Promoting Good Governance of Water Users' Associations in Nepal

by S E Howarth[1], U N Parajuli[2], J R Baral[3], G A Nott[1], B R Adhikari[2], D R Gautam[3], Menuka KC[3],

Abstract

There is a major emphasis on participatory irrigation management world-wide. This is widely seen as fundamental to improving the performance and sustainability of irrigation, and it has been incorporated in the water resources policies of many countries. Despite this effort and some significant achievements over the past two decades, progress has been less than had been anticipated.

This paper is based on the findings of an action research project[4]into irrigation on 3 schemes in Nepal: one modern jointly managed scheme (Sunsari Morang - SMIP), one older but smaller agency-managed scheme (Bijaypur Irrigation Project – BIP) and one traditional farmer managed scheme (Kamala Uttarbahini - KUIS). In accordance with the irrigation policy, water users' associations (WUAs) have been set up on these projects, but these new institutions have not yet performed as well as had been hoped. There are a number of reasons for this, which were analysed in an earlier phase of this project (Mott MacDonald 2002).

In this phase of our study we have worked in a participatory way in each project to develop a plan for improvement ("diagnostic learning and action planning") and then implemented this action plan through the medium of "water users' schools". These proved to be very popular and successful in developing awareness amongst the farmers and in making the WUAs more active and responsive to the needs of the users. These were effective in building a commitment to participation in irrigation management, an understanding of the issues and ways to solve problems, and ensured that the process of institutional development is embedded in the community rather than being externally driven

Through this process we are developing a framework for promoting WUAs. We have identified six elements which we see as fundamental for this:

- Tailoring methods to local conditions: each scheme is different and needs solutions to be identified individually;
- Organizing our understanding: irrigation systems are complex and multidisciplinary - we need a comprehensive understanding without being overwhelmed in data. The Sustainable Livelihoods Framework is valuable for this
- Working with water users: we need to work with the users to involve them understand their issues and help them develop an action plan. This requires an inclusive and participatory approach
- Investing in Social and Human Capital: through a "water users school" we have helped develop human and social capital and thereby enhanced development of the other capital assets. The nature of this school will depend on the needs of the individual scheme
- Providing O&M for institutions: WUAs will continue to need support
- Having a supportive policy and legal environment: implement policy and laws that enable the WUAs to carry out there function.

Another paper presented to this workshop by our research team describes the process followed in one sub-project. In this paper we present our overall findings regarding promotion of sustainable, well-governed WUAs.

1 Introduction

There is a major emphasis on participatory irrigation management world-wide. This is widely seen as fundamental to improving the performance and sustainability of irrigation, and it has been incorporated in the water resources policies of many countries. Despite this effort and some significant achievements over the past two decades, progress has been less than had been anticipated.

This paper describes a new approach to strengthening Water Users' Associations in Nepal, on three schemes: one modern jointly managed scheme (Sunsari Morang - SMIP), one smaller agency managed scheme (Bijaypur Irrigation Project – BIP) and one traditional farmer managed scheme (Kamala Uttarbahini - KUIS). A central element in this

[1] Mott MacDonald Ltd, Demeter House, Station Road, Cambridge CB1 2RS, UK
[2] Department of Irrigation, Nepal
[3] Development Pioneers Consultancy Service, Nepal
[4] "Guidelines for Good Governance" a Knowledge and Research Study (R8032), supported by DFID and implemented by Mott MacDonald (UK), in association with DPCS (Nepal), through the Department of Irrigation of His Majesty's Government of Nepal

undertaking is getting the active involvement of all water users, working with them to identify problems, derive and implement solutions, and monitor progress. This work was undertaken as part of the DFID knowledge and research programme, and is being implemented through the Department of Irrigation of Nepal by Mott MacDonald (UK) and Development Pioneers Consultancy Services (Nepal).

In accordance with the national irrigation policy, water users' associations (WUAs) have been set up on these projects, or are in the process of being established. The water users were not involved in preparing the policy and may not fully agree with it – particularly as one aim is to transfer costs and maintenance responsibilities to the users. Many, however, do agree with the concept of participation in water management and recognize that it can have significant benefits for them.

