



Strategies and recommendations for river basin management in Tungabhadra



Fishermen on Tungabhadra River. Photo : U.S. Nagothu



Strategy and methodology for improved IWRM - An integrated interdisciplinary assessment in four twinning river basins

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- Doraiswamy, R., Mollinga, PP., Gondhalekar, D. 2009. Participatory training in canal irrigation in Andhra Pradesh: The JalaSpandana Experience. STRIVER Policy Brief No. **17**
- Doraiswamy, R., Mollinga, PP., Gondhalekar, D. 2009. WILLINGNESS TO PAY – UNWILLINGNESS TO BE PAID. The politics of water pricing in canal irrigation in Andhra Pradesh, India. STRIVER Policy Brief No. **18**
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Summary

This deliverable constitute of the following 3 Policy Briefs attached to this report:

Manasi, S., Latha N., Suhas Paranjape, Joy K.J., Nagothu, U.S., Raju, K.V. and Mollinga, P.P. 2009. Strategies and Recommendations towards an IWRM approach in Tungabhadra sub-basin, India. STRIVER Policy Brief No. **15**

Doraiswamy, R., Mollinga, PP., Gondhalekar, D. 2009. Participatory training in canal irrigation in Andhra Pradesh: The JalaSpandana Experience. STRIVER Policy Brief No. **17**

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STRIVER POLICY BRIEF

Strategy and methodology for improved IWRM

- An integrated interdisciplinary assessment in four twinning river basins

PB No. 15



Strategies and Recommendations towards an IWRM approach in Tungabhadra sub-basin, India

In Tungabhadra sub basin, the concept of IWRM has made very little headway in practical terms. However; there are a number of small-scale initiatives that could serve as a starting point for an integrated approach. An overall integrated plan is needed to envisage how transformation can be achieved with a basin wise management approach in this transboundary river.

The STRIVER Brief series translate the results from the EC FP6-funded STRIVER project into practical and useful information for policy makers and water managers

Strategies and Recommendations towards an IWRM approach in *Tungabhadra* sub-basin, India

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Abstract

In the Tungabhadra sub basin (TBSB), Integrated Water Resource Management (IWRM) is currently seen in a number of smaller initiatives at local scale. The concept of integration is new in water sector and it has for the first time been specified in the National Water Policy (2000), the Karnataka State Water Policy (2002). Currently, water management is based on administrative and not hydrological boundaries resulting in allocation, distribution and usage problems within and across sectors. A number of institutional measures can be implemented to develop IWRM initiatives. To begin with, a complete hydrological characterization apart from reforms of water laws and water institutions through participatory approaches is required, considering several stakeholder interests. The Participatory Irrigation Management policy (2002) and Andhra Pradesh *Farmers' Management of Irrigation Systems Act, 1997* demonstrates that it is possible to make changes, but needs to be put in practice. Number of government programs exist for capacity building, which have to be customized to suit the local needs and prepare managers and other stakeholders to strengthen IWRM competence, In addition, integration of rain fed and irrigated agriculture, integration of dispersed storages like tanks and with larger sources like the major and medium irrigation projects, improving water use efficiency, and livelihoods of marginal communities is important in TBSB.

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Fact box

Tungabhadra (TBSB) is a closed river basin, where the available water is shared between agriculture, domestic and industrial sectors. Irrigation accounts for nearly 90% of the water use and irrigated agriculture has been rapidly expanding in TBSB since the 70s driven by the Green Revolution. Land use changes in TBSB has resulted in a shift in the water use resulting in more competition for water demands. Agricultural activities, together with industrial effluents, domestic sewage and mining activities cause river water pollution. Runoff from agricultural fields has resulted in salinity, alkalinity and water logging in the downstream of the command area affecting an area of 52000, 8345 and 35850 ha respectively. Fish kills are frequent affecting livelihoods of thousands of small scale fishermen households each year. The major problem in TBSB is the transboundary conflict between the two states Karnataka and Andhra Pradesh over the sharing the waters.

TBSB – present status and future needs for an integrated development

In TBSB, a transboundary river, water management is based on administrative and not hydrological boundaries resulting in various allocation, distribution and usage problems within and across various sectors. The major share (94%) of water is allocated for irrigated agriculture, which heavily influences the water management decisions followed by urban use. The concept of integration is new to water managers. It has for the first time been specified in the National Water Policy (2000) and the Karnataka State Water Policy (2002) and Water, Land and Trees Act (2002). However, these general 'framework' policies are rudimentary regulatory mechanisms for implementing and enforcing more specific policies, which for that matter hardly exist. Although it is stated as the future vision, implementation is not happening in a basin perspective and management plans do not exist at the catchment level. Traditionally, water management has been very sectoral in India with a strong emphasis on infrastructure and technological interventions. The departments have conflicting interests and often find it difficult to integrate their interests with a common goal. There are large data gaps in assessing availability of water and the estimate is a rough one.

Main problems in TBSB

Analysis from various STRIVER activities has shown that:

1. Agriculture expansion, mining, industrial development and forest fires cause severe pressures on land use causing degradation.
2. In addition, deforestation due to illegal occupation, mining activities and forest fires is a matter of concern, causing soil erosion, siltation, reduced reservoir water storage capacity, water pollution and fish kills.
3. Monitoring and enforcement of impacts due to various activities is rather weak.
4. Water pollution is a serious concern in certain parts of the river, due to release of

untreated municipal and industrial waste discharged into the river.

5. Political interests have resulted in more conflicts rather than contributing to integrated management in the basin.



Fig 1: A farmer operating in System of Rice Intensification (SRI) field in TBSB, Karnataka, India

6. Irrigated and rainfed agriculture are largely treated in isolation with very few signs of 'integration' and also within each domain policies and programmes tend to be narrow in orientation.
7. Contending water uses across different uses, especially between agriculture, industrial and urban uses is prominent and was also identified during the stakeholders meeting.

Stakeholder perspectives, inputs and scenarios

As part of the STRIVER project, three stakeholder workshops were organized in TBSB. The purpose of the workshops and field interviews was to bring together a range of stakeholders ((State agencies, NGOs, Research Institutions, farmers, fishermen, etc), in order to exchange ideas on the key challenges facing the TBSB and discuss future scenarios and policy guidelines. A number of key challenges and opportunities emerged from the stakeholder discussions.

