

**Proceedings of the National Workshop on  
*Tail-enders and Other Deprived in the Canal Irrigation System***

**Held on November 28-29, 2004  
At Hotel President, Ahmedabad**

*Organised by*  
**Development Support Centre, Ahmedabad**

*Partners*  
**The Planning Commission, Government of India  
The Wageningen Agricultural University, The Netherlands  
THE FORD FOUNDATION  
The European Union  
The Aga Khan Development Network**

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*Tail-enders are treated as second-class citizens by Irrigation Department, traders and moneylenders.*

from Karnataka Study

***Question posed by a head-reach farmer for the Irrigation Department:***

**“Why do you waste the water by supplying it to tail ends which are barren and grass lands?”**

from Tamil Nadu Study

**Though there are many studies that deal with the problems of irrigation in general and problems of irrigated agriculture in particular, in most of these studies the issue of the tail-enders is itself a “tail-end” problem that receives as little attention as the tail-enders!**

from Maharashtra Study

*Taking care of the “Deprived” of the irrigation system, preferably through participatory management, is the surest way to reform the irrigation sector.*

from Gujarat Study

## **ABOUT DSC...**

Development Support Centre was established in 1994 in response to the felt need for, indeed a demand from various non-governmental organisations (NGOs). The DSC provides support to NGOs, government agencies and other administrative bodies which are involved in participatory management of natural resources in Gujarat. DSC collaborates with academic and research institutes. Led by Mr. Anil C. Shah, Chairman, DSC's multi-disciplinary professional team helps in capacity building of key functionaries, performs hand holding operations in the field when required, takes initiatives for appropriate policy changes and carries out field studies related to policy issues. DSC's present focus is on the following four programmes.

### **Participatory Irrigation Management**

The linchpin in promoting the Participatory Irrigation Management programme in Gujarat, the DSC works in close cooperation with the state irrigation department and strives to promote the programme at state and national levels. The DSC directly implements the programme in sixty-six villages in three projects covering 18,000 hectares of command area across the state.

### **Watershed Development**

The Government of India advocates watershed approach for sustainable management of natural resources in rain-fed areas. DSC has made a significant contribution in the formulation of the National Watershed Development Guidelines and has sustained its involvement in the programme. The emphasis is to ensure that the key functionaries appreciate and build necessary skills, attitudes and behaviour to translate the rhetoric of participation into practice.

### **Agricultural Productivity Enhancement and Improving Livelihoods**

To enhance agricultural productivity and improve livelihoods, the DSC has promoted Sajjata Sangh, a network of NGOs, bringing together agricultural scientists, the NGOs and the farmers on a common platform so that the scientists understand the problems and the needs of the farmers take them into account in their research. The farmers are provided with expert advice in turn.

### **Joint Forest Management**

Gujarat was one of the first states in the country to introduce Joint Forest Management. However, despite enabling policies and tentative initiatives of the state government, the programme has not picked up the desired momentum. The DSC is striving to remedy the situation by advocating changes in the implementation of the programme at state and national levels.

DSC offers the following portfolio of services:

- Field Support Services
- Research and Monitoring Activities
- Training
- Policy Advocacy
- Field Units
- Communications and Publications
- Networking

## Mission Statement

Development Support Centre is established to provide support to people centred organisations, programmes and policies in natural resource development with an emphasis on participation, equity, efficiency, cost effectiveness, sustainability, honesty and transparency.



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## **Preface**

### **THE TAIL WAGGING THE BODY**

Anil C. Shah<sup>1</sup>

Although it is well known that significant deprivation exists among tail-enders, it is treated as a marginal, trivial problem well within the tolerance limits by those who manage large canal systems. Further, those concerned with managing or even studying the canal irrigation systems assume that they know the cause of tail-enders' deprivation—the farmers at head reaches take more water than their share, leaving less water for the tail-enders. This is not correct. The tail-enders' problem is not a peripheral problem and assuming that it is always a consequence of the greed of head-reach farmers is far from reality. The deprivation of tail-enders is not only universally found in major, medium and minor irrigation projects; it is not trivial, but a major problem as shown later in the paper while discussing the extent of tail-enders' deprivation. The head-reach farmers cornering more water than their share, though important, is only one of the several causes that contribute to tail-enders' deprivation.

Development Support Centre (DSC), while working for the promotion of participatory irrigation management, conducted a pioneering study of two major irrigation projects in Gujarat and found that tail-enders' problem was not a phenomenon confined at the tail end of the main system but was spread throughout the irrigation project. It existed in the middle- and head-reaches of the system as well; indeed, all parts of the system have their "tail-ends." DSC's study also found that even when there was water in the system, parts of the command area remained un-irrigated because of the system failure—design defects, bad construction, poor maintenance and inefficient management. Farmers in the command area who did not receive water due to system failure were referred to in the study as the "other deprived". DSC's study "Deprived in the Command of Irrigation System", brought out in 2000, examined the extent of the problem as also its causes and suggested possible corrective measures. Appreciating the significance of the study, the Planning Commission of India and the Wageningen University of the Netherlands provided financial support for carrying out similar studies in different parts of India. The studies have been carried out in six states representing the West, the East, the South, and the North.

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<sup>1</sup> Chairman, Development Support Centre, Ahmedabad



## Extent of Deprivation

Contrary to the belief that deprivation is a marginal problem, the studies found that it was extensive. In Gujarat, for instance, in a water deficient major project Dharoi with 45, 000 hectares of command area, the tail-enders problem was found in 37% of the command area and other deprivation in 27% of the command area. In Mahi, a major irrigation project serving more than 200,000 hectares, deprivation of the tail-enders was, on an average, 7% (18% in the middle reach) and other deprivation was 20% (56% in the middle reach). And this project has been winning awards for its outstanding performance!

Contrary to the general impression, deprivation was found high even in the *warabandhi* irrigation system prevalent in Haryana and Punjab. About 70% of the area of the sample farmers did not get water as per their entitlement—variations ranged from 56% to 84% across seasons and agro-climatic zones.

In Karnataka the tail-enders' deprivation was 40% in Vanivilas Sagar, a major irrigation project. In the large Tungabhadra project, the achievement was reported to be 90% at the project level, i.e., 90% of the designated area was irrigated. However, an intensive study of one distributary revealed that the farmers in the first reach got 58% *more* water than their share, in the second reach, the farmers received 52% *less than* their entitlement, and in the last reach, deprivation was as high as 91%! This clearly brings out how the reporting system conceals deprivation and the consequent suffering of a large number of farmers.

In Orissa, the study of the large Hirakud project found that the head-reach farmers were able to irrigate 100% of their land in the command area, whereas in the middle reach villages only 35% the area was irrigated and the tail-enders were able to irrigate no more than 18% of their land.