After a wider review of the issues on about 20 projects in Nepal and five in China, we selected the three projects and WUAs to work with intensively for about one year, to pilot our approach of participatory diagnostic studies followed by 'water users' schools'. As this was a research study we documented the processes systematically throughout the project, and we are now analysing these findings and observations systematically in order to draw wider conclusions on appropriate methods for promoting sound management and good governance on irrigation systems.

This paper first outlines the findings of the review of irrigation systems in Nepal and then presents an overview of the three case studies before describing the methods adopted in this project in detail. A final section draws together our preliminary conclusions and recommendations.

2 Review of irrigation systems in Nepal

2.1 Development of Irrigation in Nepal

The purpose of the initial review was to gain an overall understanding of different types of irrigation and the problems that they face. This would then enable us to select a small number of projects to represent these different types and enable us to put our observations into context.

Most irrigation in Nepal is farmer-managed: about two-thirds of all irrigation is in small farmer-managed schemes of less than 500 ha. The remaining one-third is served by about 90 projects that individually irrigate more than 500 ha in area and cover a total of almost 300,000 ha (Table 2.1). These large schemes are the focus of this study (Mott MacDonald, 2002), and those reviewed are shown on the map - they were mostly developed by the government but there are a few large farmer-managed projects (with the largest being around 10,000 ha).

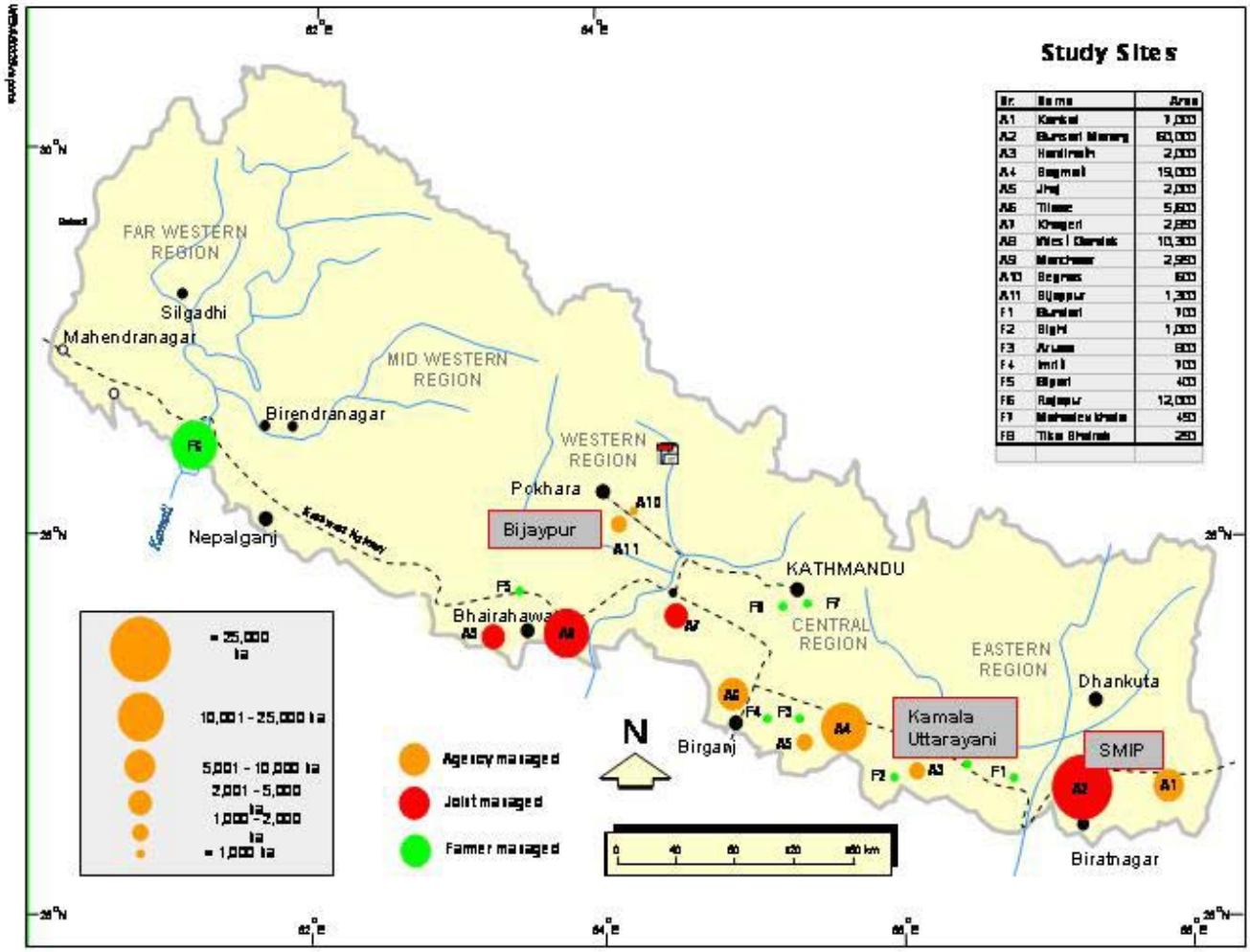
Table 2.1: Large Irrigation Schemes in Nepal

