

Water in India: A Conceptual Outflow

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Abstract

There has been considerable brainstorming on a suitable model of water resource management in India. We are frequented with debates on issues like water policy vs. water law, the ideal institutional designs for an integrated resource appropriation, the community's perception of the resource usages, and so. Progressively these debates have acquired a form of major policy challenge for the nation. Scholars from a variety of academic disciplines have expressed their opinion in this regard. As our understanding suggests, no individual discipline and no single specialization is good enough to tackle all these current issues of water constraint or overuse. And, hence, it calls for integration among various streams of knowledge supported by strong and sensitized societal actions. The present paper attempts to provide a figurative detail of the current water use scenario in India to add a piece of brick for that foundation.

Keywords: *Water Policy, Water Law, Water Right, Integrated Water Resource Management, Community Water Use, Environment.*

Introduction

The past 20th century as well as the first decade of the 21st century has made us feel the growing economic value of water like never before. There has been a perceptual shift regarding the definition of water as a free social good to an economic good that is tradable in market terms. All over the world, the public policies have largely acknowledged this change. As the hydro-engineering centric supply-side management paradigm has rapidly lost its ground to the newly explored demand side reforms, water has become the melting pot for a multitude of academic disciplines striving to find their footholds. Significantly,

a large number of empirical literature is currently available concerning different aspects of water resource and their numbers are continuously growing with every passing day. Ultimately, they help us to find such links that are the key(s) to develop an integrated framework of knowledge. This paper attempts to construct the emerging integrated knowledge on water resource use, approaches, policies and management based on select literature relevant for the exercise. India, with its awesome rate of population growth and growing pressure on its water resources, provides an ideal ground for the contextual interpretations of the various facets of water use and misuse.

Water right and regulation within the policy circle

Policy documentations may be perceived as a formative stage towards legal provisions. Both of them are complementary processes for each other. A poorly cited policy may well lead to a weak legal enactment. Similarly without a legislative sanction; even a fine policy will be nothing more than a waste paper. Unfortunately in India we are suffering from the latter. Cullet (2011) has discussed the observed weaknesses of the regulatory framework of the drinking water sector in India, in terms of legislative gaps. The question of fundamental right over secured water access has not been met with the required answer by the Indian constitution as currently there is no such thing like a national water law in the country. This persisting absence of a national water law has in many ways impeded the attainment of the objectives of the successive water policies, as without strong legislative teeth the policy documents have hardly any impact over the ongoing trend of water use or misuse. The situation is in a complete contradiction with the much stated importance of legislative regulations at the grass root level (Kauffman et al. 2006). Such legislations should be in conformity with the pattern of the resource use by the community. However, Cullet (2011) has further identified the implicit presence of a water right in India following some bright interpretations of the issues concerning public access to clean water within the context of the fundamental rights by the Supreme Court and High Courts as well. This precious little success has been achieved through a series of hearings by the apex court against public litigation interests.

The case of Mukesh Sharma vs. All L.J, 3077 is an example.

Subsequently Cullet (ibid.) has pointed towards the administrative line of action under the absence of any clear legal mandates regarding the individual or community water use. As a socialist state (according to the constitution), the Government of India has an undeniable responsibility to provide the basic amenities to the masses and as water is an essential input for life survival and production. So, the government has devised certain proxies to plug the gap that exists in the legislations. All these proxies have actually been the number of general provisions of water such as the Panchyati Raj acts at the state level and the secondary instruments in the shape of lucrative financial incentives as prepared by the executive wing of the government at the union level. We may easily see the examples of these secondary instruments that are being operationalized through the joint ventures of the state and union governments in terms of a proportional sharing of finance and other responsibilities. Crase et al. (2006) and Mandarano et al. (2008) can be well cited in this context for having discussed about the possible best institutional model for water resource management at an interstate and intra perspective level at length. The 73rd Constitutional Amendment Act has re-nourished the earlier Panchayati Raj acts in many ways. The devolution of funds and decision making power to the Panchayati Raj institutions has enlarged the scope of sustainability in the rural water provision, something that has been continuously missing in the earlier supply side dominated approaches by the governments. However Cullet (2011) has not forgotten to add the

contradictions and peculiarities that have evolved after the simultaneous inception of this decentralized and participatory approach at the grass root level and the centralized policies cited in the Strategic Plan 2022 for the water sector, as the two approaches have hardly anything similar in their objectives.