Water is sourced and used in a widely dispersed manner and only a small amount of it is intercepted by a centralized system. Water

sourcing and use often creates externalities, and more often than not, asymmetrical and unidirectional externalities. Barring piped water supply, water supply mechanisms have very high exclusion costs for potential water recipients. Moreover, it is recognized that water use and access encompasses both aspects of water as a social good and economic good. These two aspects generate stakeholder interests and consequent policy directions often moving in opposite directions needing a balance. From the point of view of stakeholder interaction in reference to an IWRM perspective all these aspects need to be taken into account in planning stakeholder policy at a basin/sub-basin level.



Fig 2: Second Stakeholders Meeting of TBSB held at Bangalore, India.

Over the last few years, there has been a greater effort, in varying degrees in moving towards greater stakeholder participation:

1. Stakeholder participation has been included in water policy documents and legislation, for example, the National Water Policy, 2000, mention stakeholders under clause 6.8 of the section "Planning" and in clause 12 of the section on "Participatory Approach to Water Resources Management".
2. The Karnataka State Water Policy, 2002 and Andhra Pradesh Farmers' Management of Irrigation Systems Act, 1997, promotes stakeholder participation in participatory irrigation management through water users' associations.
3. Many drinking water schemes, micro-watershed development programmes are being promoted with guidelines for community participation. Institutions such as village councils, Watershed Development Committees,

User Groups and Self Help Groups are formed and include the poor and women.

In short, in all the three major sectors – irrigation, drinking water and watershed development – efforts are on to promote participation. However with the limitation that these efforts are entirely intra-sectoral and very little across inter-sectoral and it is all 'local' at lower levels with no participatory governance at sight.

In the STRIVER stakeholder workshops, for the first time Stakeholders from both the states – Karnataka and Andhra Pradesh participated and shared their experiences and views that are reflected in the brief.

To this end, what is needed is a dispersed regulatory mechanism that will provide for effective and transparent stakeholder interaction at all levels in a nested manner from the watershed/village level to the basin level within a state with a special forum at the multi-state level. Planning this for each state is a massive task that needs to be taken up in earnest by both Tungabhadra sub-basin riparian states of Andhra Pradesh and Karnataka.

Towards an IWRM approach

There are, already a number of initiatives at different levels that could serve as a starting point for improved integration of water management in the TBSB. These include: Major intervention to protect the catchments and forest cover was the introduction of the Forest Conservation Act, 1980, which prevented the conversion of forestland for other purposes without prior approval. In addition, large areas within the TB catchment were also declared as National Parks to protect biodiversity. Similarly, watershed development initiatives have focused on holistic development of human resources, soil, land and water management.

Karnataka State Pollution Control Board (KSPCB) has been monitoring the water quality samples regularly and warns polluters during violation but has not been able to influence major policy decisions at large as there is no analysis at a basin level. NGO's working with fishing communities and civil society organizations like Samaj Partivarthan Samudaya (SPS) have protested against the

release of industrial effluents and brought some regulations in place for effective monitoring of effluents and also resulted in the formation of Tungabhadra Watchdog Committee. This demonstrates the potential of stakeholder influence in policy formulation and changes.

Integration in TBSB should first start at the interstate level based on negotiation and stakeholder participation. But, instead, interstate disputes are handled by tribunals set up under interstate disputes act. TBSB is part of the larger basin 'Krishna' and decision making on it is part of the disputes proceedings. TB Board has been set up for implementing the provisions of the Krishna Water Dispute Tribunal (KWDT) award. Bachawat Award was agreed in the mid 1990's and it stipulates a fixed scheme of water allocation in the Krishna basin, including the TBSB. The operation of the Tungabhadra reservoir is being done by the interstate TB Board and the Award is presently under revision. Currently, the Tribunal has been reconstituted as the earlier award has lapsed and renegotiation is on. As was evident at the stakeholder meetings, the pushes and pulls on the allocation within the two states and between the states (intra-state and interstate) are quite active. Neither the existing award, nor any other agreement, provides practical procedural arrangements for negotiating allocation and distribution under varying and changing circumstances. At the same time States treat data very secretly, and a lot of confusion tends to exist around it. There is no statutory requirement for States to exchange data and information in general. Agreed upon data is a precondition for meaningful stakeholder participation and this is virtually absent in the case of Tungabhadra. Regular stakeholder interactions at various levels can help in resolving conflicts and other than tribunals, which are often influenced by political interests.

The National Water Policy and the State Water Policies give water use priorities across different sectors, but do not have much of relevance in terms of actual water use planning and allocation. So far as sectoral allocations are concerned, most of the changes are taking place in the rural allocations and within it mainly from irrigation use to other uses. Also, there are no explicit legal agreements between sectors regarding sharing

of water. Competing water demands in the basin have to be met by reallocating water from other sectors. This creates a problem, since reallocation would mean cutting down the water quotas from certain sectors that could lead to conflicts. Water use conflict in the TB is politically a sensitive issue leading to demonstrations by farmers and legal disputes between Karnataka and AP. On the whole there is a continuous pressure from different stakeholders and at different levels. Ineffective governance aggravates increased competition and water management is usually in the hands of top-down institutions, the legitimacy and effectiveness of which have increasingly been questioned.

Strategies and Recommendations

As mentioned earlier, the National and State water policies although reflecting the principles of IWRM, are not implemented in a basin context. There are several organizations across the basin working on various aspects; however, there is no single authority as River Basin Organization or an effective co-ordinating mechanism for existing agencies in the TBSB. In this backdrop it is important to bring about major policy changes with specific reference to the following:

- Formulate an overall plan addressing multi-sectoral and interstate needs, balancing competing water demands taking the supply and demand, climate change impacts and water pricing. The plan should envisage how the IWRM transformation can be achieved with a basin wise management approach.
- Carrying out a complete hydrological characterization to get an account of the water resources available and of their regularity in time and space. Need for an appropriate basin level land and water use database for developing a holistic perspective.
- Reforms of water laws and water institutions through participatory approach holding extensive consultations involving affected agencies and public. Policies have to be directed to balancing requirement and availability across space and time.
- Adequate institutional and policy support to clarify the entitlement and responsibilities - roles, allocations, legal status across users

and water providers for sustainable use. Integration of responsibilities of water management between departments with a formal mechanism to ensure co-ordination.