Size (ha)	Nr	Total irrigated area (ha)	Management Type (% by area)	
			AMIS/JM	FMIS
>10,000	7	150,000	92%	8%
5,000-10,000	8	50,000	80%	20%
2,000-5,000	11	30,000	40%	60%
1,000-2,000	16	20,000	40%	60%
500-1,000	50	30,000	10%	90%

Source Mott MacDonald (2002)

Farmer-managed irrigation has been much studied recently and is widely considered to be very effective (eg Lam, 1998). The performance of agency-managed irrigation has generally been weaker, but there are large areas that cannot be developed on traditional small-scale lines, so there has been considerable effort spent on developing large-scale modern irrigation over the past 50 years or so.

There have been many stages of development of irrigation, with both government and private investment, but they can now be divided into three broad categories – farmer-managed (FMIS) joint-managed (JM) and agency-managed (AMIS). WUAs have been very widely promoted and have been established at some stage on almost all schemes where there has been any investment by the Government or other external agencies. Farmers are responsible for FMIS and for aspects of managing JM projects. They have no formal involvement in AMIS, but farmers are usually involved informally.



2.2 Participation in irrigation management

2.2.1 Agency and joint-managed schemes (AMIS and JM)

AMIS were designed for centralised management by a technical agency, but with the formulation of the new Irrigation Policy (IP) in 1992 they are being transferred to the users for joint management (JM). This changes the management structure from one where the central agency manages the entire system to one where autonomous local units (WUAs) manage irrigation at their level. Individual WUAs need to understand how their requirements and activities fit into the whole picture. As some of these schemes are large, a complex structure of WUAs may be needed. Unless there are good communications, they will not be aware of the constraints on supply that the agency faces and they may not understand how different parts of the system need to be managed together. It is not surprising that there have been difficulties in making the management both decentralised and within the technical capacity of user groups.

Furthermore, it has proved difficult to get sufficient awareness of the reasons for transferring management and agreement with the objectives of irrigation management transfer (IMT) which is necessary for making the process acceptable and sustainable. Consequently, the process of setting up joint-management agreements has been slow. Farmers are likely to remain dependent on the Department of Irrigation (DOI) to resolve their problems or cover financial shortfalls

Yet control of WUAs is keenly contested by local 'influentials' both because they seek to be involved in the initial rehabilitation, and because it is important for developing a local power base – leadership of a WUA has a significance wider than irrigation management, and their interests extend beyond irrigation. WUAs do not focus on long-term management and few have achieved a real commitment to it. Many give greater emphasis on lobbying for further external assistance than to acting on those issues that they should implement themselves. However, following the IP, most of these schemes are jointly managed by DOI and user organisations. WUAs are dependant on DOI providing water reliably to the canals which they are directly responsible for, and WUAs are unable to work effectively until this is achieved.

Local government usually has a very small role in management of these schemes, although individuals in the WUA may also be members of the VDC.