The study of the Palambikulam Aliyar project in Tamil Nadu found that out of misplaced sympathy, the State Government decided to extend the command area by 84% to supply water to a few backward areas. This resulted in such a severe shortage of water for the farmers at the tail end of the system--both the original and the extended—that the scanty water had to be used mainly for recharging of drinking water wells!

In the five minor tank irrigation projects, studied in three states, it was found that from the tanks taken over and managed by the Government Department, the tail-enders got much less water than their share. Earlier when the tanks were managed by the farmers' groups, they had a sense

of ownership. They kept the system in good condition and therefore the tail-enders hardly had any problem.

Not only was the extent of deprivation much greater than is generally assumed, the impact of deprivation was even more startling. It was found that the farmers in the tail end tended to produce low value crops like fodder, and not infrequently, they had to leave their land fallow. In Haryana the productivity of head-reach farmer was 1.5 to 5 times that of the tail-end farmers. One research study laments that the tail-end farmers are treated as second-class farmers by the irrigation authorities and as second-class citizens by the local shopkeepers and moneylenders.

### **Causes of Deprivation**

The research studies looked at the causes of deprivation and found that the head-reach farmers taking more water than their share. was indeed a widespread problem. The farmers often resorted to placing obstructions in the canal and even constructed unauthorised gates and sluice valves. Though almost all the projects studied reported this as a cause of deprivation, it was only one of the several causes. Equally important and widespread was deprivation caused by matters related to construction. The most important among them was poor maintenance of structures, but there were cases of design fault and substandard construction resulting in reduced capacity of the system to take water to all the parts The Tamil Nadu study reported that as one moved towards the tail part, maintenance became poorer. Another common problem causing sub-optimal performance of the canal system was inadequate staff and funds.

An emerging cause of deprivation acquiring increasing importance is the reduced availability of water in the system. This is the outcome of the rainwater harvesting activities gathering momentum in the catchments area and diversion of water for non-agriculture purposes. Or, as already has been mentioned in Tamil Nadu, the command area of a project was extended by 85% resulting in aggravation of tail-enders' problems-- both in the original and extended areas. In case of tanks, encroachment and obstructions in the catchments area reduced the inflow of water into the tanks, and as could be expected, the shortage was suffered more severely by the tail-enders.

Looking to the significance of the findings of the various studies, DSC organised a national workshop on "Tail-enders and Other Deprived" on November 28-29, 2003 in Ahmedabad. The workshop was attended by about forty-five participants that included the research teams, other researchers and academicians, the policy makers, and the NGOs involved in participatory irrigation management. After deliberating on research findings, the workshop made recommendations addressing various causes of deprivation.

## Recommended Corrective Measures

On the construction issues the workshop recommended that before finalising construction design, at least in the case of sub-minors, watercourses and field channels, the concerned farmers should be consulted. Farmers, whether affected by construction, renovation, or major repairs, should have a right to information to plans and estimates, and if a contractor has already been engaged, the terms of contract.

The studies had reported that an important cause was inadequate grant for maintenance. However, equally important was the findings that whatever funds were available were very unevenly distributed and utilised in the system. The national workshop recommended that after setting apart the fund required for salaries of the staff and for head-works, the remaining “divisible” grants should be distributed on per hectare basis to distributaries and minors in proportion of their command area to the total command area of the project. As for the paucity of funds, the national workshop recommended that the state government should raise water rates as recommended in the Vaidyanathan Committee report. From this realisation, a good part should be spent on maintenance *itself*, and not bracketed with staff salary, which takes away most of the money.<sup>2</sup> When participatory irrigation management is introduced and farmers’ organisations are given a substantial share in water charges collected by them, more satisfactory maintenance could be expected. It was also recommended that farmers’ organisations managing parts of the canal system should be authorised to fix water charges at a rate higher than the government rate and to retain the entire additional amount raised.

About the thorny issue of the head-reach farmers taking more than their share of water, the national workshop recommended introduction of volumetric supply of water. The volume of water supplied will be according to the command area under an outlet as a proportion to the total land of the command area. If this could be introduced and *enforced*, it should result in a more equitable and economical use of available water. This would amount to recognising the *right of the farmer in the command area to a share of available water in proportion to his land area*.

The workshop also considered the administrative aspect of the canal management and found that the present monitoring of canal performance does not bring out the deficit in water supply at the minor level. Nor does it take into account the number of waterings received by the command under the outlets. Monitoring and reporting system should identify the parts of the command area

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<sup>2</sup> The practice in the irrigation department is to club the amount spent for actual maintenance with the salaries of the staff. The salary component would take precedence over the requirement of maintenance.

that receive lower number of waterings than planned. The management information system should be so planned that it provides information about the number of rotations, productivity, and changing income level of farmers in different reaches of the irrigation system, on a sample basis.

### **Conclusion**

The workshop came to the conclusion that the recommendations will be more effective if there is participatory irrigation management in place so that, the concerned farmers' organisations themselves implement the recommendations in which they have a very high stake.

The findings of the study and the recommendations of the workshop point towards the need to reform *the whole system*. As the Tamil Nadu study has observed: inefficient management of the main system by the bureaucracy is one of the main reasons for the tail-enders' deprivation. Seeking to reform the entire system to improve the lot of the tail-enders amounts to the tail wagging the body! To put it in another way, *taking care of the deprived of the irrigation system, preferably through the participatory management, is the surest way to reform the irrigation system.*

## **PART I: THE PROCEEDINGS**

A two-day national workshop on "Tail-enders and Other Deprived in the Canal Irrigation System" was held at Hotel President, Ahmedabad on November 28-29, 2003. The workshop was held to discuss the findings of a research study which was carried out in six states, namely Gujarat, Haryana, Karnataka, Maharashtra, Orissa and Tamil Nadu. The names and addresses of the principal researchers and organisations are given in Annexure 1. Whereas the study was funded by the Planning Commission and the Wageningen University of the Netherlands, the workshop was funded by the European Commission under the Sustainable Community-based Approaches to Livelihoods Enhancement Programme, the Aga Khan Development Network, and the Ford Foundation.

### **Need for the Workshop**

Although it has been widely known that not all farmers in the command area receive water to irrigate their lands, not much is known about the extent and impact of deprivation. Nor are there studies focussing on the issue. The present studies explore the experiences of the tail-enders and "other deprived" ("other deprived" are those who have access to water, but it does not flow to their farms due to the system failure, such as inappropriate design, bad construction, poor maintenance, silting, weed growth, and reverse gradient) of the canal and brings to light the causes and extent of deprivation, and emerging issues and suggested solutions. It reveals that the "Tail Enders" and "Other Deprived" exist in all regions; however, there are variations in the extent and nature of deprivation. The workshop aimed at delineating the necessary steps to remedy the situation.

The studies have brought into focus a variety of issues which need to be acknowledged and discussed publicly; the findings need to be shared with a much wider audience since they have relevance beyond the study areas and lead to recommendations for changes in policies and procedures contributing to alleviation of the condition of the "deprived" in the irrigation sector. The national level workshop was organised to serve this larger purpose.

