



Integrated Watershed Management in India: Strategic Policy and Institutional Options

Policy Brief No. AES-01

January 2009

New Priorities for Agricultural Research in Asia

Suhas P Wani, Benjamin Kumpf, TK Sreedevi, PK Joshi, KV Raju, Michael J Wilson, Amita Shah, PG Diwakar, K Palanisami, S Marimuthu, AK Jha, YS Ramakrishna, SS Meenakshi Sundaram and Marcella D'Souza

Community watersheds are growth engines for the development of dryland areas. Since the beginning of watershed programs, the approach is constantly evolving in India. Today watershed projects do not focus on water conservation solely; integrated watershed management plays an important role in ensuring food security, reducing poverty, protecting the environment and addressing issues such as equity and improved livelihoods.

In March 2008 the Government of India published the Common Guidelines for Watershed Development Projects. This framework for convergence will

undoubtedly enhance the process and impacts of watershed projects in the country.

A meta-analysis conducted by ICRISAT (International Research Institute for the Semi-Arid Tropics), ICAR (Indian Council of Agricultural Research) and partners revealed that 32% of watersheds are performing above average. Watersheds recorded an average benefit to cost (B:C) ratio of 2 with an internal rate of return of 27%. Only 1% of the watersheds studied showed less than 1 B:C ratio in the country. Although major steps have been taken by the Government of India in the last 60 years, there remains a vast scope for further improvement (Fig. 1).

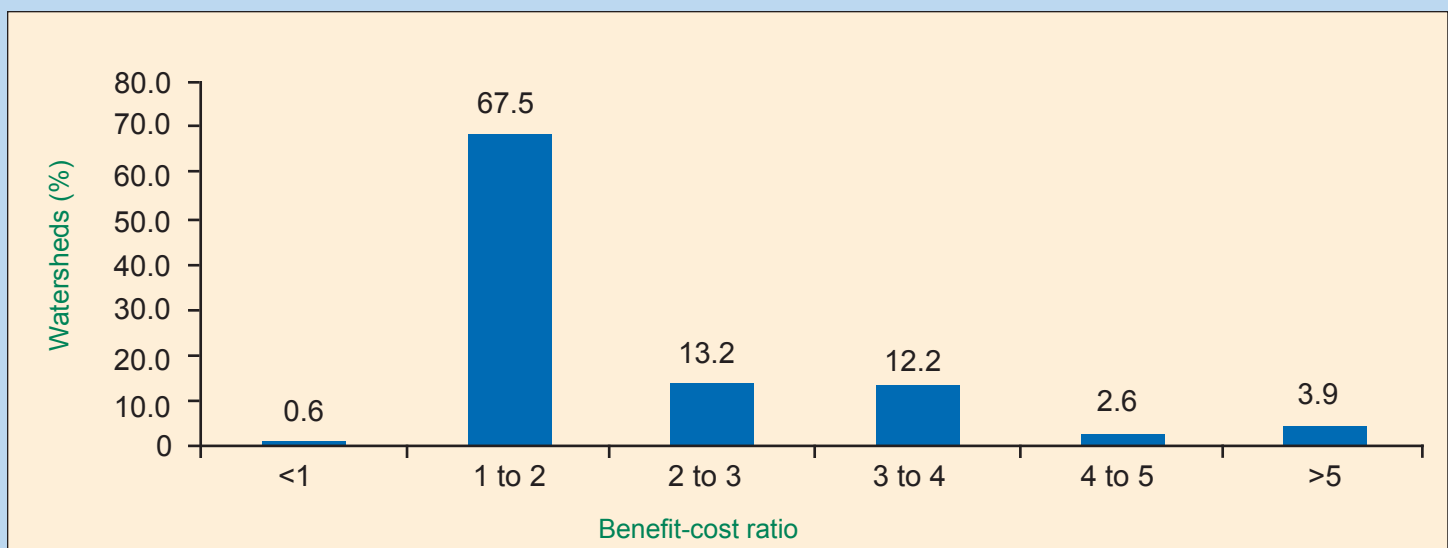


Figure 1. Distribution (%) of watersheds according to benefit-cost ratio (BCR).

In view of the vulnerability of the rural population and poorly allocated governmental funds it is imperative to further ameliorate the current policies.

