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Basin Governance and Livelihood Issues in the Context of a Sub-basin in Godavari River Basin of Maharashtra

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Background

It is being increasingly felt that water governance, which concerns the formal and informal institutions through which authority is exercised to allocate and regulate the resource, should be looked at from an integrated resource management angle. Like many other Indian States, Maharashtra has initiated water sector reforms through the Maharashtra Water Sector Improvement Project – MWSIP. A key component of water sector reform is to separate irrigation water delivery from the resource's management.A combination of policy, legislative and administrative measures is being stressed for improving financial performance of the sector by economizing costs and improving functional efficiency. The emphasis is on adopting modern technology, effective accountability arrangements and decentralized participative decision making in design, operation & maintenance of the water storage, conveyance & distribution system, and on improving recovery by instituting water rights, rational water allocation through administrative/market mechanism and appropriate pricing. Though some of the components of water reforms like volumetric supply of water, etc., have been suggested and experimented upon way back in the early 1900s, these in the view of socio-economic and political changes have acquired different meanings and are being contested.

The debates on various aspects of water governance in the absence of specificity tend to be abstract. There is a need to study how the particularities of the livelihood systems, agrarian structure and institutions in the various regions (basins) shape the actual formulation and implementation of programmes and policies. It was therefore thought appropriate to take specific sub-basin level projects and involve various sections (stakeholders) on issues of water governance. Outcomes from the research and actions at specific locations may help evolve a greater universal valence.

This article is an interim outcome of an action research project being done on Water Governance under which an analysis of the sub-basin is being done to understand the dynamics of water allocation and regulation in practice. It studies inter-sectoral water allocation, planning and management in the last decade in the small sub-basin (Waghadi) in Painganga basin of Godavari River in Maharashtra.

Yield and Inter State Allocation from Painganga Basin

Waghadi is a sub basin of river Painganga (G-7) in the Godavari river basin. Painganga basin lies mainly in the southeastern part of Maharashtra with a small catchment area in Andhra Pradesh. The river has six main tributaries - the Kiodoh, Pus, Arunawati-Adan,

Waghadi, Khuni, and Vidarbha. The river is perennial but dwindling in volume to mere stagnant pools during the hot weather season. It constitutes about 7.64 % of the catchment area of the entire Godavari basin. The yield of the river at 75 % dependability is 138.5 TMC, which amounts to about 4.62 % of the yield of the entire Godavari basin. Yield from Painganga available to Maharashtra as per the Godavari Water Disputes Tribunal (1980) is 105.6 TMC. The issue of inter-state allocation was resolved when the waters of G-7 were allocated to the states of Maharashtra, Andhra Pradesh and Madhya Pradesh through the 1975 agreement on the principle of just and equitable apportionment. As for Waghadi sub-basin as per the GWDT agreement Maharashtra has been allocated the entire yield up to the Waghadi project site.

The decision on allocation of groundwater resources of the inter-state river basin (Painganga within Godavari) did not take into consideration the close connect between surface and ground water. There were no limits to the use of groundwater to prevent reduction of downstream water supply as its flow was not fully calculable from the technical point of view as yet and hence was not yet fully perceivable from the legal point of view. Situations may not be the same today given technical advancements that have taken place in the field of groundwater assessment. The main interstate issue today in river Painganga is related to the Lower Painganga project, a joint project between the states of Maharashtra and Andhra Pradesh proposed to irrigate an ayacut of 2.27 lakh hectares, 88% of which is in Maharashtra. A broad consensus was reached on issues like sharing of costs, sharing of waters, creation of a Joint Control Board between the two states during the course of several meetings. Agitations against the project continue and at one point project-affected persons (PAPs) had filed writ petitions in the Aurangabad High Court Bench opposing the project making Maharashtra and Andhra Pradesh as parties. The environmental and forest clearance of the project was got with difficulty in 2007. A barrage was acceptable to the project affected as there would be no need for locals to be displaced. While reliance on dams has created unsustainable cropping patterns in other regions of the country, reservoirs in these areas though designed for kharif, rabi and hot weather season, have barely any demand during kharif leading to vast quantities lying unused. The reservoirs serve as evaporation pans and large carry over storages from the previous season have more recently in 2006 led to floods. According to a CWC report of 2007 while the extreme drought conditions and the lack of availability of water for irrigation has resulted in numerous farmer suicides in the Vidarbha belt, reservoirs in the region are choked up with excess water which apparently never reached the poor farmers. The report cites data for the four main reservoirs in the Painganga-Wardha-Wainganga basin with carry over storages way above the norm of 10 % or less of the capacity such as -the Upper Painganga (44% on June 16), Kamthi Khairi (88%), Upper Wardha (33%) and Arunawati (28%). The spur in irrigation projects in the region needs to be seen in this context. Experts have increasingly highlighted the need for a transparent and accountable reservoir policy and reservoir operation rules.