The workshop was a gathering of academicians, researchers, practitioners, policy makers, policy implementers, irrigation administrators and other government officers, representatives from non-governmental organisations, and farmer-leaders reflecting different viewpoints, perspectives and experiences in face-to-face discussions. A list of participants is given in Annexure 2.

## Objectives

More specifically, the objectives of the workshop were to

- obtain a fuller picture of deprivation in different states,
- provide a platform to researchers and practitioners alike to exchange their views focussing on the vital issue of deprivation,
- learn from different states about the innovative practices adopted to remedy deprivation, and
- arrive at remedies and solutions, including recommendations for reforming policies and procedures at central, state and project levels.

## Organisation of the Report

This document falls into three parts, Part I narrates the proceedings of the workshop. Part II presents problems, issues and solutions which emerged from the workshop. Part III comprises annexures. The programme schedule is given as Annexure 3. Details of projects studied are given in Annexure 4.

### **Day 1, November 28, 2003 Inaugural Session**

*Chairman: Dr. Peter Mollinga, Panelists: Mr. Anil C. Shah and Dr. Tushaar Shah*

Mr. Sachin Oza welcomed the participants and introduced Mr. Anil C. Shah, Professor Tushaar Shah and Dr. Peter Mollinga. Dr. Rohini Patel compeered the workshop and Mr. Vaibhav Chaturvedi, Mr. Joydeep Sen and Ms. Jharna Pathak provided services of recording the proceedings.

Mr. Anil C. Shah provided the background to the study. Calling the workshop a happy event, Mr. Shah described the series of happy accidents which preceded it. It began in December 1999 when he attended Dr. Sithapathi Rao's presentation on the pervasive problem of tail-enders in Nagarjun Sagar Project. This was followed by DSC's study of Dharoi and Mahi projects in Gujarat. During a joint visit to Mexico with Mr. B. N. Nawalawala, who was then an Adviser to the Planning Commission, Mr. Shah showed him the study. Mr. Nawalawala found it interesting enough to suggest that similar studies should be carried out in other parts of India and offered the Planning Commission's assistance for the same.

Dr. Mollinga's study report of South Indian canal irrigation system highlighted the issues of tail-enders and other deprived. Therefore when approached, Dr Mollinga too showed interest in our study and offered assistance of the Wageningen University.

After obtaining financial support, selecting research organisation for the Western region (Mr. K. J. Joy and Mr. Suhas Paranjape of SOPPECOM) and for the South (Dr. Mollinga himself) was easy. We managed to get recommendations for good researchers from the North (Dr. Vashishtha of the Agriculture Economics Research Centre, Delhi) and from the East (Dr Rajkishore Meher, Faculty Member, Nabakrushna Choudhury Centre for Development Studies).

Commenting on the participatory methodology which has been adopted for the study, Mr. Shah said that it does not aim at exactitude but approximations of magnitude and requested the researchers not to argue about numbers quoted unless they are misleading. The expectation is that the workshop will not end at production of proceedings but contribute to reforms benefiting the tail-enders.

Referring to the problems which have come to the fore in the research studies, he commented that they may seem peculiar to irrigation, but such problems are inherent in the government system and will be found equally in other sectors such as education, health, forestry and agriculture. He assured the irrigation departments and engineers that no offence was intended to them and they should take none.

Finally, Anil Shah mentioned that working on improving the lot of the tail-enders, he was reminded of a memorable exhortation of Gandhiji:

*Whenever you are in doubt, apply the following test: Recall the face of the poorest and weakest man whom you may have seen, and ask yourself, if the step you contemplate is going to be of any use to him? Will he gain anything by it? Will it restore to him control over his own life and destiny? In other words, will it lead to swaraj for the hungry and spiritually starving million? [If the answer is "yes"] Then you will find your doubt...melting away.*

This is very closely supportive of what Gujarat study had found, namely, that the surest test of irrigation sector reform working satisfactorily is to find out to what extent it benefits the tail-enders.

The keynote address by Dr. Tushaar Shah followed. He observed that the tail-ender problem is a symptom of a larger problem--canal irrigation itself is at the crossroads. For instance, major deviation has been found in actual irrigation as compared to planned irrigation all over the country and deprivation is a major issue in major and minor systems. Hence the importance of the present study and the need for detailed studies of deprivation. Evidence suggests that larger the

system, the higher the extent of deprivation. It is interesting to observe that deprivation of tail-enders does not necessarily translate into productivity loss since tail-enders rely on ground water to make up for water deficit.

Underlining his interest in the dynamics between research and policy, Dr. Shah said that DSC's work on this issue is significant because it is important to know how research can influence policymaking. He presented a framework of how new ideas can be incorporated and research can be used in policy. The following four clusters of causes were briefly discussed.

- Gap between planning and implementation
- Poor design
- Framers' practices
- Management of the system

The following solutions were suggested to deal with them.

- Redefine the command area.
- Begin rehabilitation of the system before it is completed as is customarily done in Sri Lanka.
- Redesign the canal system and reallocate the responsibilities. The Irrigation Department (ID) may build canals up to a certain point, then it would be the responsibility of the command area farmers to build channels. This is practiced in China.

He concluded by noting that the implications of suggestions and recommendations emerging from the workshop may be different for the existing systems and for new projects like the Narmada plan in Gujarat.

Dr. Mollinga was next to address the workshop. According to him, the present collection of studies was interesting for the following reasons:

- Canal has been a poorly discussed issue.
- Very few studies have been done on the issue of tail-enders in the state irrigation system.
- This study has brought out some sort of measurement of deprivation.
- The study is not only important from the academic point of view, but also from the point of policy advocacy and policy influence; the main issue is who controls the allocation system.
- Participatory Irrigation Management (PIM) has to look into the livelihood issue. Unless it is addressed, PIM will not succeed.
- In addition to the empirical issues, the study brings to light the analytical issues of governance, allocation and rights.



Elaborating the last point, he said that it is necessary to go beyond the local level; who controls allocation of water at the system level also needs to be looked into. The discussion has always been about irrigation *management* but not about irrigation *governance*.

He further mentioned although it has been known that “All is not well in the canal irrigation system,” irrigation has been looked at only from the perspective of *canal management*. At the least, irrigation should be addressed as an issue in *integrated water resources management*, but even that is not enough. The issue in irrigation is eventually one of livelihood and thus irrigation should come under the purview of the Ministry of Rural Development (MoRD). The fact that irrigation comes under the Ministry of Water Resources (MoWR) and not under MoRD, is not a mere academic issue, but a serious policy issue.

The inaugural session concluded with a round of introductions of the participants.

### **Day 1, November 28, 2003** **State Experiences**

After the inaugural session, state-wise research findings were presented. They were prepared according to an outline which was circulated earlier by DSC.

