

# IWRM and IRBM concepts envisioned in Indian water policies<sup>†</sup>

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*Indian water policies have adopted the current water management paradigms like Integrated Water Resources Management (IWRM) and Integrated River Basin Management (IRBM) as early as 1987 and in 2002 mainly to cope with growing challenges of water sector as a result of economic growth, burgeoning population and limited water resources.*

*This article examines the ground realities that are acting as hurdles in successful implementation since IWRM and IRBM concepts were adopted about 25 years ago. This article also examines the challenges very fundamental and pre-requisite at river basin level for successful implementation of the principles of IWRM or IRBM. The principles of IWRM are vast, however, a few of the water issues pertaining to IWRM or IRBM have been considered to highlight the existing realities in river basins.*

**Keywords:** IWRM, IRBM, left wing extremism, National Water Policy, State Water Policy.

GLOBAL Water Partnership (GWP) defines Integrated Water Resources Management (IWRM) as ‘a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment’<sup>1</sup>.

Water management is increasingly getting complex with growing demand from development sectors like agriculture, energy, industry, transportation and communication intertwined with meeting the objectives of the social sectors like education, health and environment right from local to national level, so that water can no longer be looked or managed in isolation for equitable distribution, poverty alleviation and sustenance of ecosystems<sup>2</sup>. Hence, a coordinated development of water management in the form of IWRM or such integrated approach with a river basin perspective like Integrated River Basin Management (IRBM) that includes stakeholders of the water sector is essential to meet the objectives of multiple sectors. With India achieving spectacular economic growth over the past two decades and due to rising concomitant demands on the water sector, Indian water policies have recognized the necessity to manage the water sector considering all the sectors in a socially acceptable and environmentally efficient manner – so that the economic growth is sustained. Thus, concepts identi-

cal to IWRM and IRBM can be seen envisioned in Indian water policies. However, what are the ground realities in the Indian context for successful initiation and implementation of these adopted principles of IWRM or IRBM? Is the ground situation conducive for successfully implementing these principles and ensure better water management to sustain its spectacular growth over two decades? Or should we remain complacent with mere envisioning? Or is there any need to evolve an India-centric water management paradigm, in case the ground realities are not conducive for their implementation? Without answers to these queries, but mere adoption of concepts of IWRM or IRBM would not make any difference to the Indian water sector. As a consequence, such a static scenario is detrimental to the sustenance of growth witnessed in various development sectors like agriculture, industry and services and may limit the economic growth achieved so far.

Indian water policies have embarked upon a vision of water management in tune with the existing management paradigms propounded across the world. As early as 1987, even before Dublin Principles, the National Water Policy (NWP) – 1987 envisaged the ‘resource planning in the case of water has to be done for a hydrological unit such as basin or sub-basin as a whole’ and ‘there should be an integrated and multi-disciplinary approach to the planning, formulation, clearance and implementation of projects including catchment treatment and management, environment and ecological aspects, the rehabilitation of affected people and command area development’<sup>3</sup>. Further, NWP–2002 adopts ‘...integrated approach while dealing with multi-sectoral and multi-disciplinary aspects with planning, development and management of water resources

<sup>†</sup>Views of the author are purely personal and shall in no way be construed as views of his employer.

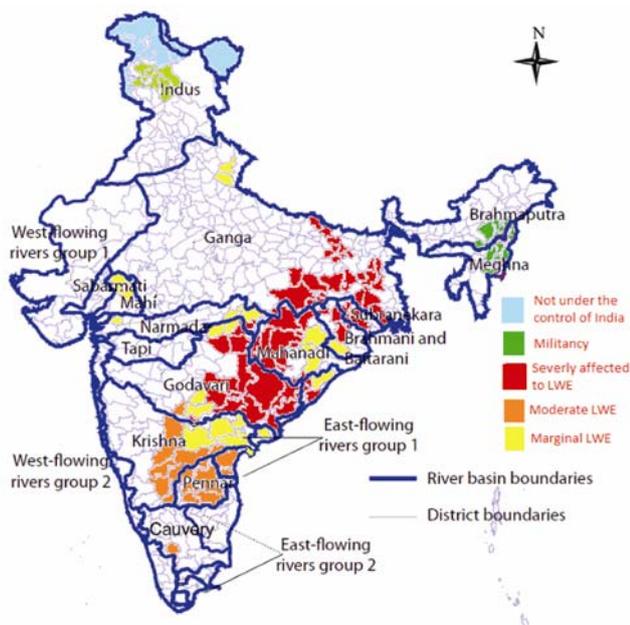
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and their sustainable use taking into account the environment concerns<sup>4</sup> – key concepts of IWRM at basin or sub-basin level, or IRBM. Similarly, several state water policies envisage basin planning with concepts drawn from IWRM (provinces in India are called states)<sup>5</sup>.

