THE POLICY PROCESS IN IRRIGATION REFORM: TECHNOLOGY, RURAL DEVELOPMENT AND POLITICS

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"I thank Joost Oorthuizen and Geert Diemer for their comments!"

Introduction

This paper was originally written for the fourth international INPIM[1] seminar in Bali in July 1998. The question the organisers of that seminar put in front of the author was the following.

> *Are top-down strategies to be preferred over grass roots strategies in the introduction of PIM?*

For reasons that will be explained below I prefer to rephrase this question in the following way.

> *What should be the characteristics of the process of policy formulation and implementation for the introduction of PIM?*

This is a big question, and no general answer to it exists that applies to all cases. What the PIM process should look like to achieve its objectives will vary from country to country and from irrigation system to irrigation system. What we can say something about is what our starting points or assumptions are when an approach to the introduction of PIM is designed. It are these starting points or assumptions underlying the design of PIM approaches that I want to discuss in this paper[2].
The argument of the paper runs as follows. In section 2 it starts with a discussion of the dichotomy of top-down *versus* bottom-up approaches to the introduction of PIM. I argue that this opposition does not capture the choices involved very well. Instead I argue for a framework that distinguishes between a prescriptive approach to policy and a process approach to policy.

[1] INPIM = International Network for Participatory Irrigation Management, based in Washington DC
[2] I am assuming here for the sake of argument that it is clear what we mean by PIM. However, the meaning of PIM itself will be subject to debate and contestation in the policy process. This issue is only indirectly treated in this paper.

In section 3 some of the problems of prescriptive approaches to PIM introduction are sketched by means of examples drawn from India, Pakistan and Indonesia. The gloomy picture that these example give of PIM in practice, leads to three issues for further discussion.

These are:

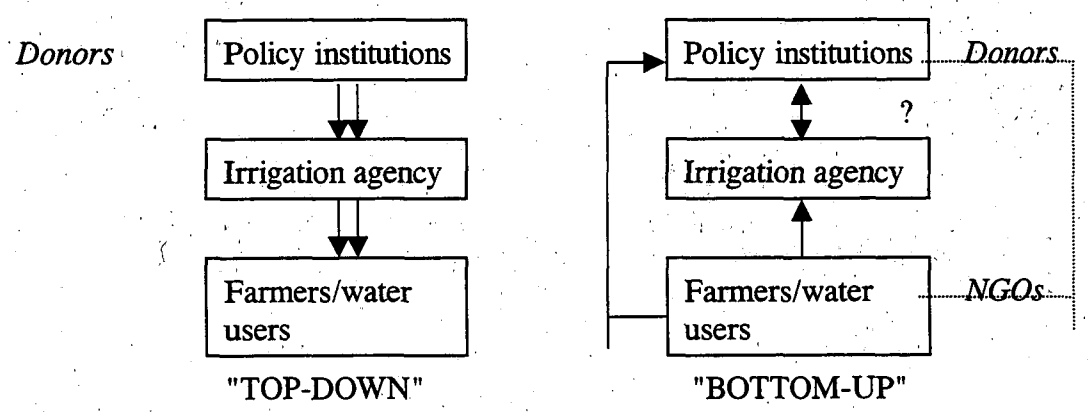
1) the need to enrol engineers in the reform process, and how this can be done by providing technical challenges (discussed in section 4);
2) the need to situate irrigation reform in a broader approach to integrated water resources management and rural development (discussed in section 5); and
3) the need to understand policy formulation and implementation as political processes, which require the forging of political coalitions to achieve policy reform (discussed in chapter 6).

I conclude the paper with a few short remarks on the possible role of the INPIM network in a `policy as process' approach (section 7).

Before commencing the presentation of the argument however, it is useful to point out that the paper takes large scale canal irrigation in Asia, particularly South Asia as its reference point. These systems are characterised by large numbers of farmers, many with small, and decreasing, holdings, widespread poverty, and strong social inequalities and dependencies among the rural population. Many systems have water scarcity as a design principle, and water needs to be rationed. The systems are managed by old and large irrigation bureaucracies with strong hierarchical orientations. Canal irrigation in this region may constitute one of the most difficult cases for irrigation reform.

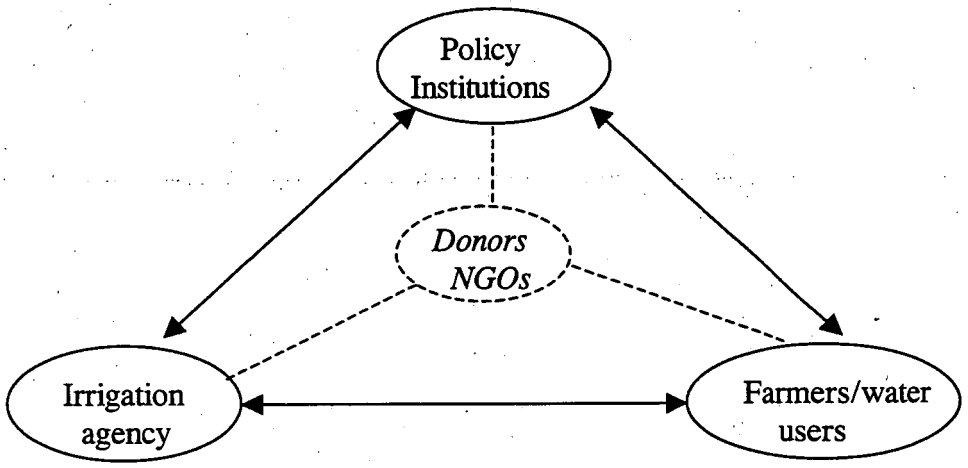
Top-down vs. Bottom-up or Prescription vs. Process ?