A tone of warning has been there in the voice of Cullet (*ibid.*) as he speaks of the misinterpretation of the concept of decentralization where it leads to a situation of a complete withdrawal of the government from a sector like water. It so happens, when there is a kind of negligence of the existing institutions of democratic governance in the mad rush for decentralization, the process of decentralization should contribute to the strengthening of democratic institutions and not to their gradual weakening. There is a need to channelize the undercurrents of decentralization through successive and strategic reforms in the supply side of the service, i.e., government agencies at various levels (*cf.* Oad 201, Bhaduri et al. 2005). Shah et al. (2004) have rightly peeped into the history of Mexican water sector reforms to find out a suitable replicable model for the Indian soil. Bhamoriya et al. (2011) have presented a comparative study among various institutional designs and tried to find out the causal factors that contribute towards the observed difference in their performances even under the same physical and socio-political set ups. Here we must remember that the engagement of the citizens in a meaningful way is a key essential for improved institutional performance and rationalization of the essence of decentralized water governance (*see, Smutko et al. 2002*).

Moving ahead with the current discussion; the concern is much relevant that the fundamental right to ‘pollution-free water’ and the right of access to ‘safe drinking water’ as has been recognized by the Apex Court under Article 21 of the constitution of India, is a right to each individual rather than a group right. This is something like a paradox when the current government run programmes largely appreciate the group right over water use whether it is regarding irrigation water usages or be the drinking water. Scholars, like Upadhyay (2011), have expressed their opinion in favour of a group right regime. Further, it has been acknowledged that such rights should be very much detailed, in terms of the inter-community and intra-community water demand and supply patterns, as many of the wise community driven water resource management initiatives have collapsed over their face due to poorly defined water rights (Jyotishi et al. 2005). If the community right regime is well coordinated with the individual water needs, it paves the way for a sense of water security among the community as a whole which is an utmost prerequisite for the successful formalization of any sustainable management venture.

In the absence of a national water law in India, some of the states have enacted their specific sectoral legislations with a focus on the regulation of a specific body of water to serve to the communities’ water needs. This is, for instance, with the cases of the state government of Maharashtra, Karnataka and Madhya Pradesh where the drinking water sector has been primarily addressed through ground water legislations. At the national level, we are having a model ground water bill since 1970 with its subsequent

revision in 2005. However, due to their certain serious inadequacies, the Planning Commission in India has introduced a new ground water model bill in the 12th Five Years Plan. It has many bright points to its credit including provisions for the strict enforcement of regulatory tools for the ground water based on a systematic zoning of the ground water resource. To achieve this task, a plan for a comprehensive aquifer mapping programme at watershed level for the entire nation has been prepared. One more excellent proposition of the model ground water bill is its stated commitment to device the mechanism to delink the connection between land right and ground water access. This critical link is primarily responsible for the increasing socially and culturally induced injustice towards the backward classes when the question is about the water accessibility (Mehta, 2003). The water entitlement system appears to be an effective solution of the challenge. However, it must have to be kept at a safe distance from the tradable water right regimes as it may damage very well the objectives of the model ground water bill (Cullet, 2012).

Integrating knowledge and the institutions

Some scholars have pointed towards the absurdness of most of the engineering interventions in water management without a due care for the proper institutional environment (Shah 2004). Here the term 'institution' refers to a well-integrated body of social and cultural norms, values and ethics that may or may not operate within a broadly defined legislative context. With a very few exceptions, so far most of the water institution designs have badly failed to find a counter of the changing external

and internal challenges that have confronted the current water use practices (Ward et al. 2007). If we diagnose the source of the malaise, a persisting gap between the net available academic knowledge on water and their utilization in management practices is observed (Baker, 1998). We simply lack an interface between administration, legislation and academia. The reason behind is the ongoing culture of 'bad politics'. This bad politics is primarily concerned with the narrow interests of a few against the overall welfare of the society and community. Homer-Dixon took up the pioneering initiative to conduct research on the ingenuity gaps and implications for the so called developing countries as is witnessed with the case of water sector today. This apparent lack of ingenuity can be removed through expanding the knowledge base of the traditional institutions (Bobba et al. 1997). This knowledge exists in a variety of disciplines viz. economics, sociology, environmental sciences, material sciences, engineering etc. The problem rests with making the appropriate choice concerning the right combination of these disciplinary knowledge (Engle 2012). This choice at the same time has to be very purposive and sustainable too.