2.2.2 Farmer-managed schemes (FMIS)

Most FMIS are at least several decades but many have been rehabilitated in the last 10 years. They are usually more intensively farmed than the agency-managed systems as they developed in response to a need for irrigation, although they are generally on small rivers with insufficient flow for spring rice. Their layout is well suited to decentralised management of essentially independent units; and management relies on labour (particularly off-season labour at times of limited alternative employment opportunities) and local materials, rather than cash.

FMIS can be categorised loosely into cooperative and autocratic types of management – although there is spectrum of management types between these two extremes. The former type is more common on the smaller schemes (particularly in the hills) where old communities developed and continue to manage the project. By contrast, much of the *tarai* was settled by awarding large land grants (*birta*) to favoured individuals; this land was developed and farmed by share croppers but all decisions were taken by the *jamindar* (landlord). Following land reform this system has been abolished, making land available for ownership by small-holders, and some of the irrigation systems have collapsed or are under-performing. Such communities of users did not take over responsibility for the irrigation and were reluctant to become involved in management of the systems. Others have managed this transition in land tenure well, including one of our case studies (Kamala Uttarbahini Irrigation – KUIS). KUIS combined elements of both co-operative and autocratic types on different parts of the system, and this may have been a source of strength at the time of land reform.

Sometimes the traditional organisation on these schemes has been replaced by or incorporated into government-promoted WUAs. These were set up as a requirement for financial assistance with rehabilitation. This rehabilitation remains the focus of activity for the new institution and it has proved difficult to strengthen the WUA sufficiently to take on a larger role. Sometimes they do not even formally take over the scheme on completion of the rehabilitation, so the WUA remains in limbo and without a clear role. Whatever the outcome of the rehabilitation, management often reverts to the traditional system. Yet even if the indigenous organisation was effective before, it may lack the skills or resources for maintaining complex modern structures – particularly if separate schemes are combined or sophisticated headworks built. Such interventions change the maintenance needs from management of large numbers of unskilled labourers, to dealing with cash and skilled labour. Even if schemes were not formally combined, developments on one project can influence another project further downstream. For example, traditional weirs were leaky, letting water pass to downstream users, while modern structures prevent this. This change can create new conflicts between adjacent schemes, yet no forum exists where these conflicts can be resolved.

As Pradhan (2000) observed, traditional irrigation was rarely democratic or equitable but it is not easy to change that – and that may not be a priority for the users.

Village Development Committees (VDCs) are often involved directly or indirectly in management of FMIS. Their formal role has changed recently, with the enactment of the Local Governance Act, but this has not been fully implemented in practice since the local bodies were dissolved in July 2002 without setting a date for elections. The implications of this act are not yet clear, but in the current political circumstances, the role of local government in irrigation (as in other sectors) remains uncertain.

2.3 Relation between type of infrastructure and management transfer

Irrigation schemes are designed to suit a particular management arrangement, and so changes in management can logically be expected to need a change in infrastructure. The sort of changes needed may be quite extensive, and it may not be possible to achieve this. For example, agency-managed schemes are typically designed in a very hierarchical way, with considerable flexibility of water control at higher levels in the system but proportionate distribution at lower levels. This contrasts with farmer-managed irrigation, such as Kamala, where the main system which serves diverse groups of people is managed rigidly but there is flexibility at lower levels. Farmers at the lower levels live in the same villages and are able to work closely together and trust each other to make adjustments to suit individual needs. This approach is also adopted on large farmer-managed irrigation schemes, such as Rajapur (12,000 ha), which are divided for management purposes into much smaller autonomous branch systems (Howarth & Lal, 2002).

Current trends in AMIS and JM are towards reinforcing simplified operation systems at the local level. The first stage of SMIP was rehabilitated as a fully-gated system, but this was changed in the second stage to the 'structured system'. The system has its origin in the long-established *warabandi* system of NE India, where rainfall is low and mono-cropping is usual; this makes the water demand uniform (Berkoff, 1990). However, the model is being challenged even there (Narain, 2003). Furthermore, the users in SMIP have less understanding of the system and the water needs are more variable making it more difficult to apply a *warabandi* system. The users thus make many informal adjustments – and this means that they damage the infrastructure also. This compromises the overall performance of the system. Some modern schemes have been built with a more flexible approach (eg Kankai and Bagmati) which avoided the problems

faced by the *warabandi* system, but this results in a very large number of gated structures and high maintenance costs which the WUA can rarely afford.