Governance structures are vital throughout hydrological units for initiating any experimentation and implementation of any concept of water management. According to UNDP, IWRM requires spatial focus like hydrological units such as river basins for initiation of any experimentation and then implementation of the same successfully<sup>6</sup>. But in India, the very spatial focus is distorted in several parts of the country. As such, policies applied on bits and pieces of river basins negate the hydrological unit concept and integrated basin planning envisioned. The reason why policies are applied in bits and pieces is that not all river basins or hydrological units in India are under the control of the government completely – a fact ignored by Indian water policies. According to the Annual Report of the Ministry of Home Affairs, Government of India (2010–11), in several parts of the country, even after 60 years of independence and democracy, governance structures are absent; and as a consequence there exist several functional inadequacies hindering initiation of development work. And due to functional inadequacies, several militant groups have filled the vacuum arising out of the absence of these governance structures. With institutions being substituted by extremists within or a portion of a basin, the question of managing any issue, in the scenario of extremism, does not arise, including IWRM and IRBM.

Figure 1 shows the districts in India that are parts of river basins where functional inadequacies exist due to



**Figure 1.** Map of India showing truncated basins due to various forms of insurgency and extremism<sup>8,14,15</sup>.

the absence of governance structures. Several districts within river basins in various parts of India are affected by left-wing extremism (Figure 2). Overall these ideological extremists are active in about 212 out of the 604 districts, i.e. one-third of the country<sup>7</sup>. All these districts form parts of some river basin/sub-basin. In addition, the Indus Basin that includes the Kashmir valley and the Brahmaputra and Barak Basin that includes the North East states of Assam, Nagaland and Manipur are also subjected to insurgency, thus hindering the implementation of any basin-wise objectives like IWRM envisioned by the water policies<sup>8</sup>. Also, the Indus Basin, Ganges Basin and Brahmaputra Basin are trans-national basins and Indian water planners have no say in the portions of these basins in other countries like Pakistan, Nepal, Bhutan, Bangladesh and China. Thus from the Figure 2, it is clear that the government in fact exerts control only partially in several river basins; and hence policies formulated can only be applied on bits and pieces or truncated basins – a challenge to IWRM and IRBM principles envisioned by Indian water policies.

River basins in India are governed by several policies like NWP, state water policies and policies of local bodies governing rural and urban regions. Too many policies within a single basin have complicated matters because of overlap and contradictions. How can the principles of IWRM like integration of water, land and related resources, stakeholder participation, sustainability of water and ecosystems be compatible in a river basin with multiple policies tearing the basin in multiple directions? As in 2011, in addition to NWP, nine state water policies have been formulated, with three more in the draft stage. Table 1 shows the states in India that have formulated their own policies and those in the draft stage. The state water policies compared here are the latest policies shown in Table 1. In addition, several state governments have enacted legislative acts that are applicable within their administrative jurisdiction and never to the whole hydrological unit. The Ganges River Basin, the largest river basin in India, is guided by the NWP, in addition to the Uttar Pradesh State Water Policy, Madhya Pradesh State Water Policy and Bihar's policy in the draft stage, but no state policy for the West Bengal portion of the basin. The Godavari River Basin is governed by NWP, along with Maharashtra, Karnataka, Andhra Pradesh, Madhya Pradesh and Orissa State Water Policies. Similarly, the Krishna River Basin is divided policy-wise among Maharashtra, Karnataka and Andhra Pradesh. Similar scenario exists in almost all river basins of India. Surprisingly, ever since the NWP–1987 and 2002 envisioned basin level water management, more states have come up with their own water policies, increasing the chaos within river basins.