Therefore, the following key elements need to be incorporated as suggested by the Comprehensive Assessment:

- *Watershed programs need to be initiated with knowledge-based entry-point activities at the community level that result in tangible benefits for the farmers.*
- *Institutions at all levels need to be strengthened in order to successfully implement and manage watershed programs. Integrated watershed management demands a multi-disciplinary approach. Suitable capacity building measures for all stakeholders involved, including national and state ministries, are strongly recommended.*
- *All stakeholders, especially women and the landless need to be included in the decision-making process during all phases of the project.*
- *In every district selected benchmark watersheds need to be monitored to effectively assess the impacts of the interventions and to plan future watershed projects with regard to collected data*

Background

The Common Guidelines for Watershed Development Projects 2008¹ form a substantial basis for successful and sustainable implementation of watershed projects. The meta-analysis of 636 case studies on watershed projects and their impacts, however, clearly shows that there is scope for further improvements of watershed management as instructed in the Common Guidelines 2008.

The Executive Summary of the Comprehensive Assessment (CA) of Watershed Programs in India “Community Watershed as Growth Engine for Development of Dryland Areas” offers a clear and succinct synopsis of the key elements and findings of the meta-analysis and other studies.

This policy-brief is based on the Executive Summary and aggregates its key recommendations in order to provide policy-makers with an overview of current regulations that require further improvement.

National Level

- *Watersheds should be regarded as a business model – Policies for Public-Private-Partnerships need to be developed to enhance investments*

Watersheds need to be owned and managed by the people. The rural population has to have a strong commitment and therefore the villagers need incentives; they need tangible economic benefits from the investments in the watersheds. Such benefits cannot be created through non-participatory top-down projects. In fact, the findings of the CA and experiences of ICRISAT and partners suggest a substantially new perspective on watershed projects: watersheds should be regarded as business models to create market links, marketable surpluses and value addition.

Public-Private-Partnerships (PPP) that create market links have proved their productivity in several watersheds sites and created win-win situations for all stakeholders involved. We therefore recommend the formulation of a coherent set of guidelines to enable governmental actors and consortium partners to efficiently approach the private sector and begin fruitful collaborations in Public-Private-Partnerships. These partnerships need to strengthen market linkages and value chains and increase investments by the private sector in watershed development (Fig. 2).

- *The governmental expenditure for integrated watershed development must be enhanced to at least RS 20,000 per hectare in every watershed.*
- *Suitable capacity building measures for all stakeholders involved, including national and state ministries, are strongly recommended.*

Institutions at all levels need to further strengthen their capacities in order to successfully cope with contemporary challenges and to adopt innovative

¹ This Comprehensive Assessment was sponsored by the Ministry of Agriculture and Cooperation and the Ministry of Rural Development. ICRISAT in partnership with ICAR institutions, state-agricultural universities, various Government departments and non-governmental organizations (NGO's), undertook the assessment during the last two years, and concluded that issues of production, environment, poverty, social exclusion and resilience need to be addressed in a harmonized framework in order to overcome the shortcomings that were found in almost two-thirds of the watershed programs.