The crisis value of water, for example, can give a very suitable interpretation of this issue. Water crisis or stress (and also water abundance) unlike its earlier generalized indifferent character, is now being defined in a variety of ways and at a variety of levels by different disciplines (Iyer 2008). However, a strong link is always very much evident among them (Gandy 1997, Freeman 2000, Shah 2005, Ayoubi et al. 2006, Loch et al. 2011). Thus the first order crisis is an

engineering definition, while the second order crisis is concerned with economics and the third order is uniquely a sociological phenomenon (Eisen-Hecht et al. 2002). However, in a real world situation there is hardly any distinction between these three orders as each one of their types is found overlapping the others and in turn being overlapped by the others. Many times one order invariably pave the way for the next order.

Integrated water resource management: a myth or a reality?

Three interrelated terms are very important for the discussion viz. integrated water resource management (IWRM); sometime also called as integrated watershed management or basin plans in the literature (Kenney 1999), water market and property right over bulk water use. Each of the three terms is equally influential and hence debated particularly in the context of the developing economies. In India, for instance, there has been huge brain storming regarding the choice of the IWRM approach for the country's underdeveloped water economy. Scholars like Tushar Shah and Barbara van Koppen have been very optimistic about the positive sides of IWRM for the water sectors; before adding a conclusion that India as a country is still at an infantile stage of water economy and hence she (India) will need to wait for a pretty long time for the IWRM formalizes as a reality. However scholars have rejected the views alleging biasness and incompleteness of their perception of the reality (cf. Iyer 2006). We too need to remember that a universally accepted definition of IWRM has not been reached so far. The very nature of the terminology

is subjected to continuous changes under various geographical and socio-cultural settings. From a critical understanding of the components of IWRM, we can identify some of its basic features that can be applied everywhere irrespective of any given condition. The ultimate objective of IWRM is the development of a water market based on sound economic principles that can ensure efficiency in water use and remove its wastage. To serve this purpose, we need to realize the value of each kind of water endowments in clear and marketable terms which is only possible when the property right paradigm is well established over the resource allocation. Once water is translated into an economic good from its earlier free social good, the question of optimality in its use will receive a very positive response by the end users as then hardly anyone can afford its wasteful and comparatively non-profitable use due to increasing monetary losses.

Now we also need to look at the flip side of the coin. Market has its own devils inside its big pockets. Optimality and efficiency in water allocations and usages will invariably lead to a situation where the distributors would tend to sell out their shares for making the maximum possible return. And, the buyers in turn will try to redistribute their purchased water towards the most profiting use (Briand et al. 2008). Thus practice of floriculture will be preferred over growing food crops as the former has clear margins in monetary terms over the latter. The question is can we afford such (in)efficient use of our water on the expense of millions hungry mouths in India, whom we need to feed on an emergency basis? Even not giving a positive sanction to the ongoing culture of

irrigational overuse of subsidized water; we can hardly compromise with such moot questions. The point is that we need to find answer for our fast deteriorating ground water statistics in an indigenous way with our own model of IWRM without being obsessed with the western practice of the term (Pitafi 2006). There is a vast array of indigenous knowledge which we need to reconsider and upgrade to reinvigorate the lost sense of sustainability in community's water demands. The 12th Five Years Plan's approach for the formation of village level aquifer management committee is nothing but recognition of this need at the national level.

There are also some serious shortcomings in the conventional IWRM models. For its successful implementations, we will need to specify each component of the community's water need so as to reorient our legislative tools to put regulations for each of their types. Subsequently, the entire sets of administrative functionaries will have to be rearranged and the transaction costs associated with the task will be much higher and sometime completely uneconomic; at least for an initial long phase unless and until the market becomes mature enough to take care of the task itself. The point is who will bear the cost for that intermittent period when there is no assured timeline for the virtual market to take off (Grigg 1999)? Even after the market possibly reach its desired maturity the need for further institutional safeguards by the government would not be over; as already has been stated that the market can compromise with the interests of the majority simply for making profits. Such policy exclusion will affect the lower income groups in the most

severe form. These markets once took-off will become very fertile ground for the big private players like the multinational companies with their ambiguous motives (Sohoni 2012). The involvement of these private players in water sectors has not been very healthy for the developing nations so far (Alam 2004). So, we have one more potential concern on this issue. Again effective regulatory tools are not easy to develop for a country like India with so large a population and with ground water use at its all-time peak since the successful implementation of green revolution.

