

- **Weak intersect oral convergence**

Hygiene practices leads to better health. This also contributes to reduction of malnutrition. However, the institutions related to health, nutrition and education viz Health centers, Anganwadi centers and the Schools do not present a place where hygiene practices are adopted.

- **Lack of community participation; ownership of water and sanitation facilities**

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### **The approach and guiding principles in formulating the policy:**

The Government of Bihar will adopt a radical shift from predominantly engineering-based solutions to local community-based water and sanitation management solutions. That is, a shift towards community-level empowerment and responsibility for their own water and sanitation management. This involves a combination of 'bottom-up' decision-making and 'top-down' technical support within a much more holistic conceptual framework. Government authorities will operate as multi-disciplinary 'technical service providers' and facilitator rather than central control organizations. Many of the policy issues herein are intended to function from this new perspective. The key features of the proposed State Water and sanitation Policy are as under

- Water Resources will be developed in a planned manner
- The norms for coverage would shift from habitation to House Hold Level
- To provide a supportive Policy and Legal frame work to ensure safe water availability to the population on sustainable basis
- All new projects shall be planned based on micro water shed planning basis so as to ensure equity in use of surplus water.
- Priorities will be fixed for different uses of water distribution.
- To develop a framework with cost effective methods to ensure safe water to all
- Maintenance of the existing projects will be done along with the construction of new projects.
- This policy will be directed towards reducing irrigation water demand through both increased irrigation efficiency, and optimum utilization of the available surface water resource. Any imbalance will also be narrowed through the application of a wide variety of water conservation measures, including effective artificial recharge.
- For efficient water resources planning a well-developed information system will be initiated.
- Demand based water management will replace the supply based management in the policy.
- To develop a sense of ownership on water resources, community based strictures/PRI's will be encouraged to participate in water management. A capacity building program of these community based organizations (SHGs/VWSCs/PRI's will be undertaken
- Necessary amendments will be enacted to control the constantly declining ground water table and efficient water management.
- Water pricing will be done in a rational manner.
- Capacity Building programs will be undertaken to enhance the working efficiency of water related departments
- Water and sanitation will be integrated at community and institution level

The proposed policy and its key components are as follows:

## **THE PROPOSED POLICY:**

### **1. Water Supply and sanitation: Availability, access and use**

#### **1.1 Water Allocation Priorities**

1.2 The order of priorities of water allocation for effective water resource management will be as follows:

#### **Priority rankings: from high to low**

- Drinking water for Human beings
- Drinking water for Livestock
- Other domestic, commercial and municipal water uses
- Agriculture
- Power generation
- Environmental and ecological Industrial Non-consumptive uses, such as cultural, leisure and tourist uses.
- Others (*Lowest priority*) Any departure from the above priorities will require consideration on a case-by-case basis.

#### **1.2 Drinking Water Supply**

1.2.1 The State Government will ensure the provision of adequate potable drinking water to every citizen, shifting from habitation based norms to family level water security. The service level for rural areas will be at least 70 lpcd..

1.2.2 Formation of special task force with budgetary provisions to manage arsenic, fluoride and excess iron in drinking water.

1.2.3 As a long term solution, cover all the habitations affected with arsenic, fluoride and iron with piped water supply in next five years

1.2.4 Promotion of the principles of Reduce, Recycle and Reuse of water

1.2.5 Sufficient funds and functionaries will be provided to PRI and Local Bodies for regulation and distribution of drinking water in villages, Tolas and towns.

1.2.6 The capacities of PRIs and Urban bodies will be enhanced in a phased manner so that these institutions can regulate and distribute the drinking water.

1.2.7 Drinking water needs of humans and livestock will be the first charge on any available water source.

1.2.8 In multi-purpose Irrigation projects top priority will be given to drinking water.

**1.2.9** Future and existing irrigation and multi-purpose projects will include a drinking water component wherever there is no dependable alternative source of drinking water.

#### **1.3 Optimizing Water Availability:**

1.3.1 A comprehensive inventory of potential and actual water resources, perennial and ephemeral will be fully identified and quantified. Funds will be provided, on priority basis, to implement programmers of optimum water utilization.