- Basis of selection of the project studied
- Brief description of the project
  - Size in terms of command area
  - Water source and reliability
  - Villages selected for intensive study
- Extent of deprivation
- Main reasons for deprivation
- Issues and suggestions emerging from the study

Each session had panelists who moderated the discussion and made observations on the presentation and ensuing discussion. The names and designations of the presenters as well as panelists are given in the programme schedule. Since most issues were common, occurring in most states, they are combined and presented at the end to avoid repetition. Where they are peculiar to a specific state, the fact has been mentioned.

### **Day 2, November 29, 2003** **Group Discussions**

The second day began with the formation of three groups, one for Gujarat and Maharashtra, one for Haryana and Orissa and one for Karnataka and Tamil Nadu. The groups were to discuss common issues which were identified in “Section 4: Emerging Issues and Suggestions” in the theme paper for the workshop. (The theme paper was circulated earlier among participants.) The list of emerging issues found in the studies was already included in the agenda papers circulated

to the members. In addition they were also given another list of issues that came up during presentations on the first day. At the conclusion of group meetings, presentations were made. Relevant points from the presentations have been integrated in Part II—Emerging Issues and Action Points.

**Day 2, November 29, 2003**  
**Concluding Session**

Mr. Anil C. Shah initiated the concluding session with the following observations:

Noting that state level farmers' organisations are important, he suggested that a conference be organised jointly by DSC and AKRSP (I) for Gujarat farmers. Some representative farmers from Tamil Nadu and Karnataka would be invited to share their progressive ideas and experiences. The entire exercise of studies in the workshop aimed at improving the lot of tail-enders and other deprived. If this aim is to be achieved, several actions would be needed, such as:

- To make the proceedings that DSC will bring out, immediately usable. The Executive Summaries of the State studies will have to be reduced.
- Executive Summary of the study for each state should be translated in regional languages and distributed to generate interest and understanding about tail-enders issues. The research team from Maharashtra has expressed desire to translate its entire study in the regional language.
- Gujarat study has already been presented to the ID of Gujarat. Other research teams should also present their research findings and workshop recommendations to their ID officials, Water And Land Management Institute (WALMI), Command Area Development Authority officers, and local MLAs and MPs.
- DSC would like to help in the follow up of the various state governments. When meetings are arranged by the researchers with the ID officials, DSC representatives would try to attend if DSC is informed in advance.

He concluded with an invitation to the researchers to continue the dialogue with DSC for furthering the cause of the 'deprived' of the irrigation sector and said that if they need additional small amounts for such follow up DSC would help in finding it.

The next speaker Dr. Mollinga commented that politics, which were kept apart earlier, have come to the forefront, particularly, the issue of governance at the macro-system-level. Further, relationships and social differentiation among the user communities have assumed a great deal of importance. Issues of social power and political pressure have come on the agenda.

Secondly, it must be recognised that farmers' organisations are of utmost importance. The process of building them at lower levels has been underway and the exercise should be scaled up. They need to organise themselves at the highest—project—level, and then they should start

negotiating with the government. They should start formulating their own water policy as well as their own research agenda. The initiatives to address tail-enders' problems should be pursued in close association with the farmers' organisations.

Mr. V. B. Patel suggested that the DSC should make a presentation of the findings of the studies and recommendations of the workshop to the Water Resources Ministry, Planning Commission, and the Central Water Commission. By way of concluding, he said that it is necessary to have a dialogue with the government so that issues of tail-end deprivation can be addressed quickly.

With Mr. Alok Singh Rana proposing a vote of thanks, the workshop was concluded.

## **PART II: EMERGING ISSUES AND ACTION POINTS**

The issues emerging from the studies and presentations and discussions in the workshop are presented under:

(1) construction issues concerning the physical state of the canals and their infrastructure (2) management/administrative issues and (3) larger policy issues. For each category, after a brief discussion of the issue, the suggestions made in the studies and during deliberations in groups and in plenary sessions are presented under the heading of “recommendations” When decisions are taken on follow up action on the recommendations, they are mentioned under the heading of “Follow-Up Action”.

### **1 Construction Issues**

#### **1.1 Design Problems**

While designing the projects, usually care is not taken of local physical features like topography, ravines, etc., which often results in parts of the command area not receiving water. In Gujarat, for instance, while the minor was being planned in a village (Dedasan) in the Dharoi Project, the villagers pointed out to the engineers that their design was not appropriate. The engineers did not listen to them and went ahead with their plan, causing deprivation. The villagers in another village (Paldi) in the same command had pointed out to the engineers that a good part of the command area was at a higher level than the level where the minor takes off from the distributary, but their views were ignored resulting in good part of the command area remaining without irrigation. The same issue was found to plague Orissa projects. In Kaunria project, the left canal in the command area around the village of Srirampur and in Hirakud, in the region irrigated by Barpali canal, the level of the canal was lower than the agricultural land. In all these cases water did not reach the fields.

#### **1.2 Sub-standard Construction**

Dharoi Project in Gujarat provided examples where poor construction had deprived the farmers of their due shares of water; Pudgam and Kambli in Dharoi and Aurangpur in Mahi. Farmers from all three villages had mentioned poorly constructed canals as a cause of deprivation. In another village, Kiyadar, the banks were too high and the inlet was improperly constructed which resulted in water not reaching the farmers. Maharashtra and Haryana studies also report that all the projects that were studied had very poorly constructed structures, such as the outlets and gates.

### **1.2.1 Recommendations**

**1.2.1.1** The farmers should be consulted before the construction design is finalised, at least for the minors and watercourses to prevent problems when canal is commissioned. If PIM is already introduced and therefore forms part of system, it should be easier to involve WUAs in finalising the design and also in executing construction works.

**1.2.1.2** Where PIM has not been introduced, the local farmers' representative group should be informed about the construction design, the plan, and the estimate so that it may have an opportunity to provide valuable suggestions. For this to take place as a routine, the farmers should have a right to information. Farmers and farmers' groups should be involved in the new construction works as well as rehabilitation works. Groups of beneficiary farmers should be informed about the planning and implementation of construction and the repair work. The Gramsabha should be used as a forum for discussing the detailed work plan. The detailed cost estimates prepared by the Department should be displayed on the notice board of the Gram Panchayat. This is already taking place in the PIM areas where the WUAs are included in the process.

**1.2.1.3** The Farmers' Organisations or individual farmers should be free to visit the site of work as long as the visit does not cause any inconvenience to the officials or the agency. If they have any observations or suggestions about quality of work, they should inform verbally or in writing only the concerned local engineer; they should not enter into an argument with the contractor.

**1.2.1.4** Gujarat ID has already resolved that while rehabilitating canals to be transferred to a WUA under the PIM scheme, the ID will consult the WUA in preparation of the plans and estimates. It has also decided that the WUA would be first offered the responsibility for construction.