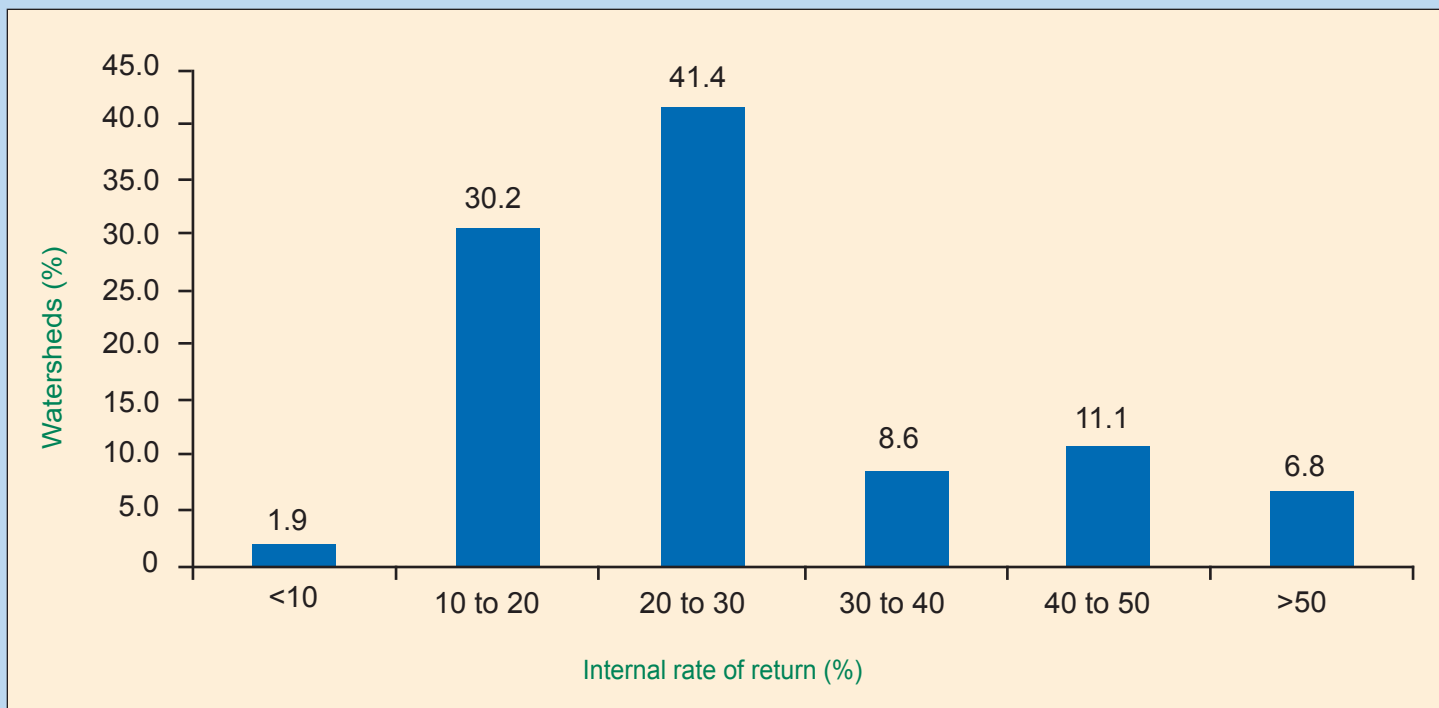


Figure 2. Distribution (%) of watersheds according to internal rate of return.

management styles. Capacity building is a multidimensional concept: it requires scientific as well as non-scientific competencies; it requires types of cooperation that enable knowledge sharing and mutual learning; it requires institutionalized linkages between the producers of scientific knowledge and local knowledge. Capacity building measures should finally create conditions that are needed to make productive use of knowledge instead of solely creating that knowledge.

- *The District Planning Units need to coordinate the watersheds as lead agency*
- *The District Collector should function as the central actor*

The Government of India has addressed the issue of decentralization in the Common Guidelines for Watershed Development Projects 2008 by strengthening state level authorities. ICRISAT and partners regard a decentralized management approach as an important development. However, in order to address the specific conditions and problems of the various regions the main responsibility should be handed to the district level. Due to their proximity to the villages, the district level authorities should prioritize and select watershed project sites. Moreover, the District Planning Units are

able to create convergences of schemes and funds from the different departments. The District Collector should function as the central agent who connects the different actors, aligns and harmonizes the cooperation of all departments involved.

- *Initiation of a national remediation campaign on micro-nutrient deficiencies and soil testing*

A national remediation campaign on micro-nutrient deficiencies and soil testing would be an ideal accompanying measure to the recently published Common Guidelines. The Comprehensive Assessment shows significant yield increases when the diagnosis of soil health and the application of adequate remediation were undertaken together with the villagers. In specific locations integrated nutrient management with an improved variety resulted in yield increases between 30% and 250%.

State Level

The following paragraphs mainly cover key elements that have not been addressed thoroughly in the National Guidelines. The Comprehensive Assessment strongly suggests that these components should be integrated in the State Guidelines for watershed projects.

- *The mandatory funds for Women's and Self-Help Groups under the Livelihood Support Systems should be augmented*
- *Watershed Committees should consist of at least 50% women*

The Governmental Guidelines follow a strong pro-poor and gender approach that proved to be invaluable in the past interventions. The active participation of landless, women and vulnerable groups in all phases of the process must be ensured and not regarded as an add-on. Therefore it is indispensable to continuously clarify the importance of these components in the watershed associations. Gender concerns should form non-negotiable components of the whole project cycle. It is imperative to enlarge the mandatory financial allocations to women and vulnerable groups in each watershed project and to address issues of drinking water and firewood collection in order to allow women to actively participate and to reduce their drudgery. Several case studies showed that a considerable representation of women in decision-making committees resulted in improved performances and better targeted financial allocations than in cases where women were not adequately represented. We therefore recommend a quota of at least 50% women in the Watershed Committees.