1.3.2 The watershed approach will be considered in planning of new irrigation projects.

1.3.3 Basin, sub-basin, aquifer and State-level water resources development and environmental plans will be prepared with stakeholder participation.

#### **Surface water:**

1.3.4 Roof top rain water harvesting, storm-water harvesting, recycling and reuse of waste waters will be promoted in water stressed areas

1.3.5 Efficient crop-water application and utilization practices shall be encouraged by adopting modern water conservation techniques.

1.3.6 The economic and technical potential for the re-use of treated wastewater will be assessed in all basins.

### **Groundwater:**

1.3.7 Exploitation of groundwater for agriculture and purposes other than drinking will be so managed by public participation so as not to exceed the average long-term recharge potential.

1.3.8 The cost-effectiveness of various technologies, under varying conditions, for brackish groundwater will be explored. Pilot projects will be undertaken to evaluate these technologies under field conditions.

1.3.12 Aquifer wise planning based on modern technology will be introduced and community organizations would be set up at village and aquifer level to plan and manage ground water resources with focus on drinking water supply

### **1.4 Project Planning and Implementation**

1.4.1 Water resources development projects will be prioritized on the basis of economic, social, environmental and financial criteria.

1.4.2 Wherever possible, projects will integrate surface and ground water resources.

1.4.3 Quantitative estimates of future water demands will be estimated by stakeholders with line-departments technical assistance.

1.4.4 Public Private Partnership in development and management of water systems will be encouraged.

## **2.0 Integrated water and sanitation management**

### **Organization and Participation of Water Users /VWSC/PRI with focus on social equity**

2.1.1 Integrated Water and sanitation Management approach will be adopted and PRIs will be adequately strengthened for this purpose.

2.1.2 Community level assistance will be provided by PRIs to village level water and sanitation communities with representation of users to initiate plan and execute water and sanitation programs.

2.1.3 Executive members of VWSC will be chosen by democratic means, with fair representation by large and small-scale stakeholders, including women.

2.1.4 The delegated organizations, will undertake comprehensive community awareness programs related to hygiene, water conservation and water-related issues, with particular emphasis upon improved water management and the reduction of groundwater extraction in over-exploited and critical areas.

2.1.6 VWSC will be responsible for giving high priority to developing efficient water usage. Related activities will include, but not be restricted to:

Community education in water issues,

Efficient and equitable water distribution,

General water resources management

Infrastructure operation and maintenance,

Movement towards recovery of full water charges,

Cooperation in data collection

Appropriate usage of hydrologic data

Water quality / public health protection.

Hygiene maintenance in families and key institutions ( AWC, Schools and Health centres)

2.1.7 The line-departments will supply water-related technical data, guidelines, information, etc., to VWSC/PRIs and other water-sector stakeholders. This will be maintained with efficient data distribution, continuity of data collection, and continuing data quality control.

## **2.2 Resourcing of Village Water and Sanitation Committee /PRIs**

2.2.1 Technical, logistic and material support will be provided for organizing and training of various stakeholders in effective hygiene maintenance, water conservation, water resource management, water quality protection.

2.2.2 Priority for rehabilitation and modernization of water systems will be given to those projects where communities are willing to take up the maintenance of the water systems. Social equity will be addressed through community consultation /suitable incentives so that the vulnerable and marginalized communities have adequate level of water and sanitation systems..

2.2.3 At the small community- based scale a rolling program of reform will be implemented to progressively transfer the management, operation, maintenance, and cost-recovery of water infrastructure to water-user groups.

2.2.4 Guidance and necessary technical support will be provided by PHED to assist VWSC/Community groups/PRIs to undertake responsibility for the management of water and sanitation systems

2.2.5 VWSC/PRIS would be given powers to collect revenues and maintain the systems

## **2.3 Technical Backup and Assistance at Community Level**

2.3.1 The PHED will act as the primary source of drinking water-related information, and will take the lead in planning and enablement of water-user groups/VWSC/PRIs

2.3.2 Measures will be undertaken to aware communities of their legal entitlements, rights, responsibilities and general resourcing in respect of water and sanitation management at community level.