Water, unlike other resources like minerals or energy resources, has many distinctions if we try to bring in the focus over its contemporary planning models. With the increasing population; as water is becoming scarce in many parts of the globe and there is least feasibility left for further engineering development for the resource exploitations even in those areas where there is still 'enough' water, the mandate for management practices has largely shifted from the earlier supply dominated remedies to the demand adjustment principles (Lewis et al. 2005). These demand adjustment techniques for every legitimate reason should not be purely economic. Because there will be associated risk of an incompletely defined market where the level of satisfaction for both the distributors and buyers would show a trend of negative bias towards the bulk water prices and other parameters like water quality, timely availability etc. would be largely compromised. Thus, the implications of a water planning model are manifold for any nation striving to sensitize the community water use through policy ventures.

After taking a critical view of the IWRM approach, it would be appropriate to redefine the term in the form of Adaptive Indigenous Water Resource Management (AIWRM) particularly in the context of India so as to enlarge the scope for policy learning (Cruse, 2012) and policy transfer (Swainson et al. 2011). Here we get an opportunity to incorporate the positive aspects of the IWRM approach without compromising with its neo liberal economic evils. Mere policy formulation would not yield any benefit if it is not accompanied by a behavioural change towards water usages on the part of communities. There is a need for community acknowledgement of the economic and environmental values of water. It would not happen unless and until the community feels a sense of ownership over the resource. The IWRM has key potentials to involve the community in the overall process of policy formulation, planning and decision making. However, the question of sustainability still would be missing from its core. For its solution, we have our own social norms, ethics, values and customs which have been tested through thousands of years' experience and they altogether are a reflection of a sustainable practice in our country which we tend to forget in the new age of reckless consumerism and insensitivity towards the environment. Thus, our basic framework should be the very IWRM and the processes should be indigenous. A systematic coordination is necessary between top-down and bottom-up approaches at all levels—national, sub-national and local. Both processes of regulations and decentralization can operate through this structure effectively. Here decentralization should be done at higher

level of government in a meaningful way to provide directions to the newly empowered community's decision makers.

Community participation to community ownership

The concepts of community participation and community ownership have to be seen in the backdrop of a growing understanding of the issues of gender participation and social identity. The community itself is not a homogenous entity rather an aggregation of genders, castes, creeds and sects. So, the process of community empowerment has also to be disaggregated through each of its components. In recent literature, an overriding stress has been given to explore the dimensions of the relation between women and water (Oreilly, 2011). As there is a social division of labour where women are primarily responsible to secure the supply of water for the entire household, the scarcity or inaccessibility of water affects them the most. So their (women's) understanding of water is vastly different from that of their male counterparts. During crisis time their expending more to fetch water is very critical for their own mental and physical health. Easy access to water and sanitation is perhaps the most important prerequisite for the women empowerment issue. So when we talk about community participation in water governance we need to ensure gender equity also.

Equally debated and important aspects of community participation are the social identities and stigmas that circumscribe the process of participation. In India where the caste based discrimination is very prevalent in many parts of the country, the lower

castes population can hardly expect justice for their water needs from the traditional dominants that basically come from the dominant social groups. Even in the general functioning of democratic processes there is a savage replication of caste based injustice. Thus to offer tea or water in separate cheap glasses to the Dalit representatives during panchayat ('village council') meetings is not seen as something odd as it gives a sense of superiority to the ego of the dominant caste group. This is a form of community mediated discrimination due to which the representatives of the lower castes either refrain completely from attending those meetings or are forced to remain silent during the sessions. Their representation thus becomes nominal and does not yield any improvement of their communities. In view of the prevalent practices, it will be very foolish to expect the community control of local water resource to become a full-fledged mass movement at this juncture.