Waghadi Sub-basin

Waghadi is one among the six tributaries of Painganga River. The river has two tributaries with the same name. One of them (Waghadi II) emerges just below Yavatmal town in the northern edge of Yavatmal plateau and flows south as Waghadi for a certain stretch beyond which it is called Akhpuri river. The river Akhpuri meets another rivulet - Waghadi I at Ghatanji. The river continues as Waghadi and flows across areas of Yavatmal and Kelapur till it joins the Painganga river. The river is nearly 80 km in length and contains water for major part of the year. The soil type in the catchment of the basin is shallow coarse and in the reservoir command of medium black type. Main types of land use in the sub-basin catchment are rainfed kharif crop area, deciduous forest, and degraded forest and scrub vegetation. In the catchment area kharif crop, deciduous and degraded forest and scrub vegetation are the main land use categories.

The area is marked with agricultural distress even leading to suicides and the immediate trigger has been traced to yield and price fluctuations in cotton and discontinuation of monopoly procurement of the crop by the Maharashtra State Cooperative Cotton Growers Federation (MSCCGF) during early 2000s. Prices offered by private traders were more than 30% lower. The introduction of Bt cotton in rainfed areas and use of spurious seeds have led to a sharp drop in yields. The lag in energisation of pumpsets in the district whose stage of groundwater development stands at 24.48 % is leading to low irrigation. The cost of cultivation of cotton, the major crop of the basin is very high as compared to the price received. As per the Planning Commission's report the average production cost per hectare in the case of Bt cotton is Rs. 16000 and the income Rs. 20100 for a yield of 10 quintal/ hectare. As of 2008-09 the Cotton Corporation of India, NAFED and MSCCGF are procuring cotton at favorable prices thus serving as a means of relief to the farmers. However the breakdown of the cotton economy during the last decade has led to a shift towards crops like soyabean which are less risky both from the yield and price angle. Though oranges are a major diversification in the Vidarbha region they have failed to catch up in both in the catchment as well as command. There is a need to renovate the malguzari tanks constructed way back in the 16th -17th century to provide supplementary irrigation to cotton and soyabean. The implementation of the watershed programme has failed to take care of this. The thrust in the region to remove backlog in sectors such as irrigation (backlog of the order of 55.04 % as on 1994) has led to a sudden stimulus in construction of dams of all sizes.

The basin lies in the Amravati division, formerly known as Berar. Like the rest of the State it too has passed through a couple of land reform measures post 1947. The land revenue system prevalent in the basin prior to independence was ryotwari wherein each

plot was surveyed, the soil classified and its assessment settled. Field study indicated that apart from ryotwari, a large part of the basin area comprised of izara villages which were held under the 'Waste Land Rules of 1865'. Under the izara system entire villages were leased out to individuals at a low rental for a period of about 30 years. The lessee could opt for keeping the whole village in perpetuity on payment of 50 % of the fair assessment if successful in bringing a third of the land under cultivation. Even today the former izardars of the area own several hundred hectares of land and continue to dominate the local politics of the area. During the process of land reforms people were allotted lands in parganas - a unit larger than village. The work of consolidation of holdings during the eighties was aimed at mutual exchange of holdings to make them as compact as possible but was discontinued as the Record of Rights was not up-to-date. Our field study revealed that most people had small and scattered fragments of holdings across several villages. The pattern of land holdings indicates that concentration of land still continues and inequality in land holding among the agricultural population is very marked even after the implementation of land reforms.