Some specific measures

- Provide supportive system to link the water users and providers. It is also important to improve the policy and technologies; innovations to have impact on water use efficiency and livelihood assurance.
- Promoting artificial recharge for increasing ground water availability. Recharging through existing private dug-wells, rejuvenation of tanks, small ponds, check dams etc.
- Need for planned integration of policies and programmes for rainfed and irrigated agriculture and also dispersed sources like the tanks and the larger sources like the major and medium irrigation projects.
- Need for improving water use efficiency, through promotion of options like SRI in irrigated agriculture through government programmes and promoting fisheries in the basin. Water efficient technological innovations have provided promising options for irrigated agriculture to paddy, sugar cane and orchard crops, which are prominently grown. The most popular innovation in paddy is System of Rice Intensification (SRI) that saves up to 40% water use and simultaneously increases yields. Drip irrigation systems of varying sophistication are available for growing sugarcane and orchid crops. However, these methods are only partially adopted. Efficiency of industrial use through proper pricing and providing credits for reuse and recycling and strict enforcement of effluent quality standards.
- Formation of a regulatory body and regulatory mechanism that provides for dispersed access to the authority and/or its officials. Special care supporting women and marginal communities in having adequate access to the regulatory authority in the defense of their rights and entitlements.
- Provision for mandatory periodic presentation of State level Water Resource Plan for all sectors in the basin including

allocations and tariffs after due consultation and representation from all stakeholders.

- Redressal mechanism for disputes over water entitlements, allocations and tariffs
- Capacity building of stakeholders to enable them to participate effectively in the stakeholder interaction on an equal footing with other stakeholders. It should also be recognized that this might involve positive discrimination and corresponding weightage for the poor and the disadvantaged.
- Sufficient budgetary allocations to support the activities of incorporating stakeholder interaction and regulatory activity into IWRM at the basin level.
- At an inter-state level there is also a need for continuous interaction at the basin level with respect to inter-state allocation, scheduling flows, monitoring water quality and environmental flows, anticipating and effectively dealing with impending disasters like floods and droughts. For this it is important that an interstate forum of the state level basin organizations be set up in a spirit of co-operative interaction.
- Provide support to the newly formed Tungabhadra Stakeholder Forum and develop it as an inclusive stakeholder forum of all the stakeholders in the basin and use it as a space for dialogue and consensus building space within the basin

Bringing some of the principles of IWRM into a water sector policy and achieving political support may be challenging, as hard decisions have to be made. The contexts of the poor are diverse and need to be addressed in a holistic approach in future development programs



Fig 3: Fisher Women selling fish at TBSB, Karnataka, India



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The Briefs are also available online: www.striver.no

About STRIVER

STRIVER- Strategy and methodology for improved IWRM - An integrated interdisciplinary assessment in four twinning river basins is a three year EC funded project 2006-2009 under the 6th framework programme (FP6) coordinated jointly by Bioforsk and NIVA. The point of departure for STRIVER is the lack of clear methodologies and problems in operationalisation of Integrated Water Resource Management (IWRM) as pointed out by both the scientific and management communities. 13 partners from 9 countries participate as contractual partners in addition to an external advisory board.

Title of project:

Strategy and methodology for improved IWRM - An integrated interdisciplinary assessment in four twinning river basins (STRIVER)

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Front-cover photo: Sandy river bank on the Tungabhadra River (India). Photo: Manasi, S.

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STRIVER POLICY BRIEF

Strategy and methodology for improved IWRM

- An integrated interdisciplinary assessment in four twinning river basins

PB No. 17



Participatory training in canal irrigation in Andhra Pradesh: The *JalaSpandana* Experience

This Brief discusses the Participatory Training Program of various stakeholders undertaken by the farmers' organization JalaSpandana in Andhra Pradesh, India. It was found that Participatory Training had a positive impact on water use efficiency and in particular farmer to farmer learning was found to be significant in promoting sustainable irrigation management.

Participatory training in canal irrigation in Andhra Pradesh: The *JalaSpandana* Experience

R. Doraiswamy, Peter P. Mollinga, Daphne Gondhalekar

Abstract

The need for farmers to participate in irrigation management is recognized worldwide, as is the need to protect limited water resources. One method to do so is to make the water user/irrigator responsible through an institutional structure in which farmers participate in governance, management and finance of irrigation, as has been adopted in parts of India. This report describes a Participatory Training Program of various stakeholders undertaken by *JalaSpandana*, a non governmental organization in Andhra Pradesh (see www.jalaspandana.org) with the objectives to strengthen Participatory Irrigation Management, sustain Water Users' Associations, and enhance water use efficiency and farmers' livelihoods. Empirical evidence was used to demonstrate that a shift from conventional to participatory training methods actively involving water users in designing and implementing training programmes was needed in order to make training efficient and sustainable. It was found that Participatory Training had a positive impact on water use efficiency and in particular farmer to farmer learning was found to be significant in promoting sustainable irrigation management.

This STRIVER Policy Brief is based on the following research report:

Doraiswamy, R. and Peter P. Mollinga (2009), 'Participatory training in canal irrigation in Andhra Pradesh: The JalaSpandana Experience'.

Fact box

Due to a lack of holistic management of water resources, there is conflict amongst farmers as well as between farmers and the government over water allocation in the Tungabhadra Basin. Capacity building in irrigation systems has not been given adequate attention. The Irrigation and Command Area Development Department I&CAD Government of Andhra Pradesh empanelled NGOs and assigned the task of carrying out Participatory Training Programmes (PTP) in canal irrigation in Andhra Pradesh. Under this programme I&CAD supported *JalaSpandana* to carry out capacity building exercises in three major irrigation projects, covering a total area of almost 200,000 ha with 125 Water Users' Associations(WUAs), and 20 Distributary Committees (DCs) spread across 452 villages. At the inception of the project, none of the 125 WUAs had established offices and only one WUA had records pertaining to the WUA. The State of Andhra Pradesh is one of the pioneers to adopt such a PTP method in Participatory Irrigation Management PIM in India (Hooja, 2006; Peter, 2001).

INTRODUCTION TO TOPIC CONTEXT

Generally in South India, there is **lack of comprehensive long-term irrigation management** and lack of effort to re-evaluate the command area and the crop pattern based on regular review of project performance (Doraiswamy and Mollinga, 2004). Most representatives of WUAs and government officials are involved *ad hoc* in water management and thus lack understanding of long-term project performance. Due to lack of effective management, irrigation projects have been underperforming (e.g., violation of cropping pattern, unauthorised irrigation, poor cost recovery) and wasting water for several decades. As a result, water use efficiency and crop productivity are below the expected levels. Farmers have had to adjust both the area and crop cultivated, depending on water availability and crop is lost due to non-availability of water at crucial growth phases. This situation is causing **water conflict between stakeholders** (Doraiswamy and Gujja, 2004).