### **1.2.2 Follow Up Action**

*The Superintending Engineer, Mahi-Kadana irrigation project in Central Gujarat agreed to try the idea of keeping the farmers group informed about the construction activity whether it was renovation, extension or maintenance. The experience gained should be made available to DSC for dissemination to the participants of the national workshop. This may be done within six months. Similar work will be done in a project in Maharashtra that would be selected by State Irrigation Department, in consultation with WALMI and SOPPECOM. Experience gained will also be communicated to DSC for dissemination to concerned practitioners and policy makers.*

### **1.3 Poor Maintenance**

All six studies had specifically noted poor maintenance as an important reason for deprivation. The Tamil Nadu study, for instance, has reported that as one moved towards tail parts, the maintenance got poorer. Grants are insufficient for operations and maintenance (O & M) to begin with, and they are being increasingly diverted to staff salaries, worsening the problem. The funds available for maintenance are often extremely inadequate. For example, in Karnataka the grant available is Rs.1.5 per hectare for tank maintenance!

### **1.4 Recommendations**

**1.4.1** The maintenance grant should be increased, but it is not enough; proper and equitable utilisation of the grant has also to be ensured.

**1.4.2** Distribution of “divisible” O&M grant, excluding funds required for salary and works like head works which are common to the whole irrigation project, should be distributary-and minor-wise in proportion to the command area.

**1.4.3** As an incentive for satisfactory collection of water charges even where PIM is not introduced, the villages under minor would be entitled to get 50% of the O&M grant according to their area and the remaining 50% in proportion to the charges collected.

**1.4.4** As suggested by the Task Force on PIM in Gujarat there should be performance audit of the working of Farmers’ Organisations by a multi-disciplinary team at least once in two years. The findings of the report should be made available to Farmers’ Organisations at various levels and satisfactory compliance should be expected on important points, particularly maintenance of the system and management of funds.

**1.4.5** As regards adequacy of maintenance funds, the State Governments should periodically raise the water rates for irrigation as per the norms recommended by Vaidyanathan Committee. This would also take care of rise in management cost over a period. When PIM is introduced, maintenance of the transferred system and satisfactory management of water distribution and finances would become extremely important.

**1.4.5.1** For augmenting funds for maintenance, the workshop made several recommendations. Funds available under rural development programmes such as Swarnajayanti Gram Swarajgar Yojana, could be availed of for better maintenance and even rehabilitation of canal systems.

**1.4.5.2** Since the tail-enders are the worst sufferers, they should be mobilised to present their problems to the authorities as well as to people’s representatives like the panchayat leaders, MPs and MLAs. The latter may also be approached for sanctioning grants for better upkeep of canals from the funds at their disposal for local area development scheme.

**1.4.5.3** The lands that acquired for the canal system and not required as canal roads, can be leased out to the villagers for growing grass or trees to augment funds for maintenance. This would be more feasible when canals are transferred to Farmers’ Organisations.

**1.4.6** When canal maintenance and water distribution is transferred to a Farmers' Organisation, the organisation will have to be given resources for discharging this responsibility. The workshop recommended that in place of giving an ad hoc grant for maintenance every year to the Farmers' Organisation, such grants should be related to water charges levied and their collection. The latter would lead to better planning for maintenance.

**1.4.6.1** If volumetric supply and pricing are to be adopted soon, Maharashtra pattern may be adopted: volumetric pricing is decided at least 20% less than the water charges that would have been collected from the farmers on the basis of traditional crop area basis. Thereafter the Farmers' Organisations should be free to decide water charges to be collected from the members whether on crop area basis or hourly supply basis.

**1.4.6.2** The alternative of Gujarat pattern was also recommended under which 50% of the water charges collected are retained by the Water Users' Association (WUA) for the purpose of maintenance and management. Gujarat Task Force on PIM has also recommended 20% of the water charges to be passed on to Distributary Committee for maintenance for distributaries and 20% to the Project Committee for maintaining main canal.

**1.4.6.3** Farmers' Organisations at the minor, distributary and project level should be empowered to fix the water charges at a rate higher than the rate fixed by the Government. They should be entitled to retain the additional amount thus collected.

## **2.2 Follow Up Action**

*2.2.1 Development Support Centre should make available to the research team and the concerned State Governments the recommendations of the Gujarat Task Force on PIM about suggested provisions for maintenance funds to Farmers' Organisations.*

*2.2.2 Gujarat Chief Engineer Mr. A. B. Mandavia had informed the workshop how in the projects under his charge funds were mobilised from rural development schemes for canal system improvement. He agreed to supply to DSC notes on Gujarat experience in this regard for dissemination to participants and concerned Government authorities.*

## **2 Management/Administrative Issues**

### **2.1 Reduction in the Quantity of Water Available for Irrigation**

Developments upstream and diversion of water to meet the need for drinking water in urban areas have been the two major causes for reduced quantity of water available for irrigation. For instance, in Maharashtra the inflows into the reservoir or at the dam site in Mula and Mangi projects have been reduced because watershed development activities have taken place in the catchments. Similarly, water for irrigation from Vanivilas Sagar Project in Karnataka has been channeled to Chitradurga and Hiriyur towns. Reduction in water quantum after command area has been designated creates management problems; the worst sufferers, as usual, are the tail-enders. (The issues of allocation of water to competing claimants and of extending the designated command area are considered separately as policy issues.) Irrespective of the reason for the reduced quantum of water, there is need for working out revised quantum of available water in the system as a whole as well as in the different parts of the system. This has to be done in such a manner that the tail-end areas at various levels are not made to absorb the shortfall in the availability of water.

#### **2.1.1 Follow Up Action**

SOPPECOM has made a study of the consequences of reduced availability of water in the Mula project. It would make available its findings to DSC for distribution to the participants and Government authorities.

### **2.2 Inadequacy of Staff and Funds**

In 25% of the projects studied, inadequacy of staff and funds was found to be an important cause for poor management, contributing to deprivation. Looking to the paucity of funds with the State Governments, they cannot be expected to change the policy of not filling up the vacant posts. Since Farmers' Organisations would be capable of managing canals transferred to them with a lower staff expenditure, introducing PIM emerges as an important step both for improving the management and meeting the requirements of the tail-enders.

### **2.3 Monitoring of Canal Performance**

At present importance is given to monitoring at the project level which may give satisfactory picture, hiding the serious deprivation within. For instance, in the case of Tungabhadra in Karnataka and Mahi in Gujarat the overall "achievement" of area irrigated is 95% and 99% respectively at the project level, but there are areas in the command which receive much less water than their due and some none.