Major policy challenges regarding water management

In most of the resource management policies a visible challenge is to formulate a set of comprehensive policy directives which is flexible enough to accommodate the changing technical and socio-economical dynamics, and detailed enough to be capable of providing a ground of resolution for the inter-conflicting stakeholders interests. As the very next step of policy formulation should be legal enactments, so the success or failure of the legislation at large depends upon the quality of subjective interpretations and technical implementation of the policy documents.

This assessment is applicable in both the national or multinational settings. A very common problem for the policy makers is to make a distinction between the terms use and overuse. At various levels of technical efficiencies the term, 'use' invariably changes into a state of overuse. The technological up-gradation in irrigation, for example, represents a justification for the statement. The earlier flood irrigation techniques were primarily concerned with water use for enhancing the farm production. While the recent improvements in drip and sprinkler irrigation are concerned with the earlier overuse of water by flood irrigation techniques. Even the concept of sustainability in resource use is variable in nature due to the same changing technical limits. That is why the importance of flexibility is repeatedly stressed in policy formulation process. This desired flexibility can only be achieved when the stakeholders, involved in policy formulation stages, are from very diverse fields and having diverse and specialized knowledge. So, the recent addition of participatory policy making in the policy discourse is a witness to this need. Both rigid process and rigid products are evidences of an inefficient policy doctrine.

The institutionalization of the conflict resolution mechanism is the second challenge to be addressed by the policy makers. Involvement of more and more stakeholders in policy making simply means there is a very extensive range of vested interests with the resource use, and each of the stakeholders will try to extract out the lion's share of benefits on a claim preference basis. In simple terms, it will be a situation where there will be hardly any party willing to be at the bottom end of the list of potential

users of the resource. It will invariably lead to a motion of conflict among the various stakeholders (Ritschard et al. 1999). The worst consequences would be filing of law suits which are both expensive in terms of time and money. Moreover, it may well hinder the progress towards the realization of the original programme and projects for which the policies were primarily designed. So, the off court mutual settlements on the basis of dialogues and consultations will be most preferable. The policy needs to provide a conducive environment for this dialogue process (Ellison et al. 2010). This prime consideration is basically responsible for the overriding politicization of policy making where the scale of economy is largely compromised for the sake of accommodating the interests of a large number of stakeholders. It is a kind of negotiation politics. Here, we gradually develop an understanding of why policy making hardly achieves a scale of economy in its actions (directives).

Growing concerns for the environment in contemporary water policy making

The ongoing discussion would be incomplete without the reference of the environment which is the ultimate source of water. Until recently, in policy making sphere, the presence of environment has been something like a proxy. It was as if the quality of the environment was taken almost for granted. This extractive policy for the resource allocation was in vogue because of its monetary gains in the shape of the green revolution and subsequent food security enhancement. It badly failed to percept the environmental costs associated with such drastic changes in the mode of agro

production. Shah (2004) has discussed about the awesome speed of ground water development in India in terms of the increasing numbers of tube wells. Kumar et al. (2008) have been very critical of the policy remedies for such problems which are sometime worse than the disease itself. Their focal point of criticism has been the ‘one-size-fits-all’ approach by the governments as evident in the case with the promotion of small water harvesting structures without any (due) care for its long hydrological impacts on the environments. Mishra (2008) has however shown his discontent with Kumar’s view and his voice has found a kind of support in Sahu et al. (2001) although not in the same context.

One mooted challenge for distributive/ extractive water policy has been estimating the exact environmental demand for water (Postel, 2003). Water as a resource not only has economic benefits to offer but has end number of indispensable ecological functions too. To maintain all those functions, the water should simply be allowed to flow unhindered down the streams or get through the complex aquifer designs. Thus, we must resort to a critical adjustment between human water demand and environmental water demand at the very outset. Cap and trade policy (Thompson et al. 2009) has been proved to be very effective for serving this purpose but they have been criticized for ignoring the other viable alternatives like proper cost managements (Michelsen et al. 1999). Same sort of criticism has been labelled against the restrictive and regulatory tools for water conservation. Moreover, for a country like India so hugely dependent on ground water for agriculture and domestic usages, these sort of cap and

trade or regulations would hardly produce the desired results. Rationalization of the water prices, at least for the irrigation sector and especially for the big farmers, has some potential. Same kind of actions would be necessarily to be followed for the industrial sector as well.