Water Resource Development in the Waghadi sub-basin

There is a medium irrigation project 1.5-km upstream of Yelabara village on Waghadi II river in the Yavatmal tahsil of the same district. The catchment area of this seasonal river upto Waghadi dam site is 238.40 sqkm (23,840 ha). The project has a reservoir and a 35.7-km long contour canal, which is divided into a number of distributaries. In the first stretch, the canal runs towards the south with 24 minor distributaries (minors). There are two major distributaries after this stretch: one running for 11 km with 5 minors towards east and the other running for 12 km with 2 minors towards west. The command area is 6110 ha, spread in 17 villages in Yavatmal and Ghatanji tahsils of Yavatmal district. A river gauging station was established at Yelabara and gauging was done from 1964 to 1966 after which it was discontinued. There are four minor irrigation projects in the catchment area, these are: Anji, Bhari, Chinchghat and Deo-nalla projects. After accounting for upstream reservation for all these minor irrigation projects and local sector minor irrigation tanks, the net yield available at the dam site is 56.594 MCM or 1.999 TMC. There are 13 villages in the catchment, 17 in the command and 4 villages under submergence (780 ha, 500 PAPs). Two of the villages under submergence were forest villages (government lands) and hence no compensation was provided. In the revenue villages compensation provided amounted to upto Rs. 1000/ ha for both irrigated and unirrigated lands. The project started functioning in 1988. The State of Maharashtra had in the Godavari Water Disputes Tribunal and the agreement in 1975 negotiated for entitlement of the entire yield till the Waghadi project site. The project was included in the master plan of the Krishna Godavari basins prepared by the Committee of Engineers appointed by Government of Maharashtra and is widely projected as a model project in the area. The actual command today stands at around 1000 ha [14 % of designed command] and is not very high as compared to the submergence area. The designed discharge of 200 cusecs at the dam headworks has reduced to a maximum of 80 cusecs now. This is the situation in most structures in the region.

A project is proposed on Akhpuri rivulet of Waghadi II river in the sub-basin by Vidharba Irrigation Development Corporation (VIDC) and is estimated to cost around Rs. 34.88 crore. This has raised a controversy since as many as four irrigation projects all a few kilometres from each other, already exist in the area and there is no need for a new project. Nilona and Chapdoh projects have already been commissioned on Waghadi I river and Kolambi and Warud projects on Waghadi II river

The projected benefit-cost ratio for the Waghadi project was 2.76 as per Detailed Project Report. Norms indicate that schemes are accepted if the benefit-cost ratio is more than 1.5:1 even if financial statements suggest that the scheme is unproductive. Further in the case of projects located in scarcity (drought prone) and backward areas (SC and ST areas as notified by the State government) a lower ratio of upto 1:1 is acceptable.