2.3.3 A high priority will be given to provide multi-disciplinary technical support for community water management. In addition, Integrated water and sanitation strategic planning, water resources modeling and direction for water management will be undertaken at river basin, sub-basin and aquifer-levels, as appropriate.

2.3.4. NGOs/PRIs would be fully involved in water management related activities such as awareness building in communities, capacity building of Community groups, design, construction of water harvesting structures and preparing Integrated water and sanitation Plan.

## **3 WATER RESOURCES AND SANITATION INFRASTRUCTURE:**

### **3.1 Data Collection and Dissemination:**

3.1.1 A user friendly but secured data base will be design and housed within the PHED. This data base will be in public domain with the arrangement of prompt supply of data on demand.

3.1.2 PHED will take the lead in data checking and entry, compilation of data, record backup, database security and management, transparency of database operation, and the provision of prompt output on demand.

3.1.3 The database will include hydro-meteorological, hydrologic, ground-water, water-quality, water-user, demographic and social data.

3.1.4 Hydrologic instrumentation and data collection throughout the state will be reviewed for reliability, observer resourcing (payment, training and mobility), instrumental efficacy and maintenance, continuity, maintenance of record, and other related factors. Recommendations will be prepared for upgrades or replacements as necessary.

3.1.5 Protocols will be developed to promptly pass on hydro-meteorological, surface-water and groundwater data to both water-user groups and to intermediate-level entities at block and district levels through internet or hard copies at nominal cost.

### **3.2 Management Information System**

3.2.1 An inter-departmental 'Management Information System' (MIS) will be developed.

3.2.2 Water-related information will be collected, processed and presented according to the water user requirements.

3.2.3 Continuity of data collection will be ensured, whilst the entire historical records will be entered into the database.

3.2.4 Prior to development of MIS, provisional mapping of groundwater, flood zones and environmental zones will be undertaken.

### **3.3 Efficacy, Maintenance and safety of structures:**

3.3.1 A periodic review of the maintenance and efficacy of all other water resources infrastructure, will be undertaken. A programs of improvement in infrastructure maintenance will be designed and implemented.

### **3.4 Drainage /solid and liquid waste disposal**

3.4.1 Areas capable of rehabilitation will be identified and investigated for economic viability of treatment. Technical support will be extended to communities as to the cost-effectiveness of rehabilitation..

3.4.2 Necessary legal provision will be made in bylaws of local bodies for water conservation and for recycling the water in urban areas. Standard ceiling for use of the recycled water will be fixed after considering the effect on human health.

## **4. WATER CONSERVATION AND PRODUCTIVE USE OF WASTE**

### **4.1 General Water Conservation:**

4.1.1 Awareness and Improvement of water-use efficiency in all sectors will be encouraged through a continuing program of multi-media public awareness, school education, and technical assistance.

4.1.2 Appropriate mechanisms will be developed to beneficially utilize all forms of solid waste, wastewater, including primary and secondary treated sewage, domestic grey-water, and recycled industrial water.

5.1.3 Roof top rain water harvesting will be promoted both in rural and urban area

## **4.2 Groundwater**

4.2.1 The extraction of ground water will be suitably regulated through appropriate legal framework especially in the water scarce areas.

4.2.2 Special initiatives will be taken for ground water recharge and it will be obligatory upon bulk water consumers to adopt ground water recharge measures to compensate the water extracted.

4.2.3 All groundwater data, from all drilling rigs in the State, will be collected and entered on the water sector's database. Depletion in water level will be analyzed and reported annually

4.2.4 For efficient use of ground water aquifer based management system will be developed.

## **5 WATER QUALITIES**

### **5.1 Water Quality and Pollution**

5.1.1 A review will be done to determine the departmental capacity to analyze, monitor and conform to the various water standards.

5.1.2 A review of basic water quality and/or analytical public health facilities will be undertaken at regular interval at various levels. A rolling program to improve the water analysis capability at district level will be initiated. The cost-effectiveness of public vs. private sampling and analysis of water will be considered.