- *Entry-point activities should be based on measures that result in tangible benefits for the community due to their participation; not on subsidies*

A key component of the planning phase is the mode in which communities are approached. Introducing watershed development programs to the community has always been an important activity and may, as findings of surveys suggest, constitute a crucial step in the process phase that can determine the scale of acceptance and thus the success and sustainability of the whole project.

The literature on watershed projects refers to these initial steps as 'entry point activities. In contrast to the subsidy-driven approach of the Common Guidelines, we strongly suggest building a rapport between the project-implementing agency and the rural population, based on knowledge rather than money. Knowledge-based and people-centric entry-point activities create a sense of ownership among the community and therefore promote long-lasting responsibility for the watershed project. This is especially true when the

initial measures are simple and enable participatory evaluation, when they show tangible results, and most importantly, when they are applicable for the majority of farmers. Suitable measures should be assessed together with the community in participatory rural appraisal sessions.

- *Precise criteria for the selection of watershed sites need to be formulated. These criteria must focus on technical aspects as well as social factors, the level of poverty and drinking water availability.*
- *Drinking water needs should be systematically assessed; equitable access to drinking water should be defined as a key indicator.*

The criteria for the selection of watersheds that are formulated by the consortium correspond only partially with the Governmental Guidelines. We strongly recommend integrating the following aspects:

Simulation modelling will further ameliorate a preparatory Monitoring & Evaluation (M&E) work that serves as an integrated part of the watershed selection process. Criteria to select watersheds must be based on technical, social and pragmatic concerns on poverty, the availability of drinking water and the willingness of the community to actively participate in a watershed program.

Furthermore, social regulations for the use of groundwater and surface water in the planning phase of the intervention should be carried out in a participatory manner as the Governmental Guidelines clearly indicate. Watershed programs should prioritize drinking water needs, put them as indicators of success and ensure equitable access to the water supplies.

- *Watershed projects should be exercised in areas of at least 1,200 ha and with specific soil and rainwater management inventory in the different rainfall regions.*

The Comprehensive Assessment reveals that in regions with 700-1100 mm of annual rainfall the watershed projects with the current technologies and approach yielded the best results. In cases when watershed sites are selected in regions with lower or higher rainfall, more suitable agro-technologies and interventions need to be developed, implemented and evaluated.

Macro watersheds of 1,200 ha and above have also proven to be more efficient than micro-watersheds of 500 ha and below. In accordance with the Governmental Guidelines we therefore recommend the clustering of micro-watersheds into suitable operational units of at least 1,200 ha.

- *Institutionalized cooperation between watershed projects and e-centers in villages should become the norm*

Village information hubs can effectively provide information concerning soil analysis, weather, market prices and other relevant aspects. The Governmental Guidelines on IT centers in each district and state therefore constitute an indispensable foundation for knowledge sharing and the dissemination of information. Institutional arrangements that effectively provide selected villages with the necessary technology and capacity building are strongly recommended.

- *Monitoring of watersheds needs to be undertaken in a systematically participatory manner*
- *Benchmark site should be established in every district for a thorough impact assessment*

The monitoring systems regulated by the Common Guidelines for Watershed Development Projects by the Government of India meet the recommendations from the consortium that were drawn as conclusions from the Comprehensive Assessment. The inter-institutional arrangements, the application of online monitoring tools and GIS, social audits, monitoring of process, of outcomes as well as post-project evaluations are components that are vital for further ameliorations of future interventions.

Furthermore, one of the crucial aspects in monitoring constitutes the active participation of the community. Participatory monitoring of the ongoing project phases as well as post-project evaluation needs to be undertaken in a common effort together with the community members. These measures should ultimately lead to a participatory monitoring of weather parameters and guide the decision-making process of crop selection and planting.

Additionally, there would be great value in a sequence of photographs of the development occurring in the watershed community: in the mid term, immediately after project completion and then beyond this. This

photographic documentary can be further augmented with the support of simulation modelling and remote sensing.

Due to the impossibility of collecting all relevant data in every watershed, we strongly recommend the monitoring and evaluation of benchmark watersheds in each district. These benchmark watersheds provide data that is highly valuable for a thorough impact assessment. The analysis of soil runoffs, nutrient losses and other important components form essential foundations for future amelioration of interventions.

In order to draw conclusions and formulate lessons learned, the respective ministries should place an emphasis on central and district funding for M&E by using up-to-date science tools as well as participatory monitoring in the formulation process of the separate state evaluation guidelines.