My guess is that the question given above and the text that accompanies it[4] has approximately the following model of policy formulation and implementation in mind.



[4] See *Call for contributions to the fourth international INPIM seminar to be held in Bali, Indonesia, 14-20 July 1998.*

In the top-down model new policies are formulated by policy institutions, which are mostly government agencies (the Cabinet, the Planning Board, special committees, or other institutions). The sources of the policy change may be different. They may be internally generated on the basis of accumulated experience, they may be forced by donor and lending agencies' pressure, they may be induced by INPIM conferences, or they may come about in other ways. After formulation follows implementation, generally by the government agency responsible for irrigation or water resources. Institutional reform of this agency may be part of the policy. The farmers/water users are the recipients of the policy implementation, and may be induced to participate in or adhere to it by means of different mechanisms, based on enforcement and/or the creation of incentives.
In the bottom-up model the process starts at field/canal level, where farmers/water users organise, perhaps assisted by NGOs. NGOs may do this organising work on their own account, or be invited and funded by government, and donors can also support it. The idea is that by using the room to manoeuvre in existing policy and regulations, a different relationship of water users with the irrigation agency can be negotiated. And, improvement and success in some cases creates a demand for more general policy change. In this way the reform ball starts to roll.
The bottom-up model can be represented more effectively as follows.



This figure shows a triangular relationship between policy institutions, irrigation agencies and farmers/water users. Farmers/water users are citizens who can be involved in the process of policy formulation and implementation in different ways: via representative politics, via public action of farmer/water users/citizens organisations, via public debate and hearings and other platforms for state-citizen interaction, and via the contribution of labour, knowledge, money and organisational capacity. Farmers/water users relate to irrigation agencies via formal or informal accountability mechanisms, and through contractual arrangements (for water delivery, fee payment, maintenance and other items). The relationship between policy institutions and irrigation agencies is one of governance, but should also be two-sided in the sense that policy decisions are informed by administrative/ bureaucratic realities.

The donors and NGOs are put in the middle of the figure not because they are central to the process (they may in fact be absent), but because they may play a catalysing role in the reform process, and may have relationships with all three parties.
The characteristic difference between the triangular interactive model and the top-down model can be captured by the phrases `policy as process' and `policy as presciption' (the

Box 1: Extracts from the Mexican National Water Law (1992)

Article 51 For the management and operation of systems and for the common use of the water (...) bodies corporate must be governed by bylaws that include regulations with regard to:

I. The distribution and management of the water conceded to them, and the manner in which decisions are to be reached by the group of users;
II. The form in which the individual rights of their members or the users of the irrigation service are guaranteed and safeguarded, and the forms in which they may participate in the management and oversight of the system;
III. The form in which the infrastructure or common system is to be operated, conserved and maintained; the form in which investments are to be made in improvements; and the form in which the costs incurred are to be recovered. It shall be compulsory for the members or users to pay the requisite fees if they are to continue to receive the service or to use the water;
IV. The rights and obligations of members and users, and sanctions for failure to comply;
V. The terms and conditions under which individual rights to water use may be conveyed among the members or users of a common system;
VI. The terms and conditions under which the rights to a concession, or the use of surplus water, may be totally or partially conveyed to third parties;
VII. The procedures for dealing with complaints by members or users;
VIII. The terms and conditions to be followed in mergers, splits, dissolutions and liquidations;
IX. All other matters that stem from this Law and its regulations or are agreed upon by members or users.

Bylaws and amendments to them require a two-thirds vote in favour by a general assembly called expressly for this purpose.

Source: National Water Law, December 1992, National Water Commission, SARH

terms are taken from Mackintosh, 1992). An illustration of the meaning of these phrases is possible by comparing two recent laws for participatory irrigation management: that of Mexico and that of the State of Andhra Pradesh, India. Extracts from the two laws are given in Box 1 and Box 2.

The extracts from the Mexican law show that it is an enabling law. It creates a framework within which water users can design their own organisation and negotiate their own agreements and contracts with the water supply agency. Their only obligation is to pay for the water. In this way what the policy actually is, is determined on the ground, and it is likely that a considerable diversity of arrangements will occur. The law attempts to constitute the conditions for a process in which the different parties involved define their relationship and the internal rules and procedures of their organisations. Policy is seen as a social and evolutionary process.

Box 2: Extracts from the Act to provide for farmers' particpation in irrigation systems, Andhra Pradesh, India (1997)

3. (1) The District Collector may, by notification and in accordance with the rules made under this Act, in this behalf, delineate every command area under each of the irrigation systems on a hydraulic basis which may be administratively viable; and declare it to be a water users' area for the purpose of this Act.
(2) Every water users' area shall be divided into territorial constituencies, which shall not be less than four but not more than ten, as may be prescribed.