Some conclusions

Water as a subject of academic research is so complex that any single research work would not be able to deal with each and every concerned issue appropriately. So it would be always in our best interest to keep exploring the lags in our policy practices and common perceptions around the resource usages. Till date water is addressed in various specialized disciplines with different perspectives like in civil engineering, sociology, economics, law, public administration and geo-sciences as well; unfortunately all these available stock of academic knowledge are often found placed in a contradictory position in relation to each other. Thus, they fail to generate a synergised solution for the burning water issues. Internal academic conflicts among the academia are also very prevalent. The need of the hour perhaps is a multidisciplinary approach towards the problematic scenario. Based on the foregoing discussions, call for a separate discipline of Water Resource Management will not be inappropriate. However, concerned, sensitized and concerted efforts in this direction are required which may yield expected outcomes in near future.

References

- Alam, J. (2004): Water not for Private Ownership, *Economic and Political Weekly*, July 24: 3351-3352.
- Ayoubi, F. E., and McNiven, J. (2006): Political, Environmental and Business Aspects of Bulk Water Export: a Canadian Perspective, *Canadian Journal of Administrative Sciences*, Vol. 23 Issue 1: 1-6.
- Baker, V. R. (1998): Hydrological Understanding and Societal Action, *Journal of The American Water Resources Association*, Vol. 34, No. 4: 819-825.
- Bennett, J. (2003): Environmental Values and Water Policy, *Australian Geographical Studies*, Vol. 41, Issue 3: 237-250.
- Bhaduri, A., and Kejriwal, A. (2005): Urban Water Supply: Reforming the Reformers, *Economic and Political Weekly*, December 31: 5543-5545.
- Bhamoriya, V., and Gandhi, V. P. (2011): Water Management Institutions for Enhancing Better Adaptiveness, *India Infrastructure Report*: 134-150.
- Bhatnagar, V., and Ramanujam, S.R. (2011): Addressing the Challenge of Financial Sustainability in Urban Water Supply Services ____ Role of Performance, Monitoring and Planning, *India Infrastructure Report*: 210-224.
- Bobba, A. G., Singh, V. P., and Bengtsson, L. (1997): Sustainable Development of Water Resources in India, *Environment Management*, Vol. 21, No. 3: 367-393
- Bouleau, G. (2008): The WFD Dreams: Between Ecology and Economics, *Water and Environment Journal*, Vol. 22, Issue 4: 235-240.
- Brightman, M. (2010): Water Management in Sites of Abundance, *Anthropology News*, February 2010: 4-5.