- *Integrated water management demands a network of different actors: watershed consortia should become the norm in managing the projects*

The institutionalization of official networks in the process of watershed programs is a crucial step towards a holistic watershed approach that includes all relevant stakeholders and creates sustainable benefits for the rural population. The engagement of quality service providers for capacity building, technical backstopping, and knowledge dissemination as stated in the Common Guidelines constitute essential modes of cooperation.

Furthermore we strongly recommend the institutionalized establishment of consortia for all watershed interventions including capacity building measures. These official networks need to include the key research and development institutions, civil society organizations and relevant private sector actors.

The learning potential for all partners in such consortia is invaluable. The cooperation of organizations and institutions with different backgrounds and expertise leads to symbiotic learning for all stakeholders. While the technical knowledge that has been created in research institutes becomes validated, scientists also have the opportunity to imbibe indigenous knowledge and traditional practices from the communities as well as social engineering skills from NGOs. The negotiations with Governmental authorities in a mutually amicable manner and the exchange of knowledge and

ideas within the consortium finally results in greater benefits for the community and important feedback for the research institutes. Communication between the consortium partners that is based on mutual respect and the will to listen and learn also creates a better understanding of the specific demands of women in the communities and the situation of landless and dalits.

- *Ongoing capacity building for all stakeholders involved, including state ministry officials, is strongly recommended to meet the multi-disciplinary demand of integrated water management.*

Symbiotic learning processes cannot be solely guaranteed through guidelines. Governmental authorities as well as NGO's and research institutes should continuously train their staff in matters concerning participatory methods and gender concerns. Such capacity building measures for the staff of all agencies involved will result in greater convergences and an ameliorated pro-poor approach of the consortium.

District Level

- *Financial support and continuous training for SHG must be ensured as well as adequate representation of vulnerable groups in watershed associations*
- *All projects need to systematically incorporate awareness-raising activities on climate change*

District level authorities should guarantee the active participation of landless, women, dalits and adivasis as well as adequate representation of these groups in decision-making committees. These social components cannot be regarded as an add-on. It is indispensable to provide financial allocations and capacity development support to women's groups and associations of vulnerable groups in each watershed project.

In the context of capacity building of the local institutions, the significance of climate change and the participatory rehabilitation of common wasteland property are important factors that should be further addressed. Creating awareness of the potential impacts of climate change needs to be a mandatory element of all trainings for local institutions.

- *Entry-point activities should shift from subsidies to knowledge-based approaches*

The initial contact with the community should be undertaken according to the principle of knowledge-based entry point activities. Contrary to the widespread subsidy-based approach, we strongly recommend that the rapport between the implementing agencies and the community be based on knowledge and not on financial donations. In order to strengthen and sustain a productive relationship with the members of the community, the project staff needs to invest significant amounts of time and energy in these entry-point activities. Certain financial assistance such as the construction of drinking water facilities, community halls or schools can certainly accompany the knowledge-based entry point activities. The focus, however, must be put on participatory methods that address the issue of low productivity with a high degree of success. Soil testing and micro-nutrient remedies are examples of methods that have proved their magnitude and resulted in measurable and tangible benefits that enhanced not only the yields but in sustaining participation and ownership of the farmers.

- *High water requiring-crops should be banned while financial incentives for smart crops need to be allocated*
- *Wastelands should be rehabilitated*

In order to create additional income for the rural population in developed watersheds in dryland areas, harvested water should be carefully used in efficient supplementary irrigation systems, if possible, for high-value crops as well as for fodder and livestock. However, high water-requiring crops such as paddy and sugarcane should be banned. Instead of using these water consuming crops we recommend the cultivation of low-water requiring 'smart' food crops with market incentives.

For greening wastelands the dryland species *Jatropha* and *Pongamia* that produce fruits containing 30 to 35 per cent oil can be planted. These crops can be cultivated on wastelands. Common property resources can effectively be regenerated as biofuel and energy plantations. Especially vulnerable groups should be given the opportunity to manage these income-generating activities. This requires long-term leases, usufruct rights, and financial allocations, which may need to last beyond the project end.

- *Advanced science tools and regular weather forecasts should form basic features of all watershed projects*

The consortium of the Comprehensive Assessment strongly supports the Governmental approach in adopting up-to-date science methodologies such as GIS, simulation modeling and remote sensing. The use of long-range weather forecasts for crop planning and of medium and short-range weather forecasts for crop management should become the norm. This highly valuable information can effectively be distributed in village information centers.