Since the construction of the Waghadi project in 1978, the irrigation functionary (Gatekeeper) in charge of the reservoir has kept a record of discharges and yields. The following information is recorded and passed on through wireless to the Division Office on a daily basis - (a) water level in the reservoir, (b) daily rainfall, (c) level of water in the Standing Wave Flume downstream of the canal headwork (d) discharge of water, (e) level of water over the waste weir, and (f) discharge from the waste weir. The releases are decided accordingly for irrigation requirements of agricultural crops. In spite of these demands on the reservoir, it is surplus and not scarcity that marks the case of Waghadi and most other reservoirs in the basin. Though administrative mechanisms to secure a statement of demand from the beneficiaries may have been followed, what is clear is that there was no economic demand from the people to construct the reservoir. Ordinarily before the construction of a reservoir, a Collector Certificate stipulating that there is a keen demand for irrigation (and other uses like drinking and industry) and that the beneficiaries are willing to come under agreement and pay water rates and betterment levy is issued. The low percentage of assessment and lack of demand in kharif season indicate the poor economic demand. The water available in the reservoir is sufficient to meet the increasing demand for drinking and irrigation at least in the normal rainfall years.

Table I presents a picture of actual irrigation versus potential created for all the structures in the Yavatmal Irrigation Circle. Actual irrigation in kharif is 9 percent for the major project and in the range of 1-2 percent for medium and minor projects. Irrigation in rabi is around 30-40 percent of the potential created for all categories of projects. The actual irrigation in hot weather season is in the range of 90 to 210 percent but being less in absolute terms cannot alter the total utilisation which stands at a mere 23.3 percent.

	MAJOR	MEDIUM					Total Medium %	Total Minor %	Total %
Name (Construction Year)	Pus (1971)	Goki (1988)	Waghadi (1988)	Saikheda (1972)	Upper Pus (1990)	Borgaon (1991)			
Kharif	8.9	0	0.6	1.9	4.8	1	1.7	1.1	2.3
Rabi	36	20	25	85	42	40	36	32	34
Hot Weather	218	372	266	48	122	7	148	97	168
Total	47.3	12.9	13.9	29	33	13.1	21	17.8	23.3

Actual Irrigation vs. Potential Irrigation

Source: *Data accessed from Irrigation Department, Yavatmal Irrigation Circle, 2006-07*

Waghadi reservoir does not have direct reservations for municipality or industry like most other medium irrigation projects but has to provide releases to a Kolhapur Type (KT) weir about 10 km downstream for drinking water supply of Ghatanji nagar parishad. The KT weir is downstream of the confluence of Waghadi I and Waghadi II and normally gets sufficient yields from Waghadi I apart from surplus flow from Waghadi II. The construction of Chapdoh dam for supplying water to Yavatmal city on Waghadi I has led to a reduction in yields at the KT site. The Waghadi dam on Waghadi II has to make releases given the poor yields from Waghadi I. To augment drinking water needs of Ghatanji town the availability from the KT weir is being supplemented with groundwater extracted through deep tubewells. The groundwater is being directly added untreated to the distribution system by pumping into the Elevated Service Reservoirs (ESR). Apart from releases to the KT weir, the Waghadi reservoir has to regularly release water during the scarcity period through the canal system as well as the escapes. This is done as per Collectors instructions during the period February to June to cater to human and livestock drinking purposes for villages downstream.

Drinking and Domestic Water Supply

Drinking water needs of urban areas like Yavatmal city and Ghatanji nagar parishad are met mostly from surface water sources in the Waghadi sub-basin. As for rural areas, about 50 % of drinking and domestic water supply needs are met from groundwater and the rest from surface water mostly through single village schemes with KT weirs on the Waghadi river or its tributaries. Yearly releases are also made through the canals and escapes of the reservoir to meet scarcity conditions during the summer months.

Yavatmal is situated on the ridge of Wardha and Painganga rivers though most of the area falls in the latter. To meet municipal water demands the Nilona project, an earthen storage dam on Waghadi had been commissioned in 1972 and was meant exclusively for drinking water purpose of Yavatmal town. It was designed for an intermediate stage capacity of 8.4 MLD (1972) and ultimate stage capacity of 13.60 MLD (in 1984). Since the project has limited storage capacity and yield it could not cater to a demand greater than 13.62 MLD. The city, which had a population of around 10000 in 1901, has grown over the period and currently has a population of around 2.5 lakh. The projections for municipal water demand were worked out for two supply situations – to the 70 % population on house connection – either 150 lpcd per day or 115 lpcd per day. In both the cases water supply to the remaining 30 % of the population is on a stand post basis @ 50 lpcd. The commercial fire demand for the city is 15 lpcd. The composite figures for the cases come to 135 lpcd and 110 lpcd respectively. The projected demand for these two options were worked out for the years 2001, 2011 and 2026 by the Maharashtra Jal Pradhikaran.