Most irrigation projects receive much attention on technical aspects but **neglect social aspects** such as public participation, operation and maintenance, capacity building, convergence between relevant government departments, productivity of water and crops, and peoples' livelihoods. **Donor supported** projects are often **short-term** and do not achieve sustainable results (Doraiswamy, 1995; *JalaSpandana*, 2005). Training is often imparted in capital cities and district centres (Doraiswamy, 1995; IDPAD 4-3-7, 2003). This limits outreach, and leads to handing over responsibilities to user organizations based on a one-time activity, without adequate capacity building. Farmers are apprehensive about training programmes as the conventional approach consists mainly of top-down delivery of lectures.

Due to poor government policy, most irrigation projects receive less funding than the estimated cost of **operation and maintenance** O&M, which results in a technically poor delivery system. The government tends to tackle this problem by applying for large loans to carry out the modernization of irrigation projects, which again need funds for operation and maintenance. However, as capacity to secure

these funds is not built in parallel, this strategy raises the question of how to sustain the modernized canal system and repay the loan. Thus, operation and maintenance is a core subject in the politics of irrigation development. Because the consensus of WUAs on the modernisation programme is not sought, new structures in canal systems are often tampered with.

There is a **wide gap in knowledge** between water users and professionals, and not enough research that sincerely tries to transform research findings to be understood by users (Pastakia, 2002), and the relation between stakeholders is weak. Further, there is a general **lack of knowledge** on rules and regulations, e.g. of the 1997 Andhra Pradesh Farmer Management of Irrigation Systems APFMIS Act and its subsequent amendments, among representatives of WUAs, officials of the Irrigation and Revenue Departments, and farmers.

There are several **existing informal water management practices** and community initiatives that are relatively capable in managing water scarcity. Examples of these are rotation systems, hiring of private *lashkars* (watermen providing information, managing rotation and, patrolling the canal system), increasing inflows, collective negotiation for water, and utilization of water from different sources, that benefit tail-end farmers.

The limitations of existing intervention and extension approaches of government agencies together with the (often unacknowledged) existence of considerable water user knowledge and capacity, make a case for a participatory approach to training (PTP), in which water users are closely involved in the design as well as the implementation of the training programme. An explicitly multi-stakeholder training programme process with balanced representation of different interest groups is expected to enhance the quality, acceptability and pace of irrigation system improvement (Narwani, 2005)

Main objectives of PTP

The PTP aims to draw attention to the **importance of carrying out capacity building** in irrigation projects in order to promote comprehensive improvement of system performance. Further, because irrigation systems are complex and have dynamic features in terms of social, economic, technical/hydrology and political dimensions (Vaidyanathan, 1999), **capacity building has to be a continuous process** and permanent exercise of government and non-government agencies. The PTP objective as undertaken by *JalaSpandana* is to increase the efficiency of water use and irrigation management in order to increase productivity per unit of water, food and employment security, and reduce conflicts in the region.

The challenge in the empowerment of WUAs is not just in dissemination of information, but in **identifying the processes** involved in irrigation management and finding ways to redress problems in the present water resources management system. Thus, the PTP stresses **research experience in the region** (Doraiswamy, 1995; *JalaSpandana*, 2004, 2005), including situational analysis of WUAs, water management practices, project performance, and ideal locations for setting up training centres. Joint data collection with representatives of WUAs (Naik *et al.*, 2002) and participation of farmers and department officials in identifying problems and solutions enabled structuring the content of the PTP and training materials to suit the location, and incorporate local knowledge.

The characteristics and outcomes of PTP as pursued by *JalaSpandana* were the following.

- It helps to **strengthen relations between stakeholders** by improving co-operation between department officials and water users, necessary for substantial improvement in water management.
- **Participation** of higher government officials, national and international delegates, as well as elected representatives (members of parliament) and NGOs **adds value**.
- PTP promotes **keen interest of farmers in understanding project performance** and involvement-

- Farmers share responsibility for training sessions.
- In areas where PIM was effectively applied, **water use efficiency increased substantially**, from 5 to 7 acres per million cubic feet (MCFT) of water.
- Many engineers had not been in the habit of working out water use efficiency systematically prior to the PTP. Subsequently, **I&CAD developed a format for management of information** for every irrigation project to assess the water use efficiency, which calls for regular assessment by irrigation engineers.
- The PTP aims to **bridge the wide knowledge gap** between users and professionals using appropriate training materials.
- Sending findings of the PTP frequently to concerned authorities, participatory knowledge generation and dissemination helped to **break the monopoly over data** on irrigation projects and enable farmers to participate in mainstream politics of irrigation system.
- The PTP **enabled stakeholders to understand problems related to irrigation on a wider scale**, by visualizing the negative impact of officials not discussing with farmers to verify appropriateness of modernization measures to avoid future tampering, tampering mistakes committed and the benefit of timely involvement by farmers in irrigation management.
- The **interactive communication** aided knowledge generation. Outreach to the whole command area was enabled by wide distribution of multi-media materials e.g. audio-visual, including by cable TV.

Simplification of rules and regulations on the water tax share apportioned to WUAs to carry out O&M, roles and responsibilities of Irrigation and Revenue Departments, and other day to day businesses of WUAs aims to reduce apprehension and **enable farmers to manage the system efficiently** and independently (Chambers, 2003). The design

of comprehensive policy and a move towards contractual agreement is helped by inclusion of the perceptions of water users and experts on water policies (Mollinga, 2004). The first **computerization** of WUA administration perhaps in India was implemented by *JalaSpandana* with cooperation of WUA representatives in English and Telugu.

The aim of documenting **local farmers' knowledge and informal practices** and community initiatives is to assess the scope of expanding these to larger scales in order to improve overall water use efficiency. For example, it was found that the employment of *lashkars* (watermen) in the entire command area reduces water wastage, improves water use efficiency and crop productivity. The PTP advocates adoption of various **new strategies** in water and crop management and **new cropping methods** in parallel to **retaining conventional methods** to help spread demand of agricultural practices for water over the full irrigation season.

INSTITUTIONAL MECHANISMS

The PTP conceived by *JalaSpandana* is set up as a continuous and permanent step by step process of **user organization and capacity building** to empower WUAs and make them responsible in the whole process of water tax demand raising, collecting, carrying out O&M, and manage the irrigation project including capacity building. During the PTP, almost all WUAs set up offices. The PTP comprises **Training Needs Assessment, Training, and Impact Assessment**, all carried out through participation, with monitoring and evaluation mechanisms involving various stakeholders and assessment of capabilities of users in water management at various levels.