## **2.4 Recommendations**

The reporting formats should be such that the deficit in the supply of water at the minor level is brought to the notice of the Superintendent Engineer (SE) or equivalent or higher officer so that corrective actions can be initiated at the appropriate level. The reporting format should be such that the number of waterings received for the smallest unit are recorded and brought to the notice of the SE. It was suggested both numbers should be reported: the number of farmers entitled to water and the number of farmers receiving water.

## **2.5 Follow Up Action**

*The SOPPECOM has developed the reporting in Mula project in Maharashtra using a format which addresses this issue properly. When this is made available to DSC, it would be distributed to the research teams and government authorities.*

## **2.6 Quality Aspects of Performance**

The researchers have examined not only whether the designated area has received water or not, but also the quantity of water available in terms of the number of waterings or rotations. The significance of the number of waterings has been brought out in the Karnataka and Tamil Nadu studies which have depicted variations both in the different reaches of the same system, and within each reach, between head, middle and tail-end regions in the crops grown, crop productivity and farmers' incomes. Unless this is looked into, some areas which remain deprived of their due share and affect livelihoods of the farmers adversely will not be recorded. For instance, it has been observed in Orissa that there are wide variations in the area under high yielding varieties of paddy in different command areas. For instance, in the villages under Hirakud command area (a large irrigation project), more than 80% of the paddy cropped area is placed under high yielding varieties of paddy, in the medium project it is 32%, and in the minor project it is 26%.

### **2.6.1 Recommendations**

The management information system that has been developed would give information about the performance of the system not only in terms of area covered under irrigation but also about the number of rotations/waterings--and on a sample basis--of the productivity, use of high yielding variety of seeds and incomes. Even the standard of living of the farmers can be monitored on sample basis by using indicators such as housing, indebtedness, contribution of agricultural income to the livelihood, etc. This may be better done through independent experts with whom local staff may be associated so that the latter can contribute on account of their familiarity with the local scene; they also learn from the experience and exposure. The effects on livelihoods and

coping strategies of farmers in the irrigation commands, particularly tail-enders, should be studied in depth.

### **2.7 Follow Up Action**

Such studies should be on the research agenda of DSC and other researchers

### **2.8 Grievance Redress Mechanism**

In most of the government departments there is a formal system of registering grievances and their redressal. Not that they work satisfactorily but the research studies have brought out that such system is almost absent in canal irrigation. In Maharashtra there have been repeated instances of tail-end farmers not applying for irrigation water because in the past they have not been able to obtain the required quota. Haryana study notes that most farmers put forward their complaints to the irrigation authorities through their local political representatives such as Members of the Legislative Assembly or Members of Parliament. The irrigation authorities seem to be acting on complaints as per the priority indicated by the politicians/public representatives.

#### **2.8.1 Recommendations**

The Gujarat study, recognising the need to register farmers' complaints and redress them, recommended that a forum be set up at a local level to review the complaints from farmers and action taken to redress them.

#### **2.8.2 Follow Up Action**

*It was decided that Mr. Sanjay Belsare, Executive Engineer and Under Secretary (Irrigation), Government of Maharashtra, and Mr. Abhay Barwe, Executive Engineer, Ahmedabad Irrigation Division, will work out a methodology and present a draft for further action in the matter.*

## **2.9 Method of Distributing Water**

How water is released and distributed to various parts of the system has an impact on the availability of water for the tail-end farmers.

The Orissa study notes that the practice of opening the sluices of the dam and thus allowing the entire canal system--the main, minor and sub-minor--to be opened at the same time leads to wastage of water in the head and scarcity in the tail. Nor are any precautionary measures taken while the sluices are closed resulting in highly uneven distribution of water. Tail-enders are not in a position to store water in the (paddy) field and as a result, their crops dry up, and there is wastage of water in the head reach.

In the New Kattalai High Level Canal in Tamil Nadu, the rule is that whenever the canal is opened for irrigation, water should be allowed to reach the tail-end first and tanks should be filled up one by one from tail reach to head reach. The rule though commendable, is seldom followed as noted by the Tamil Nadu study.

### **2.9.1 Recommendations**

State Governments may give directives to project authorities that when water is released it should be allowed to reach the tail-enders and then in turn the middle and head reaches. This is easier done when the management of distribution is by the Farmers' Organisations at various levels since they would have to consider the complaints and pressures from the tail-enders.

## **3 Policy Issues**

### **3.1 Head-reach Farmers Take More than Their Due**

The most important issue emerging from the studies is the intransigent behaviour of head reach farmers who divert disproportionate amount of water to their fields, completely ignoring the prescribed cropping pattern. In Tungabhadra project, according to the prescribed cropping pattern—localisation--less water intensive crops like millets and sorghum are to be cultivated. However, in the head reaches the percentage of area covered by water intensive crops like paddy, coconut, etc., is eight times the prescribed limit! The head reach farmers in the Mahi project behave the same way. Maharashtra study notes the shift in crop pattern towards water intensive crops like sugarcane is an important cause of deprivation at the tail end.

In Maharashtra, generally, conditions were found to be more favourable for equitable distribution of water in sub-commands where WUAs were present. There were shortages, but water was shared more equitably. Studies in Karnataka and Tamil Nadu—both states have traditional water

management organisations--suggest that distribution of water, especially in scarcity, is more equitable when it is locally managed. The feasibility of volumetric supply of water is also higher under WUAs. Not all states have the traditionally nurtured local organisations. In such states, WUAs should be set up because what is crucial is local control, whether it is exercised by traditional, evolved organisations or promoted, enacted bodies.

### **3.1.1 Recommendations**

Administratively controlling the cropping pattern of the head reach farmers, who are usually influential, is difficult in most cases. It succeeds, however, when water is managed by local institutions as in case of tanks in Karnataka. Another measure for effective control of the head reach farmer is to decide his share of volume of water--which should be linked to command area--with the farmer having the freedom to decide which crops to sow. SOPPECOM has been promoting the practice of supplying water on volumetric basis for about fifteen years and has found that it ensures equitable and economical use of canal water. Maharashtra government has declared its commitment to volumetric supply of water as expressed in its water policy. Government of Gujarat in its policy resolution of June 1, 1995 on PIM has given a directive to the WUAs to supply water on volumetric basis within three years of the transfer of a canal system to the WUA.

However, it needs to be emphasised that WUAs can perform better only if both the parties, that is the ID and the WUA, are willing to carry out their responsibilities seriously.

### **3.1.2 Follow Up Action**

*There are a few success stories in which equitable distribution and other good management practices have been adopted. These should be documented and findings distributed to interested parties.*

*DSC and other teams should take on their agenda such documentation which should be made available to DSC which would circulate it to those interested in Government, NGOs, academics and Farmers' Organisations.*

## **3.2 Conjunctive Use of Canal and Groundwater**

**3.2.1** The extent of groundwater recharged on account of canal water is relevant to canal irrigation management. This has been mentioned in studies on Tamil Nadu and Haryana. Maharashtra has examined this issue in great depth. A way to assess the performance of canal management taking into account both surface irrigation and well irrigation has to be worked out.