- Chakraborty, L. (2008): Deficient Public Infrastructure and Private Costs: Evidence for the Water Sector, *Economic and Political Weekly*, August 2: 65-69.
- Cooper, B., Rose, J., and Crase, L. (2011): Does Anybody Like Water Restrictions? Some Observations in Australian Urban Communities, *The Australian Journal of Agricultural and Resource Economics*, Vol. 56, Issue 1: 61-81.
- Crase, L., and Dollery, B. (2006): Water Rights: a Comparison of the Impacts of Urban and Irrigation Reforms in Australia, *The Australian Journal of Agricultural and Resource Economics*, Vol.50, Issue 3: 451-462.
- Crase, L., Dollery B., and O’Keefe, S. (2011): Managing Environmental Water Lessons in Crafting Efficient Governance Arrangements, *Economic Papers*, The Economic Society of Australia, Vol. 30, No. 2: 122-134.
- Crase, L., O’Keefe, S., and Dollery, B. (2012): Presumptions of Linearity and Faith in the Power of Centralized Decision-making: two Challenges to the Efficient Management of Environmental Water in Australia, *The Australian Journal of Agriculture and Resource Economics*, Vol. 56, Issue 3: 426-437.
- Cullet, P. (2011): Evolving Regulatory Framework for Rural Drinking Water: Needs for Further Reforms, *India Infrastructure Report*: 151-161.
- Dupigny-Giroux, L., (2001): Towards Characterizing and Planning for Drought in Vermont- Part II: Policy Implications, *Journal of The American Water Resources Association*, Vol. 37, No. 3: 527-531.
- Dubash N. K. (2008): Independent Regulatory Agencies: a Theoretical Review with Reference to Electricity and Water in India, *Economic and Political Weekly*, October 4: 43-53.
- Eisen-Hecht, J. I., and Kramer, R. A. (2002): A Cost-Benefit Analysis of Water Quality Protection in the Catawab Basin, *Journal of The American Water Resources Association*, Vol. 38, No. 2: 453-465.
- Ellison, B. A., and Newmark, A. J. (2010): Building the Reservoir to Nowhere: the Role of Agencies in Advocacy Coalitions, *The Policy Studies Journal*, Vol. 38, No. 4: 653-678.
- Engle, N. L. (2012): Adaptation Bridges and Barriers in Water Planning and Management: Insights from Recent Extreme Droughts in Arizona and Georgia, *Journal of The American Water Resources Association*, Vol. 48, No. 6: 1139-1150.
- Gandy, M. (1997): The Making of Regulatory Crisis: Restructuring New York City’s Water Supply, *Trans Inst. Br. Geogr.*, NS 22: 338-358.
- Grigg, N. S. (1999): Integrated Water Resource Management: Who Should Lead, Who Should Pay?, *Journal of The American Water Resources Association*, Vol. 35, No. 3: 527-534.
- Heijden, J. V. d., and Heuvelhof, E. t., (2012): The Mechanics of Virtue: Lessons on Public Participation from Implementing the Water Framework Directive in the Netherlands, *Environmental Policy and Governance*, Vol. 22, Issue 3: 177-188.
- Hoffmann, M., Worthington, A., and Higgs, H. (2006): Urban water Demand with Fixed Volumetric Charging in a Large Municipality: the Case of Brisbane, Australia, *The Australian Journal of Agriculture and Resource Economics*, Vol. 50, Issue 3: 347-359.
- Honey-Roses, J. (2009): Reviewing the Arguments for Market Based Approaches

- to Water Distribution: a Critical Assessment for Sustainable Water Management in Spain, *Sustainable Development*, Vol.17, Issue 6: 357-364.
- Iyer, R. R. (2008): Water: a Critique of Three Concepts, *Economic and Political Weekly*, November 4: 15-18.
- Iyer, R. R. (2006): Water Resource Management: Some Comments, *Economic and Political Weekly*, November 4: 4623.
- Jocoy, C. L. (2000): Who Gets Clean Water? Aid Allocation to Small Water Systems in Pennsylvania, *Journal of The American Water Resources Association*, Vol. 36, No. 4: 811-821.
- Jyotishi, A., and Rout, S. (2005): Water Rights in Deccan Region: Insights from Baliraja and Other Water Institutions, *Economic and Political Weekly*, January 8: 149-156.
- Kauffman, G. J., Corrozi M. B., and Vonck, K. J. (2006): Impervious: A Performance Measure of a Delaware Water Resource Protection Area Ordinance, *Journal of The American Water Resources Association*, June: 603-615.
- Kenney, D. S. (1999): Historical and Sociopolitical Context of the Western Watershed Movement, *Journal of The American Water Resources Association*, Vol. 35, No. 3: 493-503.
- Krishnan, S. (2011): Water Harvesting Traditions and Social Milieu in India: a Second Look, *Economic and Political Weekly*, Vol. XLVI, Nos. 26 & 27: 87-95.
- Kumar, M. D. (2008): Impact of Water Harvesting and Recharge: A Rejoinder, *Economic and Political Weekly*, Vol. XLIV, No. 10: 110-111.
- Kumar, M. D., Patel, A., Ravindranath, R. and Singh, O. P. (2008): Chasing a Mirage: Water Harvesting and Artificial Recharge in Naturally Water-Scarce Regions, *Economic and Political Weekly*, Vol. 44. No. 1: 61-71.
- Lewis, A. C., Hilton, J., and Vocke, R. (2005): Water Supply Options in a New Mexico Water Planning Region, *Journal of The American Water Resources Association*, June: 635-643.
- Loch, A., Bjornlund, H., Wheeler, S., and Connor, J. (2011): Allocation trade in Australia: a Qualitative Understanding of Irrigator Motives and Behaviour, *The Australian Journal of Agricultural and Resource Economics*, Vol. 56, Issue 1: 42-60.
- MacDonald, D. H., Barnes, M., Bennett, J., Morrison, M., and Young, M. D. (2005): Using a Choice Modelling Approach for Customer Service Standards in Urban Water, *Journal of The American Water Resources Association*, June: 719-728.
- Marcus, R. R., and Kiebzak, S. (2008): The Role of Water Doctrines in Enhancing Opportunities for Sustainable Agriculture in Alabama, *Journal of The American Water Resources Association*, Vol. 44, No. 6: 1578-1590.
- Mehta, L. (2003): Context and Constructions of Water Scarcity, *Economic and Political Weekly*, November 29: 5066-5072.
- Michelsen, A. M., McGuckin, J. T., and Stumpf, D. (1999): Nonprice Water Conservation Programs as a Demand Management Tool, *Journal of The American water Resources Association*, Vol. 35, No. 3: 593-602.
- Mishra, P. K. (2008): Water Harvesting and Recharge: A Misinterpretation, *Economic and Political Weekly*, November 29: 110-111.
- O'Reilly, K. (2011): 'They Are Not of This House': The Gender Costs of Drinking Water's Commodification, *Economic and Political Weekly*, Vol. XLVI, No. 18: 49-55.