4. (1) There shall be a Managing Committee for every water users' association.
(2) The District Collector shall make arrangements for the election of President of the managing committee of the water users' association by direct election by the method of secret ballot in the manner prescribed.

5. (13) The Government may in the interest of a farmers' organisation in the command area by notification and in accordance with the rules made in this behalf,-
(a) form a new farmers' organisation by separating the area from any farmers' organisation;
(b) increase the area of any farmers' organisation;
(c) diminish the area of any farmers' organisation;
(d) alter the boundaries of any farmers' organisation; or
(e) cancel a notification issued under this Act for rectifying any mistake;
provided that no such separation, increase, diminution, alteration and cancellation shall be effected unless a reasonable opportunity is given to the organisation likely to be effected.

16. The objects of the farmers' organisation shall be to promote and secure distribution of water among its users, adequate maintenance of the irrigation system, efficient and economical utilisation of water to optimise agricultural production, to protect the environment, and to ensure ecological balance by involving the farmers, inculcating a sense of ownership of the irrigation system in accordance with the water budget and the operational plan.

17. The water users' association shall perform the following functions, namely:-
(a) to prepare and implement a warabandi schedule for each irrigation season, consistent with the operational plan, based upon the entitlement, area, soil and cropping pattern as approved by the distributory committee, or as the case may be, the project committee.
(e) to assist the revenue department in the preparation of demand and collection of water rates;
(q) to conduct general body meetings, as may be prescribed;

In contrast, the Andhra Pradesh law is highly prescriptive. It goes into great detail about the organisational characteristics of the water users associations and their internal procedures (only a few elements are reproduced in the box). It goes even up to the point that it specifies that a member of the managing committee should be a person with not more than two children! It is also clear that the government keeps a strong hold on the organisations established under the act. In terms of property rights, the limit is the inculcation of a `sense of ownership'. Policy is seen as prescription.

The question to be answered may now be rephrased as follows.

Does the introduction of PIM require a prescriptive or process approach to policy formulation and implementation?

Problems with prescriptive policies for pim: some examples

The characterisation of the two different approaches above is not yet an argument in favour of either of the two. A prescriptive policy approach for irrigation reform can work. Two important conditions for this are the following.

1) A strong government and administration, that is, well developed enforcement mechanisms and competent leadership, and legitimacy towards citizens.
2) Policies that address real needs, or put differently, policies for which there are strong incentives for farmers/water users to participate in.

These conditions are not always met.[3] In many cases there are different interest groups within the government itself (different departments, different cadres, field *vs.* office level, party political factions, etcetera). Established bureaucracies may resist institutional change and the adoption of other modes of work. Politicians may interfere with the administration to advance the interests of their constituents. These and other factors can seriously undermine the implementation capacity of governments and administrative institutions. The state is rarely the neutral, coherent and benevolent institution that the top-down model seems to want it to be.

Also on the farmers side there may be strong divergence of interests, between head end and tail end farmers, and along other lines of social division (class, caste, gender, religion). This may cause an unequal spread of the benefits of the policy and non-adherence or even sabotage of its implementation. Farmers may also have different priorities in their survival and accumulation strategies than the government's water-reform focus.

Some of these issues can be illustrated by giving examples of field level observations of PIM introduction efforts. I give examples from India, Indonesia and Pakistan. The examples all date from 1997 and were made by the author (India) and by students of Wageningen Agricultural University as part of their M.Sc. thesis fieldwork (Indonesia and Pakistan). The stories can be found in Boxes 3, 4 and 5.

The three examples present a gloomy picture of PIM implementation in practice. The examples may not be representative, and I make no claims to that effect. Also it is not my intention to point a finger at the persons and institutions involved. My interest is a broader one: what can we learn from such examples? Which general issues do they raise? What do they teach us about possibilities for the introduction of PIM in such cases? The following observations can be made about the examples.

[3]) The Andhra Pradesh case will be interesting to follow in this respect. It is a top-down approach to the introduction of PIM, and one that seems to be implemented with vigour and `political will'. The prescriptive nature of the WUA characteristics and elections for example, explained a main responsible implementor, is to prevent dominant, head-end farmers to take control of the WUAs. The question then becomes, how long can the vigorous implementation be sustained (to make some aspects of decentralisation irreversible for example), and what are the field-level implementation characteristics?

Box 3: A PIM meeting in a tail end distributary, India

The Under Secretary to Government Irrigation Department (Command Area Development) in May 1997 issued guidelines for the implementation of PIM on a pilot basis to the Chief Engineers and CADA (Command Area Development Authority) Administrators of the different projects in the State. As the first step in the implementation of the PIM programme in the Karnap Project ten pilot villages *cum* command areas were selected. The selection criteria were, as far as we could ascertain, the size of the command area, and particularly the existence of a 'cooperative attitude' of the farmers. For one case it was reported to us that the village/command area was included on the specific request of the local MLA (Member of the Legislative Assembly).