To meet additional demands of the town Maharashtra Industrial Development Corporation (MIDC) provided 4 MLD to the Municipal Corporation from its reservation of 8 MLD at Goki project (located in Arunawati-Adan sub-basin of Painganga river basin) as they were barely using 1.65 MLD. Initially MIDC allowed the Municipal Corporation to take 2 MLD from its treatment plant and subsequently following the augmentation of capacity of the treatment plant increased the Municipal Corporation's allotment to 4 MLD. MIDC expected an increase in industrial water use and was not willing to spare its reservation at Goki to the Municipal Corporation for a period of more than 6 years. Thus the total shortfall of about 12 MLD (as per 2001 projection) necessitated the construction of Chapdoh reservoir. As augmentation of the capacity of Nilona was not possible a study of alternative sources was done before taking up Chapdoh project. The alternatives considered include -

· Waghadi project - The project lay at an elevation lower than the city and involved lift; also Irrigation Department refused to provide reservation

· Run of river project on the Wardha river - About 30 km away from Yavatmal; was rejected as the river did not have perennial flow at locations studied

· Bembla project: About 28 km away from Yavatmal is on the Bembla tributary of Wardha. The project was under construction and at the time of the study (of alternatives) had not got technical clearance from Technical Advisory Committee (TAC), Planning Commission (PC) as well as Ministry of Environment and Forests (MoEF). So despite its ability to provide a reservation of 15 MLD, the Municipal Corporation decided to go for an assured source.

· Sharad nala project: Capacity of 7 MLD was inadequate to augment Yavatmal's drinking water supply requirements

· Goki project: Irrigation Department refused reservation and MIDC was not willing to spare their reservation for more than 6 years.

Chapdoh being a dependable source with sizeable quantity of water was finalised for the augmentation plan. However, Chapdoh, which had been proposed earlier by the Irrigation Department had been initially conceived as mainly an irrigation project. After the project got sanctioned in 1994, farmers had surrendered their lands on the assumption that the area was for an irrigation reservoir. However, in 1995, the government did a turnaround and modified Chapdoh into a supplementary drinking water source for the city. Chapdoh also faces technical problems which engineers have not been able to rectify. In spite of the improvements made to the city water supply, the duration of supply is 2 hours on alternate days in normal year.

Institutional Arrangements

There are several agencies involved in drinking water supply provisioning to urban areas. The Town Planning and Valuation Department prepares population projections for the town and Maharashtra Jal Pradhikaran (MJP), the execution and formulation agency for water supply schemes in rural and urban areas uses this as a basis for planning for water sources. In the Waghadi sub-basin the Vidharba Irrigation Development Corporation (VIDC) along with the MJP and Zilla Parishad act as nodal agencies for planning and execution of water supply schemes in urban and rural areas. The Municipal Corporation is placed lower in the hierarchy and acts as an operational agency for provision of drinking water supply to the city. Maharashtra Water Resource Regulatory Authority (MWRRA) is the regulatory body. In the case of Chapdoh project, VIDC executed the dam headworks while the water supply system and transmission lines up to the water treatment plant were commissioned by the MJP. These were done for the Municipal Corporation, which raised finances from Life Insurance Corporation of India. Overlapping of roles of these bodies has led to a conflict between the Municipal Corporation and the MJP since the latter went ahead with provisioning of water to Rural Water Supply Schemes in villages that are present on the way. This is strongly contested by the Municipal Corporation on the premise that since it is providing the finances for the project it should have the right to decide on the matter. The Municipal Corporation would have preferred to negotiate with the rural local bodies for an arrangement for providing the surplus waters of the reservoir.