5.1.3 A phased program of improved domestic water quality will be undertaken, in order of prioritized health risks involving implementation of filtration, chlorination, de-fluoridation.

5.1.4 In view of high concentration of fluoride and Arsenic in ground water in certain areas, close review and monitoring of remedial measures will be undertaken.

5.1.5 A rolling inventory and prioritization of all point pollution sources will be compiled.

5.1.6 All effluent will be treated to conform to specification prescribed by Bureau of Indian Standards before discharging into natural streams or to groundwater recharge. Industrial solid waste, with potential for water contamination, will be disposed off in designated facilities, through 'Integrated Waste Management'. Discharge of contaminated effluent to either groundwater or surface drainage will be forbidden. Standard ceiling for the use of the recycled water will be fixed after considering its use in agriculture.

### **5.2 Sewage**

5.2.1 A program to design and construct sewage treatment plants will be implemented for all urban and high-priority rural areas in collaboration with local bodies. Treated effluent disposal will conform to established health standards. The standard of treatment will be determined by the beneficial re-use requirements of the wastewater.

5.2.2 Standards for the use of waste water in agriculture will be prescribed.

## **6 ENVIRONMENTAL MANAGEMENT**

6.1.1 Studies will be undertaken on climate trends, and their long-term implications for marginal and environmentally sensitive areas. These findings will be disseminated to the community level for appropriate planning.

6.1.2 Independent environmental impact studies will be undertaken for all proposed Major and Medium water supply projects. An inventory of high-priority ecological systems, particularly those of significant genetic diversity, will be prepared, and the human impact upon these systems assessed.

### **6.2 Flood and Drought Management**

6.2.1 In respect of water resources management the needs of drought prone areas will be given priority. Resilience to drought in the most vulnerable areas will be promoted through community-based initiatives with technical assistance by related department

6.2.2 Suitable water and sanitation systems will be developed so as to minimize the impact of flood on the communities; especially on women and children.

## **7 WATER PRICING**

7.1. All water rates will be set so as to convey the scarcity value of water and to generally motivate economy in water usage. While deciding the tariff this would be kept in view that those who cannot afford to pay will not be deprived of minimum quantity of potable water.

7.2 Water tariffs will be set for progressively move towards full cost of operation and maintenance. This will be matched by a rigorous program of improvement in the efficiency of operation and maintenance.

7.3 For all water supplies a three or four-stepped water tariffs will be charged, with the highest rate for excessive use of water. This stepped water tariff will be set to ensure magnitude difference in water rates between the lowest and highest rates. For the first stepped rate of relatively cheap water, the set rate will be common to all water users.

7.4 Differing stepped water rates may be charged for agricultural, industrial, commercial, and municipal purposes. In all cases, the highest rate will be a strong disincentive for profligate water usage.

7.5 A program of water metering for water management purposes will apply to all significant water users irrespective of source and water ownership.

## **8 LEGAL ENABLEMENT**

8.1 A critical review of the laws related to water sector will be undertaken. Out-dated laws will be repealed, and necessary enabling laws will be framed and the existing laws will be amended to suit efficient integrated water and sanitation management.

8.2 The role, responsibility and authority of local community structures (VWSC) will be legally specified to allow them to manage their own water resources. Within this legislation provision will be made for socially inclusive groups have a substantive voice in their local water-user group.

8.3 A legal framework will be developed for the regulation and management of groundwater extraction in general and in the 'Critical and Overexploited' zones in particular. Such legislation will also address the need for compensatory water conservation and recharge measures to be taken by the bulk water consumers.

8.4 A legal framework will be developed for dealing with conflict resolution within the water sector. This will start with community-based resolution, with subsequent appeal mechanisms at successively higher levels.

8.5 A legal framework will be developed to preserve existing water bodies from un-authorized construction, pollution and encroachment. In the event of significant pollution the local water-user group will be required to remedy the source of pollution, using technical and material assistance from the appropriate department.