The CADA took swift action and organised meetings in the villages concerned in June and July 1997. We were able to be present at one such a meeting. The village/distributary command area was located in the tail end of the main canal. This was in contradiction with the intention at policy level that sites with not too problematic water supply conditions should be chosen. Furthermore, the meeting took place in the head end village, while the existing association was based in and had a chairman from the tail end village. The meeting place seemed to have been determined by the practical reason of accessibility by jeep. The meeting place was appropriate in so far that most farmers who irrigated in this distributary were from the head end village. The tail end village area hardly received any water. Apart from the chairman only head end farmers, about 20, were present at the meeting.

The farmers had been informed about the meeting a few days earlier. The Irrigation Department officer present at the meeting had heard about it the night before. The meeting was chaired by a CADA officer. Initially the meeting was rather one-directional. The chairman explained the contents of the new policy. It was clear that he was not very well informed about its content. This was hardly his fault because not all the details of the policy were decided at that point of time (one example was the composition of the management board of the new WUA).

The farmers were very quick to notice the problem of the quantity and the stability of water supply from the main canal. The Irrigation Department officer correctly argued that a stable supply could not be delivered because of interventions upstream in the system that his division was unable to influence. The chairman told him to determine a supply that he could guarantee, and thus more or less ignored the issue. The head end farmers had some fear that they would lose water in the new situation, but the head-tail issue was not appreciated and left undiscussed.

A large part of the discussion focussed on the most concrete aspect of the policy: the need to make an estimate of the costs of the necessary technical repairs and improvements of the canal system before the management would be turned over to the farmers. The only concrete result of the meeting was that the chairman told the Irrigation Department officer to prepare such an estimate together with the farmers within a few weeks.

At the end of the meeting we asked whether a copy of the guidelines could be provided to the farmers in the State's language. The chairman first reacted by stating that these guidelines were meant for the government officials and that farmers had no need for them. In the second instance he argued that there was a stationary problem in his office. He was clearly totally unprepared for this question. After the meeting we had some discussions with farmers that had attended the meeting, and it was clear that they had only very partially picked up the content of the PIM policy. Self-governance is a novel idea, and it takes time to explain it. However, when after the meeting we asked the CADA officers whether they would return to the village for further explanation and discussion, the answer was negative. They only intended to return at the occasion of a formally called meeting.

Box 4: A visit to a pilot village by a government and World Bank delegation, Pakistan

The World Bank urges the Pakistan government to make haste with giving farmers larger responsibilities *vis-à-vis* the Irrigation Department, which is reformed into a Provincial Irrigation and Drainage Authority. Part of the reform programme is that in the first 5-7 years pilot projects have to be implemented, in which specific distributaries (secondary canals) are privatised. The village where the student was doing his research turned out to be one of the selected villages for a pilot project. He reports the following.

> In March 1997 a mission visited the study village. It consisted of three officials from the World Bank, the Assistant Commissioner of the Irrigation Department, the Zilladar (divional revenue officer) and some Patwaris (land, water and tax record keepers) of the local Irrigation Department office. The Patwari told me more about the event. Three months before, officials from the World Bank asked the Zilladar for the names of the large landowners in the village. Those large landlords had been invited by the Irrigation Department to come to meet the mission. The proposal of the mission was to form committees in every watercourse around the village. One large village water committee would be formed in which all different watercourses would be represented. The water committee should agree on the division of water over the different outlets. If it would have the feeling that a new scheme was needed, like a tubewell or lift irrigation scheme, the World Bank and the government would provide for 80% of the costs. The committee would have to decide if the present system of water fee/tax collection should be maintained and if the Patwaris should remain in function or not. The officials of the World Bank suggested that the Village Development Organisation would take the responsibility of organising the committee on village level. According to the Patwaris, the farmers of the village were not enthusiastic about the proposal. They mentioned a lot of problems, but their main fear (at least according to the Patwaris) - that the large landlords would take all the benefits of the programme and all the water - was not expressed. The farmers said they were afraid for the fact that the project is an experiment and that they did not want to put their crops at risk. According to the Patwaris, the mission from the World Bank was left with the impression that a lot of problems existed in the village and that the enmities in the village would harm the forming of the committees. Nevertheless, the project would continue.

The mission must have assumed that by inviting large landowners it would get a good representation of the village and the irrigated area, or at least would group those with authority. However, not in all watercourses there were large landowners, and the person most active in organising farmers at watercourse level was not a large landowner. He was not aware of the meeting. The student had also found that organisation of irrigation was strongly linked with village politics, and that the lines of division within village politics did not coincide with the boundaries of watercourse command areas. For unknown reasons this possibly difficult village was selected for the pilot project, while nearby villages where the On Farm Water Management (OFWM) Programme had formed viable farmer organisations, which were waiting for legal recognition and handing over of responsibilities by the Irrigation Department, were not selected.

Box 5: The participation of farmers in turnover, Indonesia

The Government of Indonesia has recently expanded its irrigation management turnover programme to include not only systems smaller than 500 ha but also larger systems between 500 and 1000 ha. Pilot projects were set up to experiment with the turnover of the larger systems. In the implementation of the two pilot cases that were investigated foreign and local consultants were also involved. An important element of the turnover process is the `design system planning meeting'. In this meeting the WUAs that are formed negotiate with the consultants and government about the system upgrading that needs to be done as part of the turnover. The observation of one such meeting yielded the following results.