In Maharashtra the MJP identifies the location and details of storages to be created and indicates it to the Irrigation Development Corporation like in the case of Chapdoh reservoir in Waghadi sub-basin. It does this based on requirements put forth by the Urban or Rural Local Bodies.

In most reservoirs in the Painganga sub-basin the lack of adaptive mechanisms to manage discharges and unutilized reservation for either irrigation/ drinking/ domestic/ industrial use is leading to a lot of wastage of water. MWRRA's Draft Approach Paper on Tariff's (prepared recently by ABPS Infra) suggestion that command area irrigators should pay half the water charges when they do not take irrigation has drawn a lot of criticism from farmers and their representatives. There is a demand that Municipal Bodies and MIDC pay for their unutilised reservation in the reservoirs. In case of a lag in construction of a particular component for either drinking/ domestic/ industrial/ irrigation use mechanisms do not exist for transferring the reservation to other categories. Water reforms underway see the operation of market mechanisms as the only way of allocating the resource.

The legal framework for water resource management in the basin comprises of Maharashtra Management of Farmers Irrigation Systems (MMISF) act, 2005; MMISF Rules, 2006; MWRRA Act, 2005; Maharashtra Irrigation Act, 1976; Maharashtra Project Affected Persons Rehabilitation Act, 2001; Maharashtra Fisheries Act, 1960; Water (Prevention and Control of Pollution) Act; National Water Policy; State Water Policy etc. The Irrigation Department (now called Water Resources Department) through the five Irrigation Development Corporations (1997) set up under the IDC act of 1997 manage surface water and allocate it for various uses like irrigation, drinking water and sanitation, industrial purpose etc. The WRD can decide on allocating a maximum of 15 % of the reservoir storage to industry and municipality for drinking water; in case of reservation exceeding this the matter is referred to a Committee headed by the Chief Minister for decision. Groundwater is regulated and monitored by the Water Supply and Sanitation Department, GoM. Industrial water in the MIDC areas (including townships) is supplied by the MIDC. MJP executes urban and rural water supply schemes. Urban local bodies are responsible for urban water supply whereas Zilla Parishad is responsible for rural water supply schemes. There a lack of clarity of roles of these agencies often leading to conflicts and mismanagement of water.

In order to increase the economic demand of water and recover costs legislations like MMISF and MWRRA have come up in 2005. MMISF Act places the responsibility for maintenance of the system on WUAs. WUAs are to get bulk water entitlements on a volumetric basis from the reservoir and will be charged in return. The individual irrigators will not be assessed as earlier and the responsibility has been shifted to the WUAs. WUAs are permitted to mix groundwater with surface water and can charge the irrigators for it. WUAs in the basin are not in a position to supply water

volumetrically to the retail units. This means that WUA will assess on a crop-area basis. In the case of Waghadi project, which is undergoing a system modernization, no arrangements have been made for volumetric measurements. The provisioning of water on a volumetric basis to the WUAs is itself suspect though the agreements between the WUA and Irrigation department (Executive Engineer) show entitlements. How the entitlements will be ensured is not at all clear. Experiences of the WUAs in the basin suggest that wherever the WUAs have been effective in recovering costs they have not received their share on a timely basis. The current tariffs are uniform throughout the state and do not take into account the actual returns from irrigation. Further the tariffs suggested in MWRRA's approach paper are based on cost and do not take the capacity to pay into account. The question as to why a farmer collective could not be formed to demand water and pay for it has not been probed. The Act itself is not an outcome of a demand from the people. The responsibility of ensuring equity has been thrust on WUAs without studying problems like tenancy, fragmentation of landholdings and the different returns which are available from irrigation because of physical (topographical and soil differences) as well ability to match other inputs because of inability to invest capital or because of insecure land tenure.