## **9 COMMUNITY EMPOWERMENT AND CAPACITY BUILDING**

9.1 Institutional capacity building will be implemented at community, mid-level and the State-level. Capacity building at all levels will involve reorientation of perceptions from the traditional State-controlled engineering approach of water management, to the holistic participatory-community based approach.

9.2 Community-based capacity building will include training for water-user groups, and other community-based stakeholders in the water and sanitation sector, in their structural formulation, rights, and responsibilities.

9.3 Capacity building at Government level will be directed towards (a) broadening their skills-base, (b) reorienting their conceptual 'raison d'être' towards the provision of more responsive technical services, (c) a new focus upon data processing, strategic planning and basin-level water resources assessment, (d) greater autonomy of action, and (e) a radical change in attitude from reactive vertical administration to proactive questioning, testing and analysis.

9.4 Deviating from the tradition of project planning and implementation the main function of Capacity building will be directed towards the provision of sound and timely technical advice and material assistance to community groups and other community based stakeholders in the water and sanitation. Sector Effective communication system will be developed for providing technical information between Government agencies and VWSC.

9.5 Concept of water as a critical resource in need of community-based water management, water conservation, and optimum water utilization will be integrated with school curriculum, starting with basic concepts at primary level. Similarly, key institutions especially Anganwadi centers, schools and Health centers will be developed as an example of efficient water and hygiene centers to motivate communities for having a hygiene environment in the household and adoption of hygiene practices.

9.6 'Awareness of water scarcity' will be followed by public education in the practicalities of community-based water management, improved water use efficiency, improved conservation methods, water-related public health and improved sanitation. Capacity building at community level will include a revised human framework for water resources management, and improved local ability to access information and resources from within the Government.

9.7 The State will encourage and support training across all disciplines within the water sector, including IWRM, water supply, social infrastructure, public health, chemical and microbiological water quality, environmental management, dry-land and brackish agriculture.

9.8 The capacity of various Government authorities to collect appropriate, accurate and continuous hydro meteorological, hydrological, ground water, water-usage, and water quality data will be reviewed. Historic data will be examined for its accuracy, completeness, reliability, systematic / non-systematic errors and, methodologies applied to correct deficiencies.

9.9 Technical capacity building will be directed towards such areas as improved human and instrumental data collection, GIS-database-website development, GIS-applications, computer modeling (of groundwater, surface water and basin hydrology), new and improved ground-water recharge, water resource assessment and modification, and achieving improved irrigation efficiency.

9.11 The attitude of departmental officers will be diverted from construction to water management.

## **10. INSTITUTIONAL RESTRUCTURING**

10.1 Water Regulatory Authority would be setup in conjunction with related department.

10.2 To improve efficiency in delivery of services institutional the existing framework of functioning of PHED as public works department will be reviewed and will be modeled it to function as development department wherein it is able to carry out functions of facilitator and

work closely with community structures and PRIs. The existing provisions of administration and finance will be modified suitably.

## **11. RESEARCH AND DEVELOPMENT**

11.1 An emphasis upon applied water resources research, focused upon Bihar's most critical water-sector issues, will be promoted between academic and government institutions, and an ethos of cooperation between these two sectors will be promoted. The possibilities for both internal and external cooperation in research will be pursued, particularly with relevant specialist institutions, both inter-state and internationally.

11.2 The research will be promoted to harness new learning to the benefit of the community.

## **12. MONITORING & EVALUATION OF WATER and SANITATION POLICY AND ACTION PLAN**

12.1 The action plan of state water policy will also be implemented and monitored under Rajeev Gandhi water Mission.

12.2 Benchmarking of all the water resources project would be done in next five years to improve their efficiencies and make the system transparent and accountable.

## **Acronyms used in the document**

GIS: Geographic Information System

IMS: Information Management System

IWRM: Integrated Water Resources Management

Lpcd: Litre per Capita per Day

NGO: Non-Government Organization

O&M: Operation and Maintenance

PHED: Public Health and Engineering Department

PRI: Panchayat Raj Institutions

STP: Sewage Treatment Plant

SWRPD: State Water Resources Planning Department

WHO: World Health Organization

WUA: Water Users Association

WUG: Water User Groups