The decision of **setting up training centres** and sub-centres for carrying out PTP and general training to farmers and all WUAs, conveniently located for access, is taken during interactive sessions with farmers and department officials. One main training centre and several regional centres are planned to cover the entire command area evenly, whilst ensuring free access to all farmers, i.e. free from any particular community, class or person. In the long-run this enables a viable institutional mechanism for the self-driven installation of training centres in irrigation projects on a permanent basis.

Intensive training is used to establish **model WUAs** to increase outreach and strengthen linkages between stakeholders. 28 model WUAs were formed which also function as users' schools, and were making progress in the development of WUAs, participation in water management, water tax collection, etc. Very intensive training is used to **establish Model Farms and Farmer Field Schools (FFS)**, to carry out PTP and increase outreach to farmers in the region (Doraiswamy and Mollinga, 2004), which can demonstrate new strategies in water and crop management and new cropping methods and give farmers firsthand experience and confidence to adopt learning in their WUA. **Farmer to farmer learning/technology transfer** is very significant in terms of adopting new methods on a trust basis from fellow farmers. Thus, *JalaSpandana* promoted farmers as trainers and deployed farmers experienced in new methods to train farmers in the command area, making water users integral to PTP. The establishment of Farmers Field Schools was given importance due to its efficiency in transferring knowledge to farmers on new methods of farming. In this exercise 436 FFS were established, and one of the outcomes of these FFS is enhanced productivity i.e. increase in yield from 30 bags to 50 bags per acre.

Data and information obtained from concerned departments and farmers was analyzed in collaboration with farmers, whereby the intervention agency functioned as a facilitating agent. The concept of **Water Users' Research Facility** is now being explored, where farmers' identification of problem areas that require further research is facilitated. **Study tours** for representatives of WUAs, department officials and other stakeholders are also employed to convey understanding of increasing pressures on water resources. The initiatives listed in PTP are samples of larger initiatives which could be designed on a regular basis.

POLICY GUIDELINES

The *JalaSpandana* PTP experience suggests the following policy guidelines.

- In order to enable the continuous capacity building process of government and non-government agencies that is necessary for building viable user organizations, a **sufficiently long time frame** is needed of at least three years. Because of the complexity of issues, regular revisits, intense analysis, and ongoing suggestion of measures for emerging challenges in irrigation project management are needed.
- At the Irrigation Department **staff from various disciplines should be recruited**, to sustain the realization that PTP is integral to irrigation management, and thus sustain the allocation of sufficient budget for training and the social component of irrigation management. A reason for the past neglect of social aspects is that many Irrigation Department staff exclusively have an engineering background, or are kept too busy preparing estimates.
- PTP has to **involve department officials at every stage of the training**, with the aim that in the long run the entire capacity building process and improved irrigation performance become a **joint venture of WUAs and Irrigation Department as system managers**. Impact assessment of the PTP revealed significant change in attitude of Irrigation Department officials towards empowerment of WUAs and NGOs, and activities and data became shared. This intense coordinated activity between Irrigation Department, WUAs and *JalaSpandana* has drawn the attention of many NGOs across the State.
- Creation of a **Research and Development cell for each irrigation project** inside the Irrigation Department is advised. Through involvement, officials realize that development of scientific assessment of water auditing and

budgeting at all levels of irrigation projects and coordinated efforts of the Irrigation, Revenue and Agriculture Departments are needed for sustainable irrigation management. Field research revealed the existence of much raw data available at different agencies on irrigation project management and system performance. Most of this data remains unused in understanding system dynamics. The PTP showed that many of the water problems in the region could be solved utilizing a **systematic data bank** on the various dynamic factors at all levels of the irrigation system.

- The 1997 APFMIS Act emphasises the formation of WUAs at three levels: Primary (WUA), Distributary (Distributary Committee) and project level (Project Committee). *JalaSpandana's* experience suggests that **Project Committees are essential for system performance improvement**, as major decisions of allocation of funds and water are taken at that level. Lower tiers of organisation depend on these decisions for their effective functioning. PIM was introduced in Andhra Pradesh in 1997, but the formation of Project Committees only took place in 2009. **The new Project Committees need to be strongly supported through participatory training programmes.**

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Title of project:

*Strategy and methodology for improved IWRM
- An integrated interdisciplinary assessment in four twinning river basins (STRIVER)*

Instrument: SUSTDEV-2005-3.II.3.6: Twinning European/third countries river basins.

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Front-cover photo: *Farmer's efforts to save his crop by manually lifting water in Tungabhadra Left Bank Canal. Photo: R. Doraiswamy*

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STRIVER POLICY BRIEF

Strategy and methodology for improved IWRM

- An integrated interdisciplinary assessment in four twinning river basins

PB No. 18



WILLINGNESS TO PAY – UNWILLINGNESS TO BE PAID

The politics of water pricing in canal irrigation in Andhra Pradesh, India

This paper discusses water taxation and tax collection issues in surface canal irrigation in Andhra Pradesh, India. It is recommended that farmers are involved in irrigation governance, including financial governance, to make canal irrigation financially viable.

WILLINGNESS TO PAY – UNWILLINGNESS TO BE PAID

The politics of water pricing in canal irrigation in Andhra Pradesh, India

R. Doraiswamy
Peter P. Mollinga
Daphne Gondhalekar

Abstract

In canal irrigation systems in South India, the problem that not enough cost is recovered for Operation and Maintenance (O&M) has been ongoing for decades. The conventional problem analysis of water tax payment and O&M cost recovery in surface irrigation in South India focuses on the low level of payment, the waiving of water tax payment arrears by government, and irrigators' willingness and capacity to pay. Policy initiatives to increase recovery to make surface irrigation more financially sustainable have generally adopted a 'making the farmer pay' approach. The case study suggests that willingness to pay among farmers is high when certain institutional conditions are fulfilled, but that the main problem seems to be the government's 'unwillingness to be paid (or collect)' under such conditions. Introduction of new systems of water tax payment and collection involves a re-negotiation of the balance of power between government and irrigators in system governance and management. It is recommended that farmers are involved in irrigation *governance*, including financial governance, to make canal irrigation financially viable.

This STRIVER Policy Brief is based on the following research report: R. Doraiswamy and Peter P. Mollinga (2009), 'WILLINGNESS TO PAY – UNWILLINGNESS TO BE PAID; The politics of water pricing in canal irrigation in Andhra Pradesh, India'.