- Postel, S. L. (2003): Securing Water for People, Crops, and Ecosystems: New Mindset and new Priorities, *Natural Resource Forum*, Vol. 27, Issue 2: 89-98.
- Rajabi, S., Hipel, H. W., and Kilgour, D. M. (2001): Multiple Criteria Screening of a Large Water Policy Subset Selection Problem, *Journal of The American Water Resources Association*, Vol. 37, No. 3: 533-546.
- Ritschard, R. L., Cruise, J. F., and Hatch, L. U. (1999): Spatial and Temporal Analysis of Agricultural Water Requirements in the Gulf Coast of the United States, *Journal of The American water Resources Association*, Vol. 35, No. 6: 1585-1596.
- Sahu, M. K., and Gupta, A. D. (2001): Reservoir Operation and Evaluation of Downstream Flow Augmentation, *Journal of The American Water Resources Association*, Vol. 37, No. 3: 675-771.
- Sargent-Michaud, J., Boyle, K. J., and Smith, A. E. (2006): Cost Effective Arsenic Reduction in Private Well Water in Maine, *Journal of The American Water Resources Association*, October: 1237-1245.
- Shah, C. H. (2005): Economic Analysis of a Drinking Water Project in Andhra Pradesh, *Economic and Political Weekly*, January 29: 474-481.
- Shah, T. (2004): Water and Welfare: Critical Issues in India's Water Future, *Economic and Political Weekly*, March 20: 1211-1213.
- Shah, T., Scott, C. and Buechler, S. (2004): Water Sector Reforms in Mexico: Lessons for India's New Water Policy, *Economic and Political Weekly*, January 24: 361-370.
- Smutko, L. S., Klimek, S. H., Perrin, C. A., and Danielson, L. E. (2002): Involving Watershed Stakeholders: an Attribute Approach to Determine Willingness and Need, *Journal of The American Water Resources Association*, Vol. 38, No. 4: 995-1006.
- Sohoni, M. (2012): World Bank's Urban Water Report on India: Thinking Backwards, *Economic and Political Weekly*, Vol. XLVII, Nos. 47 & 48: 22-26.
- Swainson, R., and Loe, R. C. de. (2010): The Importance of Context in Relation to Policy Transfer: a Case Study of Environmental Water Allocation in Australia, *Environmental Policy and Governance*, Vol. 21, Issue 1: 58-69.
- Thompson, C. L., Supalla, R. J., Martin, D. L., and McMullen, B. P. (2009): Evidence Supporting Cap and Trade as a Groundwater Policy Option for Reducing Irrigation Consumptive Use, *Journal of The American Water Resources Association*, Vol. 45, No. 6: 1508-1518.
- Upadhyay, V. (2011): Water Rights and the 'New' Water Laws in India, *India Infrastructure Report*: 56-66.
- Wolfe, S., and Brooks, D. B. (2003): Water Scarcity: an Alternative View and its Implications for Policy and Capacity Building, *Natural Resource Forum*, Vol. 27, Issue 2 pp. 99-107.

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