However, there are many other differences between AMIS and FMIS so it should not be assumed that approaches which are successful on FMIS can be directly translated to AMIS. For example, the layout of traditional irrigation, such as Rajapur, is more likely to match social and village boundaries than modern schemes, such as SMIP, where canal command areas cut across village boundaries and even individual land holdings. It is interesting to observe the changes that the users themselves introduced at Pithuwa after taking this scheme over from the Government, when they replaced the adjustable structures with fixed ones (Pradhan, 1996).

In the past, it has often been felt that FMIS were inefficient and 'untidy', and many schemes were built over the top of old FMIS without any recognition of the previous system. This approach has been criticised recently in the context of the barrage at Butwal and associated irrigation scheme (Dixit, 1999). This destroyed a functioning scheme for a theoretical but unrealised benefit of increasing the command area and improving performance and equity.

The Sunsari Morang Irrigation Project (SMIP - see below) was built on land which was in a small part irrigated by old FMIS. The new infrastructure was designed to make it physically easier to deliver water to farmers so that they would receive a supply proportionate to the area of their land holdings. However, this has been criticised by those who used to get water from the old FMIS, and they did not operate it as intended.

Transferring management responsibilities should therefore be accompanied by a careful review of the infrastructure – simple rehabilitation may not be sufficient and is often just a carrot to help persuade farmers to take the scheme over. In general there needs to be a comprehensive review of the redesign in order to ensure that it is consistent with the new management system. It is always difficult to get farmers to focus on future maintenance before construction has even started, but there should be a sound maintenance plan prepared in advance to ensure that the can be sustained (technically, institutionally and financially).

2.4 Performance of WUAs and Implications for Sustainable Management

Although there are many successful farmer-managed irrigation schemes, it is difficult to use this experience on new irrigation schemes, and it has even been difficult to support well-established schemes. One reason is clearly that institutional development has been given less emphasis than physical rehabilitation but there are, equally evidently, significant difficulties in setting up and supporting strong, sustainable WUAs.

Our review of WUAs suggested that the following characteristics are particularly important for strong WUAs:

- *Appropriate structure for the WUA.* The format of most newly established WUAs is more complex than traditional systems and is aimed at making the WUAs more democratic. These were mainly designed by outsiders, with little involvement by the users themselves. However, new WUAs are rarely as representative as desired and even the formal democratic procedures are rarely acted on. This structure also has implications for who participates in the institution and how, and on the roles assigned to different stakeholders.
- *Leadership.* Strong leaders are able to promote the WUA both internally and externally. However, there is arisk that they will work as an individual rather as leader of an institution and their actions may reflect their personal relations. Unless there is effective participation, the leaders follow the rules and remain accountable to the general members, they will quickly lose the trust of the membership.
- *Participation.* Users need to understand and be willing to participate in irrigation management to an appropriate degree and at all levels. This includes the extent to which the users are aware of and agree with the application of policy to the local situation; their participation in the management institutions; how comprehensive this is for different sections of the community and different categories of users; and how well this reflects their interests.

  Within the WUAs, there are requirements for regular elections, including quotas for participation by women. These are not often enforced, but even if they were, they might not lead to effective representation of excluded groups, since such people are reluctant to talk openly in public meetings which are dominated (directly or otherwise) by political elites. Other groups, such as some categories of tenant, are also excluded. Sharecroppers, for example, are not eligible to be members even in places where they form a large proportion of the users. In practice, they are often involved on an informal basis since it is they rather than their landlords who are most dependent on irrigation.

- *Clarity of roles.* There is often confusion or disagreement over roles and responsibilities; and they may not suit the local situation (socio-economic situation, type of agriculture, type/scale of infrastructure, water stress, etc). This also applies to relationships and communications with other organisations, including higher and lower levels of irrigation management.