Fact box

As early as the 1960s and 1970s it was observed that the rates charged to farmers and the collection were rather low (GOI/PC, 1965; GOI/MOIP, 1972; GOAP, 1982). But very little was done until the late 1980s and early 1990s. The water tax issue occupies a central position among the representatives of Water Users' Associations (WUAs), because the water tax and O&M of the canal system is directly related. Farmer-irrigators themselves have started articulating the need for reform, as a response to increasing levels of dissatisfaction with, and decreasing presence and capacity of government irrigation managers. *JalaSpandana*, a farmer-irrigator organisation that unites State level farmer-irrigator organisations working on canal irrigation issues in South India, most prominently in the States of Tamil Nadu, Karnataka and Andhra Pradesh, started a process of reform from below, through organisations fully controlled by farmer-irrigators themselves, that is, not as NGOs with external, so-called expert, input (too long sentence,).

Background of water pricing politics

The sustainability of irrigation systems depends on the revenue generated from the irrigation projects, allowing proper operation and maintenance and other things. In India, the governments of the federal states have achieved very low collection rates of water tax and been very hesitant to raise the level of water taxes. In many states, these remained unchanged for decades, implying that canal water relatively became cheaper and cheaper. The poor collection and low level of water tax has become a major reason for deferred maintenance of the irrigation systems, causing most of the irrigation projects to perform below their full capacity. This has resulted in loss of crops due to lack of water in crucial irrigation periods, inducing conflict between farmers and between farmers and managers over distribution of limited water. Farmers are sometimes forced to spend equal or more than the water tax either directly or indirectly to get water for irrigation. Further, some farmers violating the crop pattern and engaged in unauthorised irrigation pay as much as double the water tax amount to get water to their lands. These payments include costs for canal guarding, lifting water with pumps, and making informal payments to canal managers for releasing water (Wade, 1982; Mollinga, 2003). This gives a clear indication that farmers are willing to pay provided they are assured of their share of water at the right time. In many parts of Andhra Pradesh and also in the study area (Kurnool-Cuddapah Canal, Rajolibanda Diversion System) there are a number of villages, where informal village development groups carry out informal taxation from traders and individual farmers for water management in canal irrigation. Thus apart from willing to pay, water users have also shown capacity to raise local funds for irrigation. The question is under which conditions this potential becomes practice, and what constrains that realisation.

At the international level, the neo-liberal development agenda for irrigation management reform of the 1990s focused on Irrigation Management Transfer (IMT) with emphasis on 'financial autonomy'. It placed great confidence in the effectiveness of market and market-like mechanisms to improve water management. The main premise was that financial autonomy of irrigation agencies will lead to a more productive accountability relation between managers and water users, including the reduction of corruption (Merrey, 1996). The IMT approach advocated the introduction of water markets and tradable property rights in water. Although as early as 1989 the 'fallacies' of the neo-liberal argument for canal irrigation had been pointed out (Moore, 1989) this evidently had no great impact on the 1990s international irrigation reform discourse. However, Molle and Berkoff (2007) show that on a global scale there is very little empirical evidence for these theoretical propositions actually being realised in practice, at least in canal irrigation. This may be because prices/financial incentives are not necessarily the dominant mechanism at work to shape management practices and water use levels, and that levels of water prices/water rates in canal irrigation are often so low that even doubling or tripling them may not have much effect. Thus, the idea that increases in water charges lead to water use efficiency (Dinar and Subramanian, 1997; Saleth, 1998) is far from reality.

Wholesale introduction of 'water markets' was not tried in Indian canal irrigation, and neither was full-scale IMT. Reconfiguring the relationship between irrigators and the government service provider more as a contractual relation did enter Indian irrigation policy. Experiments with volumetric water delivery and payment to WUAs were conducted in Maharashtra and other places in the 1980s. Through these experiments the idea of self-management of irrigation systems by farmer-irrigators as Participatory Irrigation Management (PIM) became established in

India. PIM stopped short of the 'management transfer' concept of IMT and of self-governance. Government continued to be strongly involved in management, and no governance powers were shared with or transferred to water users. In some states increases of water tax and reshaping of collection practices have been part of PIM, particularly since the start of irrigation reform in Andhra Pradesh in 1996-97 (documented by Mollinga, Doraiswamy and Engbersen, 2004; Raju et al., 2006) under the Andhra Pradesh Farmer Management of Irrigation Systems Act (APFMIS Act). This Act served as a legal example followed by many other states. This reform aimed to establish a three-tier farmer management/governance system of canal irrigation, with Water Users Associations (WUAs) at the local level, Distributary Committees (DCs) at the secondary canal level, and Project Committees (PCs) at the project (whole system) level.

Water tax system in Andhra Pradesh: formal procedures

Water tax legislation

In Andhra Pradesh water tax collected for the water supplied for irrigation purpose is levied depending on the category of the irrigation project, area irrigated and on the basis of crop per acre per season. There are five crop types: first or single wet crop, second & third wet crop, first irrigated dry crop, second & third irrigated dry crop, and aquaculture (levied per year); and two categories of water tax: permanent irrigation sources, and irrigation sources for at least 4 months. Water tax is based on the 1988 Water Tax Act and 1990 Water Tax Rules, and Act amendments through Act 13 of 1997. The revised water tax is directly linked to the O&M cost of the system (Peter, 2001). The State has set up a water tax review committee to look into O&M (Operation and Maintenance) cost and water charges levied by the government periodically.

Water Tax Demand and Collection

According to the official procedure the water tax demand raising (estimation) or 'crop booking' is undertaken through joint inspection called *Ajmoish* carried out by the village secretary of the Revenue Department, representatives of the Irrigation Department and the WUA. The joint survey of the area extent and the crop grown is to be carried out by visiting individual irrigators in the command area.

'Crop booking' starts from the second month of the crop season, which in this area normally starts in June/July. The policy contains specified formats for preparing the demand list and conducting *Ajmoish*, as well as provision for reconciliation of the demand list, so that farmers seeking correction in demand can give representation to the Mandal (sub-district) Revenue Officer (MRO), the government administrator in-charge of sub-district tax collection. Mandal level demand statements are sent to higher authorities for correction and compilation. The resulting demand statement is returned to the MRO, who has powers to re-correct and finalise the statement. Section 17 of APFMIS Act 1997 clearly states the role of WUAs in assisting the Revenue Department in preparation of demand and collection of water taxes.

The tax is collected by the Revenue Department, which is under the control of the District Collector. The village secretary, and since February 2007 village revenue officers, are authorised to collect water tax. A receipt is issued on receipt of tax. In the recent rearrangement of Panchayat Raj Institutions to decentralise governance, local village government secretaries were separated from the Revenue Department.