The meeting was organised by the DPW (Department of Public Works) and they also conducted and chaired it. In the meeting the objectives of the turnover process and this particular meeting were explained. The village and WUA heads heard about management transfer and the contents of the meeting for the first time at the meeting itself, and - thus -had come unprepared.

The local consultants presented the proposed infrastructural design to all attendants of the meeting. They introduced it as a combination of the farmers proposed design and design made by the local consultants themselves. Discussion was needed, they said, to define the priorities for the rehabilitation. These priorities should be defined by the WUA heads and village heads.

Before this discussion the local consultants gave the list of the proposed design to farmers representatives. While they gave it to the farmers representatives, they whispered to the representatives (in dialect) that they had already marked (with a blue circle) which work should be given higher priority than others. This was mainly done to convince the foreign consultant that negotiations with farmers had already taken place. The consultants had used the signature of a single WUA head as evidence for farmer involvement in the proposed design.

During the discussion the farmer representatives obediently identified the priorities for the rehabilitation as it had been prepared. However, when the foreign consultant asked why they considered that work as more important than other work, the farmer representative could not answer and got confused. The DPW staff said that the the WUA head was not used to speaking in Indonesian, and proposed to translate the explanation in Indonesian for the foreign consultant. What really happened was that the WUA head admitted (in dialect) that he did not understand a thing about these drawings, while the provincial design officer `translated' the explanation of the technical drawing to the foreign consultant.

It also turned out that the priorities of the DPW in rehabilitation were not those of farmers. The DPW wanted to build the still unconstructed secondary canals in this system in the natural drains (also used for re-use of drainage water and diversion by village weirs), while the farmers wanted the secondary canals on the ridges. According to one source there were no more funds for land acquisition because they had been used for other purposes by the DPW, and therefore construction on the ridges was financially impossible.

1) In all three cases the PIM initiative did not originate in the group of farmers/water users, but came from outside. PIM was an idea of the government, the World Bank and consultants. Farmers were confronted with it, but they had not asked for this confrontation.
2) In neither of the three cases a serious effort was made to understand even the basic features of the local situation with regard to water management and distribution and social relations in the community. There is also a strong tendency to discuss with large farmers and local leaders only. This ignores differential interests and perceptions within the group of farmers/water users. That priorities of farmers were different than those of government remained unobserved.

3) In all three cases the primary interest of the irrigation agency was the physical interventions that were part of the reform process. Construction remains the main orientation of irrigation agencies. It may even be speculated that institutional reform programmes' main, but hidden, objective may be the mobilisation of new funds for physical works.

We can hardly be surprised that PIM policies will achieve little when they are implemented in this way. What are the implications of this for the design of policies and programmes to introduce PIM in such situations? I have three suggestions to make.

1) Ways need to be found to enrol irrigation agency staff in the reform process. There are `negative' ways to do this, meaning the adoption of policies and procedures that force irrigation agencies to work differently and change their priorities. There are also more `positive' ways to do this: by education and training, by creating incentives (or removing disincentives) for different modes of work and forms of organisation. An underemphasised way to enrol irrigation engineers in reform, and the one that I want to highlight in this paper, is to provide engineers with professional technical challenges that will contribute to the reform process. I elaborate this point in section 4.

2) Policies and programmes have to be designed from farmers' perspectives and priorities. In this it should be recognised that irrigation is just one the elements of a farmer's livelihood strategy. Goldensohn, in a review of programmes for the establishment of WUAs in six countries has concluded something similar.

> The sociologists and anthropologists who joined the irrigation bureaucracies to help create and strengthen WUAs concentrated on how to organise. They paid far less attention to what to organise for. They generated effective internal management and administrative structures to help establish organisations as good as the irrigation infrastructure itself. But they failed to look carefully enough at why water users would want to organise and what purpose WUAs would serve after the construction was over. They aimed for simplicity and efficiency in their organisations and gave little thought to the complications that politics and economics could introduce.
> Farmers cannot be expected to limit their objectives to those of engineers and sociologists, but unfortunately, until recently, this assumption has governed most efforts to organise WUAs in Asia.
> (...)
> The members of WUAs (...) earn their living from their farms, not from their irrigation systems, which admittedly provide a crucial input but one that is no more important than land, labour, capital, seeds, and other inputs. Without these agriculture cannot thrive, even if the irrigation system is working perfectly. WUAs principally are organisations of water-using farmers, whose final concern is the living they earn from agriculture.
> The participatory approach to WUAs stops at the entry to the farm. The WUAs thus become irrelevant to farmers after construction or rehabilitation is over. Farmers want water. But they want water as a means to an end, not as an end in itself. The WUAs are conceived with water management as their sole objective, whereas farmers want more than to manage the water and to perform O&M. They

> know that efficient and effective water delivery is a sine qua non for agriculture. They are not opposed to what the engineers have in mind. On the contrary, their almost universally enthusiastic response to efforts to organise WUAs for system construction, rehabilitation, or expansion shows that they share the engineers' goals. However, they want to go beyond these goals because they see a holistic system, not just an irrigation system, at work. (Goldensohn, 1994:11-12)

The implication for reform policies and intervention programmes is in my view that these should be less canal and water focussed than they have been so far. I elaborate this point in section 5.