Some of the contradictions of the State Water Policies within a basin are as follows: In the Ganges River Basin, Rajasthan State Water Policy–2010 envisages IWRM

Three state water policies + 1 National Water Policy + Other State Acts within each slice = IWRM/IRBM?

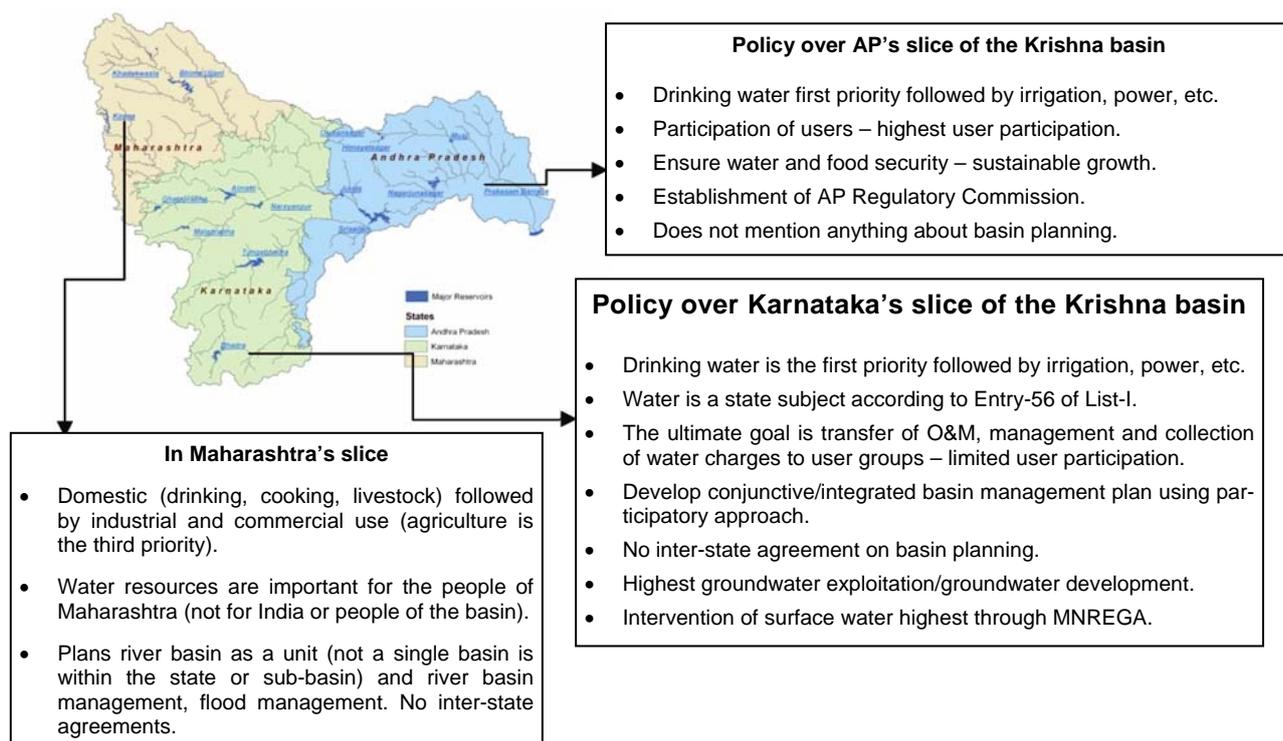


Figure 2. Krishna River basin indicating the divergence of policies within a single basin (Source: ref. 16).