Water tax level

In 1996, the Government of Andhra Pradesh revised water tax from Rs 60 to Rs 200 per acre for wet/paddy crop as part of the

irrigation reform process. *Water Tax apportionment to WUAs/Re-plough mechanism*

Re-ploughed water tax is an important financial resource of WUAs. The water tax is collected by the village secretary and remitted to the MRO office. The MRO in turn has to apportion the money to the Irrigation and Command Area Development (I&CAD) Department, WUAs, Distributary Committees, the Project Committees (extant since 2009) and the *Gram Panchayat* (village council), with stipulated percentages for each. The amount of money 're-ploughed' is based on the water tax collected in respective WUAs. The WUAs have to get their due share from the Pay and Accounts Office, a separate department.

Water tax practices in Andhra Pradesh

The study

This study is based on field experience during a participatory training programme carried out by *JalaSpandana* in three major irrigation projects in the upstream part of the Krishna Basin in Andhra Pradesh. The training programme was financially supported by I&CAD from 2005 to 2007. (Doraiswamy, Mollinga and Gondhalekar, 2009). As part of this programme, *JalaSpandana* facilitated a series of training sessions with sufficient time for detailed discussions on water tax and the O&M issue. Furthermore, under the project 'Farmers Network for Water Sector Reform in South India' (FNWSR), supported by the International Network for Participatory Irrigation Management (INPIM) Washington D.C., *JalaSpandana* had earlier facilitated the formation of an informal project level WUAs federation in one of these three irrigation systems. The informal committee at project level comprised of the presidents of WUAs. This meant that some degree of project-level organisation of water users existed.

Findings

Demand estimation: Despite the clear procedure laid down to estimate the demand and arrange the collection of water tax jointly by the different government departments, in practice estimation of demand through the survey work on the irrigated crop area from the field is carried out separately by the authorities of the Revenue and Irrigation Departments. This separated approach results in wide variation in the demand estimated, due to lack of coordination and disagreement on the current area under irrigation and crops to be considered for demand calculation. The provision in the policy for reconciliation of the demand lists with participation of farmers is very rarely used.

Water tax collection: Water tax collection is very low in almost all irrigation projects and there is lack of incentive for WUA representatives to participate in collection. Further, whatever amount is collected is not timely remitted by the concerned government agency – the Mandal Revenue Office. Water tax is not regularly apportioned to WUAs, as the policy stipulates it should, in these projects. The procedure adopted by the Revenue Department for re-ploughing of water tax to WUAs is lengthy and cumbersome with undue delay at every level. The situation causes WUAs to be unable to carry out O&M of the canal system. This leads to disinterest for PIM.

An effort at improvement: In response to such experience, I&CAD and *JalaSpandana* prepared a Memorandum of Understanding (MOU) towards water tax collection that would be signed between representatives of WUAs and the I&CAD Department, using a participatory approach in facilitation, consultation and collective drafting. As per the MOU, the WUAs shall be responsible for collecting water tax, retain their share and remit the share of departments and other institutions accordingly. The WUAs will be given a rebate of 5% for timely remittance. At present most of the WUAs have sent their copy of the resolution to the office of the Commissioner, I&CAD, Hyderabad, urging the department to bring

amendments to the APFMIS Act and Water Tax Act to transfer the collection responsibility to WUAs. Also, I&CAD made an attempt to pursue the matter with the Finance Department to ensure re-ploughing of water tax collected to respective WUAs as per apportionment. The Finance Department, Government of Andhra Pradesh issued a Memo dated 22-08-2005 facilitating the apportionment of the collections to WUAs. Nevertheless, the MOU could not be carried forward due to hesitations within the government apparatus argued as a lack of 'enabling atmosphere', including installation of measuring devices at all levels of canal structures for volumetric supply.

In addition, a frequently asked question by I&CAD staff in terms of transferring the power of water tax collection is the apprehension about the accountability of representatives of WUAs and the transparency in utilising the water tax amount. All in all, there was, apparently, insufficient support within the government apparatus to implement the transfer of collection responsibility, despite some formal decisions taken in this direction.

Analysis

As regards water tax estimation, payment, collection and 're-ploughing' to water user organisations the study has identified the following general situation to prevail.

Cooperation: The study shows that the Revenue and Irrigation Departments battle for authority over water resources. The lack of cooperation between these two departments results in differences in tax demand raised. Further, there is lack of cooperation between the two departments and WUAs. Although the APFMIS Act 1997 emphasises the role of WUAs in assisting the Revenue Department in the preparation of demand and collection of water rates, WUAs express that they are not informed about the date and time of the survey of 'crop booking'. WUA representatives state that there is no actual field visit carried out by the Irrigation Department and the

Revenue Department. WUAs have no staff either exclusively appointed by WUAs or deputed by the I&CAD Department, or financial resources to engage people, for carrying out their own surveys.

Government procedures: Cumbersome and time-consuming procedures cause lag in tax collection. The water charges review committee has stated that the collection of water charges by the Revenue Department needs improvement. This study found that in WUAs under one particular Mandal, the water tax collection was more than 90%. This was attributed to the WUA's participation in the collection process. However, WUAs are tired of the present system and are losing interest in participating in collection. The informal project level WUAs federation representatives have expressed willingness to take over the responsibility of water tax collection, with government support in terms of power delegation to enable a) action against those not paying the tax to WUAs, and b) evaluation of tax waivers. Further, they advocate that the WUAs would retain their share of tax and remit only the government share in order to avoid lengthy and cumbersome government procedures. Cumbersome procedures are increasing the workload of village secretaries as well as Revenue Department officials. The latter are overloaded with work in addition to spending much time on protocol works like visits by various elected representatives, development officers, and elections and vote counting.

Political will and law enforcement: I&CAD has attempted to simplify the process of assessment of water tax demand and collection by redefining the roles of the Revenue and Irrigation Department. The Irrigation Department realised the discrepancies in the procedures in preparing water tax demand and issued GO No. 96 empowering the Executive Engineer of the I&CAD Department and Managing Committee of WUAs to prepare the demand list. However,

the government did not exhibit political will to devolve its authority over water tax collection, thus retaining the powers under the Revenue Department.

Lack of good progress in collection of water tax is also due to lack of enforcement of existing procedures by higher authorities. This can be attributed to political factors, i.e. the government do not want to strictly carry out collection because of vote bank considerations. In the old system of collection the Karnams (local level revenue authority) had full authority and carried out collection. The non payers were searched for their property and there are instances that the non payers name was publicly announced in the village, which caused severe social hardship and compelled the farmer to pay the water tax. Further examples are the selling of cattle that belonged to such non paying farmers to recover the tax. Without wishing to return to these pre-democratic institutions and practices, mechanisms for strict enforcement are needed to bring about proper collection. Some WUAs opine that the government has to issue orders that oblige the Revenue and Irrigation Departments for the system to function properly. Though such a 'law and order' perspective on irrigation management have has around in debates on irrigation reform since the 1960s, it has not been able to achieve much in practice.