  There has been little awareness amongst users of the reasons for setting up WUAs - often with a lack of understanding of the function of WUAs and unrealistic expectations for user involvement by government. Given this lack of awareness, it is not surprising that few people are willing to accept the role envisaged for them. Most training has been given to committee members and even they have been given little long-term support so few WUAs continue to function effectively after the end of the project. Few farmers believe that they can improve management or want to take over management responsibilities. The objectives of management transfer include improved performance and sustainability but, whilst there is some anecdotal evidence that some may achieve this (particularly where there is strong leadership), there is little documented evidence of any relationship between existence of WUAs and performance of irrigation.

- *Autonomy*. WUAs need the authority and ability to make independent decisions, collect and manage sufficient resources, appoint staff, establish and enforce rules, resolve conflicts (in accordance with local norms), and act in their own interests etc, rather than depend on external sources or influences. They need to make and enforce their own decisions and rules so that they meet local requirements, but this process may need to be externally facilitated in order to avoid merely reproducing local power structures and relations.

  WUAs are usually part of a joint management structure. In order to work in an autonomous way, they need to be given a predictable, planned water supply from the main system. At the moment, and although DOI may strive to achieve this, there is no formal obligation on DOI to achieve a specified reliability of water delivery to the WUA. The WUA have no legal recourse against DOI if they fail to provide water in accordance with an agreement.

  WUAs have limited authority to collect and manage resources. Although there are demands for WUAs to be given greater legal authority for this task, this would create the risk of further abuse and misappropriation of funds by local elites unless financial management systems are improved. Currently VDCs have greater authority for collection of fees that WUAs have, but as they have different boundaries it is difficult for fee collection to be managed effectively by VDCs and they have little incentive to do so.

- *Accountability.* The WUA should be accountable to its members, with clear procedures and rights of appeal. WUAs have rarely participated in a fully accountable way even for management of rehabilitation, and WUA committee members have shown little commitment to taking up their full responsibilities. The GA is intended to be a forum for ensuring accountability, but meetings are rarely held. Registration and renewal of WUAs is also intended to ensure accountability, but this remains a bureaucratic burden (and largely ignored) and has little impact on the general users

- *Transparency.* Transparency is needed at all levels – of information (including communications), procedures, finances, and distribution of water to an agreed schedule. Disputes or distrust over the use of financial resources are common reasons for WUAs to become dormant. Many people do not trust WUAs to operate honestly and transparently. They may even consider them to be less democratic than local government, which has better established procedures in place. Lack of trust is all-pervasive – people assume that WUA executives will steal money – and weak procedures and lack of records make it impossible to prove whether or not this is the case.

It is quite easy to state these issues in general terms, but it is clearly far more difficult to ensure that these conditions are met. The second stage of this project therefore included action research on three projects, with interventions aimed at strengthening users' organisations, with realistic objectives. We intend to use this experience to develop guidelines that can be used more widely.

WUAs have mainly focused on managing irrigation – it is rare for them even to attempt to work as multi-purpose agricultural institutions, despite the potential benefits if they succeeded in diversifying. Diversification is a risky strategy for WUAs and the few attempts to date have not been sustained (Pradhan, 2002).

3 Study Sites

3.1 Introduction

Three projects were selected to represent a range of different conditions. A shortlist was made from those considered in the Stage 1 study on the basis of 8 criteria. The aim was to include schemes that:

- represent a range of management arrangements from fully agency managed to fully farmer managed;

- have an area of more than 500 ha;
- do not have an ongoing rehabilitation programme;
- have cropping and climatic conditions result in a strong need for irrigation;
- are likely to have WUAs and farmers interested in cooperating with the study,
- indicate room for institutional improvement and/or can shed light on elements which are conducive to strong water management institutions, and
- indicate that the study team is unlikely to encounter security problems in the course of its work.

Three projects were selected on this basis: one modern jointly managed scheme (Sunsari Morang - SMIP); one older but smaller agency-managed scheme (Bijaypur Irrigation Project – BIP); and one traditional farmer managed scheme (Kamala Uttarbahini - KUIS).