Table 1. States/provinces that have formulated their own water policies, with some in the draft stage<sup>5</sup>

| States having their own water policy | Year |
|--------------------------------------|------|
| Andhra Pradesh                       | 2008 |
| Assam (Draft)                        | 2007 |
| Bihar (Draft)                        | 2010 |
| Himachal Pradesh                     | 2005 |
| Karnataka                            | 2002 |
| Kerala                               | 2008 |
| Madhya Pradesh                       | 2003 |
| Maharashtra                          | 2003 |
| Orissa                               | 2007 |
| Punjab (Draft)                       | 2008 |
| Rajasthan                            | 2010 |
| Uttar Pradesh                        | 1999 |

with local community-level water management instead of engineering-based solutions. However, none of the neighbouring states within the Ganges River Basin envisage anything alternative to engineering solutions exactly similar to Rajasthan. The Madhya Pradesh policy declares domestic water as its top priority of water allocation followed by irrigation, but Rajasthan declares human domestic water as its top priority followed by livestock water requirements followed by agriculture. Almost every state that has formulated its water policy envisions basin-level planning of water resources. In the Krishna and Godavari basins, the Maharashtra policy declares the river basin as a unit, but it also declares water resources as

important for only the people of Maharashtra (what about the people outside Maharashtra but belonging to the same river basins?). Similarly, the Madhya Pradesh policy declares protection of state interest and not basin interest. The style of river basin management in the Krishna Basin is illustrated in Figure 2.

The Krishna River Basin is split into three slices among Maharashtra, Karnataka and Andhra Pradesh (Figure 2). Each slice of the basin is guided by its own water policy, besides NWP. Let us consider water user participation in the Krishna Basin for the study of basin approach. According to Briscoe and Malik<sup>9</sup>, water user involvement in management of irrigation water has been found to be more successful in realizing the goal of better water management. In the Krishna Basin, the forefront state in the water user involvement or participatory approach is Andhra Pradesh compared to Karnataka or Maharashtra, through its landmark Acts like Andhra Pradesh Water, Land and Trees Act – 2002 and Andhra Pradesh Farmers Management of Irrigation System Act. Maharashtra also has its own Farmer Management Act. But, the middle slice of the Krishna Basin comprising Karnataka, despite the Irrigation Act–1965, is lagging in governance and in facilitating participatory approach in comparison to the other two slices. Thus within a single basin, better stakeholder participation and better management of irrigation water is seen in Maharashtra and Andhra Pradesh<sup>9,10</sup>; but the Karnataka portion has been disintegrated from the basin perspective of participatory

**Table 2.** Ministries and organizations within Government of India dealing with various aspects of water sector as on 2011 (source: author)

| Departments/Ministry controlling water                       | Main aspect of water controlled   | Ministry within Government of India                        |
|--|---|--|
| Central Water Commission (CWC)                               | Policy/planning of water resources (WR)/<br>design consultancy/surface-water data           | Ministry of Water Resources (MoWR)                         |
| Central Ground Water Board (CGWB)                            | Managing and studies on groundwater resources   |  |
| Central Water and Power Research Station                     | Research/Solution to complex WR problems  |  |
| Ganga Flood Control Commission                               | Flood control in Ganges Basin   |  |
| Central Ground Water Authority                               | Regulation of groundwater resources   |  |
| National Water Development Agency                            | Water balance studies/optimum utilization of WR   |  |
| WAPCOS   | Planning and optimum solution to WR problems/<br>design consultancy                         |  |
| Upper Yamuna River Board                                     | Sharing of Yamuna waters up to OKHLA barrage –<br>Yamuna sub-basin body within Ganges Basin |  |
| National Ganga River Basin Authority                         | Abatement of pollution and conservation of<br>Ganga with River Basin approach               | Ministry of Environment and Forests (MoEF)                 |
| Water Quality Assessment Authority                           | Monitoring of Water Quality throughout India  | MoEF/MoWR/CPCB/CWC/CGWB/<br>State Governments/Local bodies |
| Central Pollution Control Board (CPCB)                       | Water Act 1974/Air Act – Prevent, control and<br>abatement of pollution of WR               | MoEF   |
| Ministry of Drinking Water/Sanitation                        | Rural water supply/sanitation   | Ministry of Drinking Water/Sanitation                      |
| Ministry of Urban Development                                | Urban water supply/sanitation/industrial water/<br>desalination plants                      | Ministry of Urban Development                              |
| Water Resources Division,<br>Planning Commission             | Planning of WR  | Planning Commission  |
| Department of Land Resources                                 | Integrated watershed management/drought-prone   | Ministry of Rural Development                              |
| Ministry of Rural Development                                | MNREGA – water conservation   | Ministry of Rural Development                              |
| Ministry of Agriculture                                      | Water use efficiency/national watershed<br>development for rainfed area                     | Ministry of Agriculture                                    |
| National Rainfed Area Authority                              | Problems of rainfed areas   | Ministry of Agriculture                                    |
| Central Electricity Authority/Ministry of Power              | Hydropower  | Ministry of Power  |
| Damodar Valley Corporation                                   | Flood control in Damodar sub-basin of Ganges  |  |
| India Meteorological Department                              | Measurement of rainfall   | Ministry of Earth Sciences                                 |
| Inland Waterways Authority of India                          | Navigation/national waterways   | Ministry of Shipping and Ports                             |
| National Remote Sensing Centre, ISRO,<br>Department of Space | WRIS/remote sensing of WR   | Ministry of Science and Technology                         |