### **3.2.2 Recommendations**

**3.2.2.1** Wells in the irrigation command area should be brought under the jurisdiction of WUAs (where they exist).

**3.2.2.2** The three WUAs on Waghad project in Ozar in Nasik district in Maharashtra, promoted by Samaj Parivartan Kendra, have adopted an integrated approach to ground and surface water sources with help from SOPPECOM. Their experience needs to be studied and documented so that lessons may be drawn from it.

### **3.3 Follow Up Action**

*WALMI (Aurangabad) would host a national workshop on conjunctive use of water when SOPPECOM will present its studies. Director WALMI would also present the documentation of other projects where surface and ground water have been treated in an integrated way.*

*It was also agreed that in the same workshop, the issue of volumetric supply and pricing of water would also be considered. Here also experience and documentation of SOPPECOM would be an important item on the agenda.*

### **3.4 Extensive versus Intensive Irrigation**

Those concerned with equity are in favour of extensive irrigation that would provide adequate water to raise less water intensive crops like millets while banning water intensive crops like paddy, sugarcane and banana. When the command area of Parambikulam Aliyar Project (PAP) project in Tamil Nadu was extended, the original irrigators protested. A committee, set up to review the performance of PAP, came to the conclusion that extensive irrigation is more desirable because the benefits can be distributed to a larger community. The aggrieved farmers—the original irrigators—took the matter to court—right up to the Supreme Court. The Supreme Court decided that the state had the right to decide on the issue and can order extensive or intensive irrigation. In fact, this is in the design of most of the projects. The cropping pattern prescribed is for extensive irrigation over a large area. The problem is that the cropping pattern is ignored in practice, and the irrigation department fails to control the head reach farmers who raise water intensive crops depriving the farmers downstream of their share of water.

### **3.5 Recommendations**

The workshop favored extensive irrigation, which should provide water to a larger area and a larger number of farmers. Knowing that this was the accepted principle in planning of most of the

projects in the low rainfall areas of the country, including Gujarat and Maharashtra, the workshop made the following detailed recommendations.

**3.5.1** When extensive irrigation approach is adopted the volume of water required should be sufficient to raise low water intensive kharif crop. If there is surplus left at the end of the kharif season then low intensity crop in rabi and summer should be permitted. Such approach would indicate to the volume of water that would be required in each season for the given land area in the command.

**3.5.2 To** ensure that this does not remain a principle on paper but implemented and enforced, the workshop strongly recommended that supply of water to each branch / distributary / minor and outlet should be on volumetric basis.

**3.5.3 Based** on these considerations and assuming 50% dependency in the normal area, the command area may be reassessed.

#### **4 Entitlement to Water (Water Rights)**

All these issues can be summed up in the issue of rights of the farmers throughout the command area of a canal system. The right of the farmer to the share of water in proportion of land holding has to be reconciled with the quantum of water available in the system for irrigation. Thus the concept of water right would be dynamic where the area and the quantity would change from season to season. The basic issue is whether the farmers are *entitled to* a certain share of water. Do they have a legally enforceable right to their share of water? In practice, there is large scale denial of such "rights", particularly at the tail end.

##### **4.1 Recommendations**

The workshop therefore suggested that awareness about entitlement and rights should be created among the farmers and those managing canal /tank systems. Especially, the duties and obligations of irrigation authorities to provide water equitably, particularly to the tail-enders and other deprived, should be impressed upon them. This entitlement, that is right to supply of water, is enforceable through Courts also. For example, according to Rule 28 of the *Gujarat Canal Rules 1962*, the farmers are entitled to remission of water rates, if they suffer loss on account of non-reaching of water. Court verdicts which have upheld water rights should be publicised to encourage farmers to press for their rights. This can be achieved through communication--in terms of instructions, literature, and intensive training programmes for the farmers' representatives and irrigation staff.

#### **4.2 Follow Up Action**

*DSC and other research teams should put on their agenda documentation of cases where farmers / Farmers' Organisations have been able to demand and secure their share of water whether through pressure on the Irrigation Department or through a court verdict. DSC should compile such information and make it available to those interested.*

### **5 Promoting Farmers' Organisations as a Broad-ranging Solution**

A general, broad-ranging recommendation which emerged in connection with almost every issue was to entrust management of irrigation to Farmers' Organisations. Thus introducing PIM and promoting Farmers' Organisations and their federations, including at state level, was recommended as the right course of action which the irrigation sector has to adopt to satisfactorily deal with various issues that have emerged. As noted earlier mere transfer of responsibility to FOs, whether through law or administrative orders would not produce expected results, unless accompanied by supportive measures of awareness creation, capacity building, minimum funds, powers, etc. It is likely to prove, may be in the long run, a more effective way of engagement with political processes that may have an impact on and determine the policy agenda and policy changes.

### **PART III: ANNEXURES**



### Annexure 1: Researchers and Research Organisations

States	Organisations	Principal Researchers
Gujarat	Development Support Centre 2 Prakruti Apartments H.L. Commerce College Road Ahmedabad 380 009	Mr. Anil C. Shah Chairman, Development Support Centre Ahmedabad
Haryana	Agricultural Economics Research Centre (AERC) University of Delhi Delhi 110 007	Dr. Prem Vashishtha Director, AERC, Delhi
Karnataka	Pragathi: Farmers Society for Rural Studies and Development, 72, 7 <sup>th</sup> Cross, C.T. Street, Vasanthnagar Bangalore 560 052	Mr. R. Doraiswamy Executive Director, Pragathi  Dr. Peter Mollinga Visiting Professor, Administrative Staff College of India, Hyderabad
Maharashtra	Society for Promoting Participative Eco-system Management (SOPPECOM) 16, Kale Park Someshwarwadi Road, Pashan Pune 411 008	Mr. K. J. Joy Secretary, SOPPECOM  Mr. Suhas Paranjape Member, Governing Board, SOPPECOM
Orissa	Council of Professional Social Workers N-3, 409, I.R.C. Village Nayapalli Bhubaneswar 751 015	Dr. Rajkishore Meher Faculty Member, Nabakrushna Choudhury Centre For Development Studies Bhubaneswar
Tamil Nadu	SaciWATERs (South Asian Consortium for Interdisciplinary Water Resources Studies) 20B, College Park Quarters Road No.3, Banjara Hills Hyderabad 500 034	Dr. A. Rajagopal Research Coordinator

## Annexure 2: List of Participants

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- Mr. Abhay Barwe. Executive Engineer, Ahmedabad Irrigation Division, L. D. Engineering College Compound, Navrangpura, Ahmedabad 380 009
- Mr. P. K. Bhattacharya. Research Investigator, Agricultural Economics Research Centre (AERC), University of Delhi, Delhi 110 007, Tel.: (011) 27667588
- Mr. H. N. Bhavi. Farmer WUA President & Chairman, PRAGATHI, Belawalakappa, Bopalkote District
- Mr. Satish Bhingare. Director, Water and Land Management Institute (WALMI), PB 504, Kanchanwadi, Paithan Road, Aurangabad, Maharashtra
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## Annexure 2: List of Participants (Contd.)