Conclusion

The two major inter-related aspects of basin management in the present context are allocation of water resources (area-wise and sector-wise) and integrated water resource management. The GWDT award to settle inter-State dispute has done area-wise allocation/ apportionment of water for each basin. Below basin level, area-wise allocation for irrigation and other sectoral uses gets determined administratively through project planning and design and in view of the priorities set under the State Water Policy. Though the quantity and quality of water depends upon natural resource management in the basin, water utilization by different sectors takes place both within and outside the sub-basin. Accordingly there are different administrative units dealing with water working on different geographical scales.

Integrated water use management involves integration among (a) sectoral uses and environmental requirement (b) rainfall, surface water and groundwater (c) structures [larger/smaller] (d) institutions, and (e) different land uses in catchment, command and area outside the command. The integration is necessarily required to ensure sustainability of water utilization through appropriate natural resource conservation and management in the basin and for equitable distribution in order to realize social justice and to avoid conflicts that have the potential to affect bio-physical condition of the basin negatively. At present the focus of water resource management is sectoral water allocation and price determination for different uses. The question is - how does one conceptualize both integration as well as allocation. The amount of water required for different sectors in any unit changes with time owing to changes in economic activity, demography, urbanization etc. Water from the surface storage structures is utilized for irrigation, fishery, industry, domestic use and drinking purposes. As for irrigation one cannot divide areas geographically even taking villages as a unit into catchment and command. There are large areas within villages below the reservoir that do not get any irrigation. Similarly there are areas within catchments of the reservoir that get irrigation because of structures made under catchment treatment. Rainwater and groundwater are used both in catchment and command for various uses. Different departments or sections within departments manage watershed development and different reservoirs depending upon their size. Each department/section tries to involve communities through formation of community/users groups. Technical interventions in the catchment and command and changes in land use affect hydrology and hence availability of water in different periods and locations. The integration requires mechanism to assess and discuss with all concerned the impact of each intervention on hydrology and in turn on each sector and sections/communities within sectors. Leave alone integration there is not much coordination among different departments, not to talk of sections/community groups.

Allocation among different sectors from storage reservoirs is done following different approaches. In the case of drinking water requirement it is done on the basis of projections from the past trends, in the case of irrigation projecting required agricultural growth and in the case of industry it is done arbitrarily in terms of percentage share out of each reservoir. The new capacity creation through construction of reservoirs is being done in the name of removing the backlog in irrigation sector and on the assumption of greater requirement of water for industries as a result of projected growth in the manufacturing sector. It is assumed that the availability of water would help in attracting capital to the region. These assumptions and projections may not necessarily be true. As of present, the industrial water reservation does not match the capital investment in the manufacturing sector in the basin with the result that there is a lot of unutilised water by the sector. At the same time agriculture too is unable to use its water entitlement properly largely because of system deficiencies as well as low water demand by the command area farmers. Adaptive mechanisms are required to shift the allocation on a sectoral basis based on the needs. In order to move towards proper basin management there is a need to periodically carry out an analysis of the hydrological aspects, develop adaptive mechanisms for allocating water resources sector-wise and build capacities of the stakeholders at various levels to help evolve institutions that can match the task at hand.

References

Amita Shah and Anjal Prakash, IWRM in India: From Critique to Constructive Engagement, unpublished

Approach Paper on Developing Regulations for Bulk Pricing in the State of Maharashtra, ABPS Infra, submitted to MWRRA, September 2008

District Statistical Handbook: Yavatmal, Department of Economics and Statistics, 2006-07

Godavari Water Dispute Tribunal Award, 1980

Groundwater Information, Central Ground Water Board, Central Region, Nagpur, Yavatmal, 2007

Peter Mollinga, IWRM: Global Theory, Emerging Practice and Local Needs, Sage Publications, 2006

Planning Commission's Report of the Fact-Finding Team on Vidarbha, 2006

Yavatmal District Gazetteer