Incentives: With the current method of and complications in the water tax system, there is no incentive for WUAs to participate in demand raising, nor sustaining initiatives taken in self-collection of water tax. Further, the water charges review committee observed that the O&M expenditure per acre is well below the water charges levied by the government.

Interpretation

The lack of success of the WUAs' attempt to convince the Revenue Department to accept their self-designed collection approach that

was described above, can be interpreted in different ways. It can be regarded as a technical matter of policy implementation, with lack of success resulting from the absence of volumetric supply devices and other practical reasons. It can also be interpreted as follows.

The apprehensions of the government over the accountability and transparency in utilisation of water tax are prone to the interpretation that the government is unwilling to lose control over the people in the constituency. The elected representatives and the bureaucracy, in other words the agencies of the government, have direct control over the constituency that binds the people, bureaucracy and elected representatives. This control is exercised through discretionary power of elected members of parliament over transfers of government officials as well as their significant role in decision making on resource distribution in the constituency (for instance, implementation of government projects and programmes), and through the mechanisms that constitute 'vote banks'. The system of binding farmers is a channel that helps the elected representatives to exhibit populist measures like tax waiver, loan waiver, free power supply and agriculture subsidies.

Further, historically, the revenue system functioned as the main tool to exert authority over the people, dating back to the princely states and the colonial regime. This history is quite evident even from the way the people address the revenue officers, especially the District Collectors, as 'lord', locally called *Dora*. Any devolution of power is thus likely to be resisted strongly by the Revenue Department.

Another commonly reported viewpoint by farmers with regard to reluctance of the government to devolve power on water tax is that the officials of the Revenue Department do not want to lose the monetary gains which

otherwise they get through under-quoting the irrigated area, not fully reporting the violation and unauthorised irrigation (see Wade, 1982, for a general discussion). There are ample cases across the State in terms of area irrigated which show that the irrigated area figures of the representatives of WUAs are far exceeding those of the Revenue Department.

This suggests the following interpretation. The basic trade-off between government and irrigators in irrigation reform is that of devolution of control vs. farmers' 'willingness to pay' for O&M. This study confirms that willingness to pay among farmers is high when certain institutional conditions are fulfilled. However, when farmers offer to pay the water tax fully, the government may be 'unwilling to be paid' when farmers demand that they collect the payments themselves. The unwillingness of government agencies to accept payment and collection schemes proposed by farmers that include an element of self-governance by farmers, shows that the real issue is 'control' rather than 'cost recovery' as such.

Moves forward

The understanding that in canal irrigation main system management is crucial has existed for decades (Wade and Chambers, 1980). The main canal system is the level at which canal irrigation system governance happens, as it is the level where water is allocated, and where rules are made for this (release schedules). The importance of the main system is also acknowledged in Andhra Pradesh reform. However, farmer self-governance is still far despite general long-term movement in the direction of larger farmer self-management in canal irrigation systems at lower system levels. Despite the Andhra Pradesh reform being the strongest effort ever in India to establish irrigator-controlled management of irrigation systems with the Irrigation Department in a new role of 'service provider', it took a decade for the Government of Andhra Pradesh to establish PCs. In the PCs self-governance would be located, as the APFMIS Act intends

that allocation of water and decision making on O&M works at system level takes place there, with the I&CAD department in the role of 'service provider'. Without the PC as the third tier of elected water user bodies, the activities of WUAs and DCs remain self-management activities, because they are overseen (governed) by the irrigation agency in control of the main canal system. With the delay in PC establishment till 2009, the government demonstrated its reluctance to lose authority over main system management. In 2008, the government announced election dates to PCs and subsequently again postponed the elections. This prompted water users to file a case against the government postponement move in the High Court of Andhra Pradesh. While the case was going on, the government decided to conduct elections to PCs resulting in 21 out of 23 PCs in major irrigation projects and 60 out of 60 in medium irrigation projects, being established in the State. There may thus be slow movement in the direction of a role of farmers in canal irrigation governance.

A further recent development is that in October 2008, the I&CAD issued Government Order (GO) No. 170 stating that the apportionment percentage is revised from 75% to 95% to the different tiers of water user organisations and the remaining 5% to Gram Panchayats (village councils). With this it is decided to apportion the government share in water tax collected to the WUAs towards administration and water management. The impact of GO 170 is yet to be seen in the field.

Policy recommendation: from participatory management to farmer governance

Based on our research we suggest that the route to go is to pursue the path of stronger involvement of farmers in irrigation *governance*, beyond farmer involvement in irrigation *management*.

The case studies, and the authors' field experience more generally, suggest that irrigation farmers are willing and capable to manage and to pay taxes in exchange for governance power. What remains to be accomplished is a move towards whole-hearted irrigation governance transfer on the government side – the willingness to be paid under power-sharing conditions.

The recently established Project Committees may be a step in this direction, provided they receive adequate mandates and support. Realising the potential of farmer irrigation governance through PCs will require continued farmer advocacy, as well as different kinds of support, by government, researchers and NGOs.

One element of such support is recommended to be the facilitation of interaction of the informal union of project committees meeting in District and State capitals to discuss several issues, including the water tax issue. Advocacy and support is needed till PCs have become full-fledged and self-dependent organisations. It is only then that the bargain between control and cost-recovery can be sustainably struck in a new way.

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About STRIVER

STRIVER- Strategy and methodology for improved IWRM - An integrated interdisciplinary assessment in four twinning river basins is a three year EC funded project 2006-2009 under the 6th framework programme (FP6) coordinated jointly by Bioforsk and NIVA. The point of departure for STRIVER is the lack of clear methodologies and problems in operationalisation of Integrated Water Resource Management (IWRM) as pointed out by both the scientific and management communities. 13 partners from 9 countries participate as contractual partners in addition to an external advisory board.

Title of project:

*Strategy and methodology for improved IWRM
- An integrated interdisciplinary assessment in four twinning river basins (STRIVER)*

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Front-cover photo: *Farmers during a strike (bandh) in Karatagi, a town in the Tungabhadra Left Bank Canal irrigation system, to press the government to postpone the closure of the canal to allow an additional irrigation of the standing rice crop. Photo: R. Doraiswamy*

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