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### Annexure 3: Programme Schedule

**DAY 1: NOVEMBER 28, 2003**

**Inaugural Session: 10-11 a.m.**

*Chairman:* **Dr. Peter Mollinga**, Associate Professor at the Irrigation and Water Engineering group at Wageningen Agricultural University, the Netherlands

- Welcome: **Mr. Sachin Oza**, Executive Director, Development Support Centre
- Background: **Mr. Anil C. Shah**, Chairman, Development Support Centre
- Keynote Address: **Dr. Tushaar Shah**, Lead Researcher, International Water Management Institute
- Chairman's Speech: **Dr. Peter Mollinga**
- Round of Introductions

**Tea Break: 11-11.30 a.m.**

#### **Session 1: State Experience**

*Panelists:* **Dr. C. Sithapathi Rao**, Director, Institute of Resource Development and Social Management and **Dr. K. V. Raju**, Professor, Institute for Social and Economic Change, Bangalore

- 11.30-11.50: Gujarat, **Dr. Rohini Patel**, Consultant, Development Support Centre
- 11.50-12.10 p.m.: Maharashtra, **Mr. K. J. Joy**, Core Faculty, Founder-member and Secretary, Society for Promoting Participative Ecosystem Management (SOPPECOM)
- 12.10-1.00 p.m. Discussion on Gujarat and Maharashtra

**Lunch Break: 1-2 p.m.**

#### **Session 2: State Experience**

*Panelists:* **Mr. S.T. Patil**, Director, Water and Land Management Institute (WALMI), Dharwad, and **Mr. Apoorva Oza**, Chief Executive Officer, Aga Khan Rural Support Programme, India

- 2-2.20 p.m. Haryana, **Dr. Prem Vashishtha**, Director, Agricultural Economics Research Centre, Delhi
- 2.20-2.40 p.m. Orissa, **Dr. Rajkishore Meher**, Reader in Sociology, Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar
- 2.40-3.30 p.m. Discussion on Haryana and Orissa

**Tea Break 3.30-4 p.m.**

#### **Session 3: State Experience**

*Panelists:* **Mr. S. L. Bhingare**, Director, Water and Land Management Institute, Aurangabad and **Mr. Niranjan Pant**, Director, Centre for Development Studies, Lucknow

- 4-4.20 p.m. Karnataka, **Mr. R. Doraiswamy**, Executive Director, *Pragathi*, Bangalore
- 4.20-4.50 p.m. Tamil Nadu, **Dr. A. Rajagopal**, Visiting Fellow at the National Institute of Rural Development, Hyderabad
- 4.50-5.40 p.m. Discussion on Karnataka and Tamil Nadu

### **Annexure 3: Programme Schedule (Contd.)**

**DAY 2: NOVEMBER 29, 2003**

#### **Session 4: 9.00-11.00 a.m. Group Meetings**

- Group discussions

The following three groups will be constituted: Group 1: Issues in Gujarat and Maharashtra; Group 2: Issues in Haryana and Orissa; and Group 3: Issues in Karnataka and Tamil Nadu. In addition to the researchers and farmers from the state, some other participants will make up the group. Each group will discuss issues and problems and make its own suggestions. The group will also suggest future plan of action for securing expected impact.

**Tea Break: 11-11.30 a.m.**

**Session 5: 11.30 a.m.-3.30 p.m.**

**(Lunch break: 1-2 p.m.)**

*Panelists:* **Mr. S. N. Lele**, Founder-Member and Chairman, SOPPECOM, **Mr. V. Lingarajiah**, Chief Engineer, Hemavati Project, Karnataka; **Dr. R. Parthasarathy**, Professor Gujarat Institute of Development Research

- Plenary session on group reports for evolving common recommendations and special state-specific recommendations.

**Concluding Session 3.30-4.30 p.m.**

*Panelists:* **Mr. V. B. Patel**, Former Secretary, Water Resources Department, Government of Gujarat; **Mr. M. S. Patel**, Secretary, Irrigation, Government of Gujarat; **Dr. Peter Mollinga**, **Mr. Anil Shah**

- Overview of the deliberations

#### Annexure 4: Details of Projects Studied

States	Major Projects, Number of Villages, Their Location or Reach	Medium Projects	Minor Projects including Tanks
Gujarat	<ul style="list-style-type: none"> <li>• Dharoi, 6 villages Head: 2, Middle: 2, Tail: 2</li> <li>• Mahi, 28 villages Head: 9, Middle: 10, Tail: 9</li> </ul>	---	---
Haryana	<ul style="list-style-type: none"> <li>• Bhakra (3)</li> <li>• West Yamuna Canal (3)</li> <li>• West Yamuna Canal (3)</li> </ul> <p>Three minors, one from each project, three villages from each minor, one each from head, middle and tail regions of the minor</p>	---	---
Karnataka	<ul style="list-style-type: none"> <li>• Vanivilas Sagar</li> <li>• Tungabhadra system (sub-distributaries of distributary 54)</li> </ul>	---	<ul style="list-style-type: none"> <li>• Belagumba tank, (Bangalore rural District)</li> <li>• Hirekere tank, (Tumkur District)</li> </ul>
Maharashtra	<ul style="list-style-type: none"> <li>• Mula Head: 2, Middle: 4, Tail: 4</li> </ul>	<ul style="list-style-type: none"> <li>• Mangi RBC: 5, LBC: 3</li> </ul>	<ul style="list-style-type: none"> <li>• Walen (Pune District) Entire command</li> </ul>
Orissa	<ul style="list-style-type: none"> <li>• Hirakud Two villages from head, middle and tail regions of its 3 distributaries, total 18 villages</li> </ul>	<ul style="list-style-type: none"> <li>• Kuanria Two villages each from head, middle and tail regions of the left and the right distributaries, total 12 villages</li> </ul>	<ul style="list-style-type: none"> <li>• Deras MIS (Khurda District) Two villages each from head, middle and tail regions, total 6 villages</li> <li>• Gaghara Bandha MIS (Nayagarh District) Two villages each from head, middle and tail regions, total 6 villages</li> </ul>
Tamil Nadu	<ul style="list-style-type: none"> <li>• Parambikulam Aliyar Project Canal system and its distributaries divided into head, middle and tail regions, villages were selected from each, Total 7 villages</li> </ul>	<ul style="list-style-type: none"> <li>• New Kattalai High Level Canal and its distributaries divided into head, middle and tail regions, villages were selected from each, Total 18 villages</li> </ul>	Rain-fed tanks: Maravanoor and Venkaram