3) At the most general level it can be concluded that policy formulation and implementation in practice often are complex processes of formal and informal, legal and illegal, open and hidden interaction and negotiation of different interest groups. Policy formulation and implementation need to be treated as political processes in which many interests are at stake. Reform processes tend to be slow and difficult in such circumstances[4], and require strategic political action to be successful. This is elaborated in section 6.

Technical challenges as part of pim initiatives

Any reform initiative in canal irrigation needs to take cognisance of the fact that these systems are designed and managed by civil/irrigation engineers. When irrigation management is to be done differently, these professionals and the institutions they work in will have to change. There are as yet very few examples of successful bureaucratic reform of irrigation agencies, certainly in South Asia. There seems to be insufficient pressure of governments, from society in general, or from the possibility of financial and other crises, to induce processes of institutional change within these bureaucracies. Irrigation departments tend to take an extremely defensive attitude towards reform. It has not been possible to enrol their staff in the desired process of change.
Without wishing to suggest that there are simple solutions to this problem, I would like to put forward the idea that one of the most obvious ways to interest the engineering community for reform has not been used very much. That way is the translation of the different elements of the reform into professional, technical challenges for the engineers. When the devolution of rights and responsibilities, and self-governance of part of the canal systems by farmers are considered as elements of PIM, many technical challenges emerge. I give a number of examples.

1) The first is the issue of intermediate storage in canal systems. `Live' examples of these can be found for example in some irrigation systems in South India where tanks are part of canal systems. Intermediate storage facilitates `hydraulic decentralisation'. It decreases fluctuations in the supply from the main system, and creates small buffers. It may also create the possibility of night storage.

[4]) Those who want to argue that only radical decisions can provide solutions in such cases, have to answer the question when, how and by whom such radical decisions can be taken. The magical formula of `sufficient political will' can hardly suffice as a strategy.

Intermediate storage can make the use of canal systems much more flexible, and local self-governance more realistic. They involve many design issues with regard to size and number, location, siltation and other factors.

2) The type of outlet structure that connects the government-managed part of the system and the farmer-managed part of the systems is a second challenge. The features of this device are crucial for how and how much water is delivered to farmers. Our research in South India suggests that field level engineers are quite creative in trying to respond in their designs to problems in water management. However, they are heavily constrained by the rules and procedures in the irrigation agency, in which design standards actually mean standard designs. Instead of getting rewards for their creativity, they fear that their digressions from the standard design are detected.

3) Another technical challenge lies in the provision of drinking water for the people who live in the irrigation command areas, and more generally in the health and sanitation dimensions of irrigation. Particularly in areas where there is no good quality groundwater (like in the vertisol `black cotton soil' areas on India) the canal systems are essential for drinking water provision, but often the systems are closed for several months in the summer. For farmers and their households water is not just irrigation water, but has other functions and values as well, which require particular infrastructural provisions.

4) Perhaps the greatest technical challenge lies in the integration of soil and water conservation technologies and irrigation technologies. These disciplines and their projects are often implemented separately. In the irrigation system where I worked the soil and water conservation was not even allowed to undertake activities in the area that was the jurisdiction of the irrigation department! The increasing emphasis on integrated water resources management provides many technical challenges for irrigation engineers.

5) Yet another area is the use of local materials in for example canal lining and small dam/weir construction. These materials may be cheaper and allow more sustainable use of the infrastructure (for examples, see Gore, 1998).

6) The last area that I just want to mention, is that of drainage, which acquires increasing prominence with mounting problems of waterlogging and salinisation.

The biggest challenge however perhaps does not lie in the technical questions as such, but in the way that they are addressed. I would like to advocate an approach of participatory technology development in this respect. Models for this have been developed for and used in the context of farmer managed irrigation (and in other sectors like agriculture, forestry and soil and water conservation), but they have found very little application in canal irrigation. However, they could very well be part of PIM initiatives. A participatory approach to technological innovation would provide professional challenges to engineers, and establish different relations and interaction patterns between farmers and engineers, which could also help institutional change.

A rural development approach to irrigation reform

In most cases irrigation reform policies of governments have not met with great enthousiasm from farmers. At the same time many local experiments with farmer organisation suggest that there is great interest of farmers in different types of irrigation management. However, these positive local experiences never seem to replicate themselves. The reasons for this are partly the prescriptive nature of government policy and the unwillingness to devolve real powers to local organisations. Partly also it is related to the limited focus of the policies: they tend to limit themselves to irrigation water and canals, and do not look at water from the perspective of farmers livelihoods. It is this latter point I want to elaborate in this section. My argument is that irrigation reform initiatives like PIM need to be made part of broader efforts at integrated water resources management and rural development to be able to speak to farmers' needs and gain more explicit support.