Community Level

- *Gram Sabha institutions need to be further strengthened*
- *Their role and responsibilities need to be clearly defined*

The specific roles of the Gram Sabha and the Gram Panchayat have been clarified in the Governmental Guidelines as well as the tasks of other village institutions. Analog to the findings of the Comprehensive Assessment, the Gram Sabha has to be strengthened. The specific role of the Gram Sabha, especially regarding the cooperation with the Watershed Implementation Committee, needs to be clearly defined. The Gram Sabha institutions are key players on the community level and the main actor that provides the district level authorities with important feedback. The Gram Sabha institutions play a crucial role in the exchange of information and knowledge between the communities, the district and all the other actors that are involved in the watershed. Furthermore, responsibilities such as social audit, water budgeting and the establishment of market links, volume promotion and entrepreneurship constitute duties of the Gram Sabha. The institutions should also provide support in decision-making processes concerning crop planning, based on weather forecasts.

- *Adequate participation of women and vulnerable groups in watershed associations must be ensured*

Throughout all project phases the active participation of women and members of vulnerable groups must be guaranteed. Again, gender concerns form a non-negotiable component of the whole project cycle. Adequate representation of women in decision-making committees and continuous institutional support for women groups need to be ensured in all projects.

- *Income-generating activities must be supported by the Governmental actors*

Key elements in watershed programs that successfully address natural resource management as well as poverty reduction are income-generating activities for the rural population. The Common Guidelines accentuate various possibilities of enterprise generation such as pasture development, sericulture, *in-situ* moisture conservation, the promotion of non-conventional energy saving devices and various other innovative activities. Harvested water can also be used for improved livestock and additional fodder.

- *Training in the application of micro-nutrients, integrated pest management and fertilizers should form an integrated part of watershed projects*

We highly recommend the systematic integrated management of nutrients, pests and diseases, including biological pest control and the application of micro-nutrients. The use of pesticides should be discouraged while integrated pest and disease management should form an integrated part of capacity building activities for the local institutions.

The analysis of natural resources, soil and hydrological resources in the planning phase should finally result in substantial fertilizer recommendations.

- *Monitoring and evaluation should be undertaken in a participatory manner*

One major role of the community is the organizational support of participatory monitoring and evaluation during the whole project cycle. The active involvement of the villagers in M&E constitutes a key element of the holistic watershed management approach and serves as a clear indicator of successes and shortcomings of the project.

About the authors:

Suhas P Wani, Principal Scientist (Watersheds) and Regional Theme Coordinator (Asia), Global Theme on Agroecosystems, ICRISAT, Patancheru 502 324, Andhra Pradesh, India

Benjamin Kumpf, Communication Specialist, Global Theme on Agroecosystems, ICRISAT, Patancheru 502 324, Andhra Pradesh, India

TK Sreedevi, Senior Scientist (Watershed Development) Global Theme on Agroecosystems, ICRISAT, Patancheru 502 324, Andhra Pradesh, India

PK Joshi, Director, National Centre for Agricultural Economics and Policy Research, Pusa, New Delhi 110 012, India

K V Raju, Professor & Head, Centre for Ecological Economics and Natural Resources Unit, Institute for Social & Economic Change (ISEC), Nagarabhavi, Bangalore 560 072, India

Michael J Wilson, 16 High Croft Hunmanby Filey, North Yorkshire England YO140JZ

Amita Shah, Professor, Gujarat Institute of Development Research (GIDR), Ahmedabad 380056, Gujarat, India

PG Diwakar, Head, RRSSC, Indian Space Research Organization (ISRO), Bangalore, Karnataka 560 070, India

K Palanisami, Director, Centre for Agriculture & Rural Development Studies (CARDS), Tamil Nadu Agricultural University Coimbatore 641 003, Tamil Nadu. Currently working as Director, IWMI-Tata Policy Program, International Water Management Institute (IWMI), C/o ICRISAT, Patancheru 502 324, Andhra Pradesh, India

S Marimuthu, Scientist (Agronomy), Global Theme on Agroecosystems, ICRISAT, Patancheru 502 324, Andhra Pradesh, India

YS Ramakrishna, Formerly Director, Central Research Institute for Dryland Agriculture, Santoshnagar, Hyderabad-500 059, Andhra Pradesh, India

SS Meenakshi Sundaram, Former Secretary, Ministry of Rural Development, Govt of India and Principal Secretary, RDPR, Govt of Karnataka and now Visiting Professor, NIAS, Bangalore, India

Marcella D'Souza, Executive Director, Watershed Organization Trust (WOTR), Ahmednagar 414001, Maharashtra, India