In all 11 ministries are controlling various aspects of water in Government of India and several organizations under various ministries are directly dealing with water issues. This excludes departments under State Governments and Panchayats/Municipalities.

irrigation management. Then, there is no trilateral agreement among Maharashtra, Karnataka and Andhra Pradesh for integrating participatory management in Krishna Basin in accordance with the spirit of IWRM.

Further, considering the groundwater scenario, the middle slice of the Krishna Basin comprising Karnataka has greater percentage of overexploited blocks out of the total assessed units than Andhra Pradesh, whereas the upper riparian Maharashtra has a larger percentage of groundwater assessment units completely safe and not yet exploited like Karnataka<sup>11</sup>. The stage of groundwater development in Karnataka is about 70%, while that in the upper riparian Maharashtra is 48% and lower riparian Andhra Pradesh is 45% (ref. 11). Thus disparities in the stage of groundwater development state-wise and the level of exploitation of assessment units within a single basin, i.e. Krishna Basin prove that there is hardly any basin approach in groundwater development or management and a complete disconnect between linkages of surface and groundwater. The uneven stage of groundwater has serious repercussions on surface water availability in the whole basin and has far-reaching effects on lower

riparian stream flows in Andhra Pradesh. According to Dinesh Kumar<sup>12</sup>, in the Narmada Basin, the link or interactions between groundwater and surface water has resulted in a decline of stream flow due to excessive groundwater draft, resulting in additional recharge or reverse recharge of groundwater from the surface water and reservoirs causing reduction in stream flows and reservoir levels. Unfortunately, Andhra Pradesh State Water Policy, like many water policies in India, is woefully ignorant of the likely repercussion on water management in the territory due to intervention in one of the components of the hydrological cycle like groundwater or surface water at some portion of the river basin. Thus, state water policies too are contradicting the envisioned concepts of IWRM and IRBM.

The decision making in India is split amongst various organizations. Some of the functions of the organizations are overlapping or contradictory, much against the spirit of river-basin approach enunciated in water policies. Over 22 organizations under 11 ministries are involved in decision making of various aspects of water sector at the level of the Union Government alone (see Table 2). Apart

from the Union Government, there are several water resources/irrigation departments, water supply boards, groundwater authorities and pollution control boards functioning within State Governments and rural governing bodies called Panchayats. A river basin thus possesses 20 different organizations from the Union Government plus about 3–5 organizations per state government and numerous local bodies at the rural level. There is simply no common platform formulated in India where all these organizations can be brought together and diverse views converged, conflicts avoided and decisions taken in the best interest of the water sector in a river basin. Instead, all these organizations have mushroomed in river basins with a 'silo' approach, having no or very less co-ordination between them<sup>13</sup> – a candid assessment from the Planning Commission of India.