To illustrate my point I briefly discuss the main elements of an approach that has been published under the title `banking on biomass' (see Paranjape and Joy, 1995; Datye, 1997).

The first element of that approach can be derived from the following quotation.

> It is generally found that in watershed development schemes local groups as well as development administration tend to concentrate on the *in situ* measures to the exclusion of water source development for water application. On the other hand irrigation projects give scant attention to local resource management and exogenous water is seen not as supplement to primary ecosystem productivity that it should be but as a substitute for it. The need is to integrate them both within a coherent perspective. (Datye, 1997:57)

The dichotomy between rainfed agriculture and (canal) irrigated agriculture needs to be transcended. In this approach the sustainable management of local resources is a precondition for the availability and use of `exogenous water' like that provided by a canal irrigation system. Such an integrated approach to water resources development can lead to substantial increases in resource use efficiency.[5)]

The second element of the approach refers to the social dimensions of sustainable resource use. It can be derived from the following quotation.

> Equitable access to water necessary for ensuring livelihood needs to be treated on par with employment guarantee and the right to work as part of the larger right to an adequate livelihood. (...) water necessary for drinking and domestic use, for regeneration and for the livelihood component including special measures for the disadvantaged sections represents a priority claim on water resources in the area, and only after these claims have been met can the water be available for commercial use. The policy is to ensure a minimum livelihood for all and to regulate all resources necessary for this, and leave the rest of the resources to be freely utilised by the enterprising. (*ibid.*:58)

[5)] The author claims that "by the integration of external sources of irrigation water with `local' water harnessed from the watersheds and conserved *in situ*, it is possible to raise the productivity level of total available water for productive use to levels three times that of `external' irrigation water." (Datye, 1997:142) These and other statements are backed up by empirical evidence and calculations on the basis of existing technologies.

The approach defines a basic water right for all, and delinks water rights from land rights. In strategic terms the approach wants to allocate `new water', that is water that has become available through efficiency gains and ecosystem development, to the resource poor. The approach is a positive-sum variant of hydraulic property creation (Coward, 1986a&b). Those who have (collectively) invested in the generation of new resources by optimising existing resource use, gain rights in these new resources.[6)]
The third element is the ecological sustainability-with-growth element. Characteristic of the approach is that it not only advocates ecologically sound techniques for agricultural production, but conceptualises agriculture as a system of `regenerative biomass production' that provides the bio-energy not only for sustainable agriculture but also for dispersed industrialisation.[7)] The production strategy emphasises production of crops that can serve as the inputs for small industries, like tree crops. The approach wants to `move beyond subsistence' and wants to provide an agricultural *cum* industrial perspective of sustainable growth.[8)] Part of the approach is an argument for non-subsidised prices for external inputs in agriculture, subsidies that help the detrimental effects of high external input agriculture to pertain. The approach proposes the (gradual) removal of subsidies on electric power and the introduction of a progressive tariff system, volumetric water supply and cost recovery, while price support for coarse grains is advocated.
The fourth element is the methodological one. There is a strong emphasis on decentralised and interactive planning and decision-making, including an emphasis on elements like people's science, participatory technology development, and resource literacy.[9)]

[6)] The authors recognise that the acceptability of equitable access to water is a "most troublesome point" (Datye, 1997:130), but several examples are cited where this has been achieved in practice. The general finding in the cases reported is "that where access to water resource is seen to come about clearly to collective action, and where there are no previous entrenched water rights, farmers are not averse to equitable sharing arrangements." (*ibid.*:132) In terms of social reform the approach chooses to move away from a primary focus on land reform as a precondition for agrarian change. "The alternative paradigm presented here suggests another route -- that of augmenting the subsistence base by harnessing and generating new productive assets and ensuring access to them in the course of development in building up common resource pools through the development of wastelands and water, and by a policy of tying availability of public funds with the conditionalities of creating rights and access for the rural poor to the common pool resources of water and biomass. Combined with an overall improvement in the availability of water and efficiency of water use along with increased productivity of land and water, conflicts can be minimised though, of course, not entirely eliminated." (*ibid.*:261) This aspect of the approach is likely to spark a lot of discussion, particularly from a gender perspective. For the importance of control over land for gender equality see Agarwal (1998). Also see NEDA (1997).
[7)] The publications referred to contain descriptions and calculations of biomass based power generation, in relation to the power required for lift irrigation that is part of the agricultural system for example.
[8)] In this respect it goes one step further than approaches like those described in Chambers, Saxena and Shah (1989) for example, though many of the individual elements are similar. There is also a greater emphasis on the technological prerequisites in Datye *et al.*'s approach.
[9)] The publications referred to do not discuss these methodologies in detail. For more elaborate treatment see for example Chambers, Saxena and Shah (1989), Shah (n.d).

Elements of Datye *et al.'s* approach can certainly be questioned. However, it makes an in my view highly original attempt to combine the concepts of integrated water resources management, ecologically sustainable agriculture, agro-industrial growth, equity/poverty alleviation/social security and decentralisation/democratisation. It broadens the debate on canal irrigation reform in the following way.