Thus, the ground realities for water management in India indicate that concepts of IWRM or IRBM are just a myth under the prevailing scenario. Seriously, if the current water management paradigms need to be tested in India, then it shall have to be ensured that the hydrological units are under complete government control, militancy is replaced and governance structures are placed. In this case, the water management in India is crucially dependent on the success of the Ministry of Home Affairs, Government of India, in regaining all the areas under the effective control of extremists. That Indian river basins are not under complete government control, and being under the mercy of the Ministry of Home itself negates IWRM or IRBM, even before it can be conceptualized – a fact ignored by planners so far – as IWRM or IRBM is cross-sectoral and prefers spatial focus like hydrological units for effective water management. Thus, success of the latest water management paradigms strongly hinges on the success of the Ministry of Home Affairs and certainly not on the Ministry of Water Resources or the Planning Commission – a paradox in the Indian water sector. In addition, the scenario has turned adverse since 25 years, with the mushrooming of policies over river basins, disconnect in river basin approach as seen in participatory irrigation management, groundwater development and management, ever multiplying organizations at all government levels overlapping and contradicting the objectives of IWRM, thus causing anarchy in the river basins.

Sustenance of India's economic growth achieved over the past two decades needs effective water management. However, the adverse ground realities for the existing water management paradigms like IWRM and IRBM are an impediment for achieving the objectives demanded by multiple development sectors like agriculture, energy, industry, health, transportation, communication, and fulfilling the objectives of the social sector and environment,

or in other words, effective water management. Not able to implement water management paradigms means limitation on sustaining the economic growth in future. Hence, either the ground realities have to be changed or an India-centric water management paradigm needs to be evolved. Given the adverse ground realities for concepts of IWRM or IRBM, it is time to evolve alternative water management strategies that are India-centric and adopt the same in future. Continuation of the status quo in water policies without changing the adverse ground realities would only perpetuate them, causing further deterioration of the water sector and threaten the sustainability of the economic growth that India has witnessed over the past two decades.

1. Global Water Partnership; <http://www.gwp.org/The-Challenge/What-is-IWRM/>
2. Biswas, A. K., Integrated water resources management: is it working? *Int. J. Water Resour. Dev.*, 2008, **24**, 5–22.
3. Indian National Water Policy – 1987; [http://cgwb.gov.in/documents/nwp\\_1987.pdf](http://cgwb.gov.in/documents/nwp_1987.pdf)
4. Indian National Water Policy – 2002; <http://mowr.gov.in/writereaddata/linkimages/nwp20025617515534.pdf>
5. Indian State water policies; [http://www.ielrc.org/water/doc\\_states.php](http://www.ielrc.org/water/doc_states.php)
6. Taylor, P., Gabrielle, E. and Holmberg, J., *Economics of Sustainable Water Management – Training Manual and Facilitators Guide*, Cap-Net (UNDP), 2008.
7. *Peace and Reconciliation in South Asia – Challenges and Opportunities*. In Proceedings of the International Conference on International Association of Human Values, Oslo, 2008, pp. 44–45.
8. Annual Report (2010–11), Department of Internal Security, States, Home, Jammu & Kashmir and Border Management, Government of India, pp. 5–36.
9. Briscoe, J. and Malik, R. P. S., *Handbook of Water Resources of India – Development, Management and Strategies*, The World Bank, Oxford University Press, New Delhi, 2007.
10. Cullet, P., Gualitieri, A. G., Madhav, R. and Ramanathan, U., *Water Governance in Motion – Towards Socially and Environmentally Sustainable Water Laws*, Foundation Books, New Delhi, 2010.
11. CGWB, Groundwater scenario of India, 2009–10. Ministry of Water Resources, Government of India, 2010.
12. Dinesh Kumar, M., *Managing Water in River Basins – Hydrology, Economics and Institutions*, Oxford University Press, New Delhi, 2010.
13. Planning Commission, Eleventh Plan Mid-term Appraisal Review. Ministry of Water Resources, Government of India, 2011.
14. Amarasinghe, U. A., Shah, T., Turrall, H. and Anand, B. K., India's water future to 2025–50: business as usual scenario and deviations. International Water Management Institute, IWMI Research Report-123, Colombo, Sri Lanka, 2007, p. 37.
15. The International Institute of Strategic Studies; <http://www.iiss.org/events-calendar/2010-events-archive/november-2010/countering-the-maoists-naxalites-in-india-the-way-forward/>
16. Krishna River Basin Map available in the IWMI; <http://krishna-basin.iwmi.org/>

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