1) It situates canal irrigation reform in a broader rural development strategy, and doesn't look at canal irrigation as a self-contained phenomenon.
2) It links canal irrigation development and watershed development (it takes an integrated water resources management perspective), and links this to decentralised and democratic forms of planning and decision making.
3) It emphasises the importance of water rights (and property rights in resources in general) as central for a development strategy that targets the resource poor.
4) It gives detailed attention to the technological dimensions of the development strategy.

Coalition politics

Despite the statement that (in India) "the policy framework and implementation of the post-Independence programme in the water, energy and infrastructure sectors lack all the components of the policy frame proposed here" (Datye, 1997:266), the approach described above contains no description of a strategy to achieve the policy reform and/or broad-based social activism that is necessary to create more favourable conditions for large(r)-scale implementation of the approach. Are we discussing Utopias?
I don't think so. Interesting about the approach is that it incorporates elements of several other reform perspectives: an emphasis on productivity growth, employment creation, resource use efficiency, and non-subsidised pricing. This implies that it can possibly speak to the concerns of a number of different political constituencies.
This introduces the general question how to build a political support base for policy reform in the irrigation sector. Bottrall (1992) is one of the few attempts that I know of a strategic political analysis with regard to canal irrigation reform in the South Asian context. He argues that

> "there could be a possibility of [an irrigation reform] agenda being incorporated into - and thereby reinforcing - broader-based movements for democratic reform." (Bottrall, 1992:245)

According to him major changes on three fronts are necessary:

1) reduction of the excessive powers of the Irrigation Department and other agencies responsible for
large-scale canal irrigation,
2) the formation of agencies for long-term integrated water resources planning, and
3) launch programmes in regions that were neglected in the past.

He argues that support for such an agenda might be found in different corners.

> "Those currently opposed to the *status quo*, or with good reasons to oppose it, include finance ministries (concerned about IDs' never-ending demands on public funds); politicians and their constituents in regions disadvantaged by present patterns of water development (either through direct damage, as in waterlogged areas, or through

> long neglect, as in tank areas); environmental action groups; local issue-based groups (such as opponents of state water policies in Maharashtra); and non-agricultural water users, including urban domestic and industrial users, who suffer from the absence of efficient methods of inter-sectoral water allocation." (*ibid.*:244)

What Bottrall argues is that political coalitions have to be forged of non-governmental and governmental groups in society to create a demand for reform. He also suggests that the agenda of such a coalition should be broader than the sectoral interest of better management of canal irrigation systems, but focus on irrigation as part of integrated water resources management.

Conclusion: The role of inpim

To conclude this paper I would like to look at the possible role that INPIM can play in an approach like that advocated above.

Let me begin with a sketch of the policy reform situation in the South Indian state where my research work is located. What we have seen in this state is that over the past few years there has been an initiative within the government to formulate a policy for PIM. A High Level Working Group was appointed, which prepared an interim report and later a final report which contained proposals for reform. These proposals were approved in principle, and all the necessary amendments and rules to implement them have been put on paper. A start with implementation was already made by the selection of pilot projects and conducting meetings with farmers (see Box 3). The amendments and rules only needed formal political approval to go ahead. That situation has existed for a year. Up to a few months ago the approval had not come. The momentum that was there seems to be drifting away.

My understanding of this course of events is the following. The policy initiative had a number of different sources. There is a history of management problems in existing canal irrigation systems and general policy declarations that something needs to be done about it. There was a case of a World Bank assisted construction project in which the World Bank had put conditions for policy reform in relation to WUA formation and other items. There was pressure from the Central Government to take initiatives for policy reform. There was the influence of reports on successful experiments in other States which academics and NGOs brought into the debate. And there was a fair number of individuals within and outside the government that had ideas about the changes that are necessary. At a certain moment in time a number of these individuals were occupying positions in the government influential enough to allow the active pursuit of a PIM policy initiative. A working group could be formed, and the process of mobilising support for the ideas started. Why did it stop - hopefully temporarily - shortly before the finish?

The main reason for this in my view is that it was a group of *individuals* that was lobbying for the policy change. When one of them was transferred (for reasons nothing to do with the PIM initiative), the momentum was lost. There was no back up. There were no groups in society that were actively demanding a new PIM policy. There is no coalition of social forces as envisaged by Bottrall that has made irrigation reform an important item on its agenda. When such a support base does not exist, the acceptance of particular policies

becomes a matter of chance and circumstance. And one can wonder, when the policy is accepted, what the commitment to implementation will be.
Here possibly lies an important role for a network like INPIM, and particularly for its national chapters. As an independent organisation an INPIM chapter can play an advocacy role in the reform process. It can document problems in existing irrigation systems and positive experiences with reform, and bring these into the public debate. It can take initiatives to bring together the different stakeholders, and try to identify common agendas. It can organise training sessions and other activities to redirect the professional orientation of engineers to field-level problems. And it can do many other things.

To conclude my paper I would once again like to rephrase the question with which it started, into a discussion question for this seminar.

> *How can INPIM and INPIM chapters contribute to the emergence of an interactive or participatory policy process that provides professional challenges for engineers, that looks at irrigation in the context of IWRM and rural development and that can build social and political networks and coalitions to support irrigation policy reform?*

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