The following sections describe the basic physical and institutional characteristics of these schemes at the start of the study. Interventions to improve management required a more subtle understanding of the social context, but developing the process for understanding this was itself part of the intervention and is described in the next chapter (section 4.2).

3.2 Sunsari Morang Irrigation Project

3.2.1 Introduction

Sunsari Morang Irrigation Project is the largest in Nepal and was built in the 1970s with Indian assistance to irrigate 66,000 ha, using water from the perennial Kosi River. At that time only the main canals were built and there was no concept of participatory irrigation management. Command area development followed on almost immediately (with World Bank support). This entailed construction of tertiary canals and watercourses, with outlets to serve 4 ha blocks. At the same time parts of the main canals were rehabilitated and the design concept was changed in order to simplify management. It was originally designed as a fully flexible gated system for management by DOI, but this was changed to a 'structured' and 'joint-managed' system. These concepts are important to understanding performance of the project, and are described further below.

There was small-scale indigenous irrigation in parts of the command area, but this just used local streams and was inadequate for the whole command area. Nevertheless, some farmers are dissatisfied with the change as they used to get sufficient water. The new layout also ignored the old canals, as this made it possible in theory to simplify the layout and increase coverage but this benefit has not been realised in practice.

This is a supplementary irrigation project, designed to provide water to complement the unreliable monsoon rainfall. Rainfall, and thus potential benefits vary considerably from year to year. The greatest benefits should be expected in very dry years, but the projects is designed on the basis of providing sufficient water in a 1 in 5 dry year. This inevitably means that there is insufficient water in more extreme droughts which is just the time farmers most need (and expect) it. Such resource limitations are inevitable, but many farmers are unaware of the basis of design and have unrealistic expectations. Farmers' aspirations may also be reinforced by recollection of better times in the past when the population and water demand was lower.

3.2.2 Institutional arrangements

A hierarchy of water users associations has been set up, to suit the requirements of joint management as laid down in the Irrigation Policy. Although broadly in accordance with Ostrom's (1992) principles, this was established in a fairly standard 'top-down' way. Each type of canal has a corresponding type of users' organisation. There are two organisations with responsibilities for management below the structured level - the water users committee (WUC) for the sub-secondary canal (typically 200-700 ha), and the water user groups (WUG) for watercourses (30ha). Higher-level associations have duties for co-ordination with different levels of the project authority for jointly managing the main and secondary canals – these are known as the water users' central co-ordinating committee (WUCCC) and water users' co-ordinating committee (WUCC) respectively. Each layer is formed of representatives from the layer below, and the

hierarchy as a whole has been registered as a legal entity. In practice, the users were not involved very effectively, and they do not appear to understand the role of the institutions clearly.

The WUA has been assigned noble tasks: improving management of water; resolving disputes and conflicts; mobilising resources (cash, kind and materials); and undertaking system maintenance and repair. But they appear to do little in practice, and all activities have been carried out on an *ad hoc* basis (mainly on the initiative of tail-end farmers who are the first to suffer from system inefficiencies, leakage etc).

The WUA are generally considered by the users to be moribund. They have few systems or rules, and those that they do have are not acted on. Using the terminology of Krishna and Uphoff (1999), DOI focussed on promoting the institutions or structural social capital. They gave less attention to developing the shared values and norms of cognitive social capital which are necessary to make the institutions function. The WUA was created on paper and constitutions and bylaws were prepared, but little was done to stimulate the shared values and commitment needed to make the institution work.

3.2.3 Water distribution

SMIP was designed as a "structured irrigation system" (Albinson and Perry, 2002), which is intended to be a simple way of managing large-scale irrigation. The approach is based on a clear delineation between the part of the irrigation system that is actively managed (at various flow rates and water levels) and the part of the system that operates *either* at full supply level (with proportional division of water down to the level at which farmers rotate among their individual farms), *or* is completely shut. The point of transition is referred to as the *structured level*. The government is responsible for the actively managed part of the system down to the head of sub-secondary canals (typically serving from 100 to 1,250 ha). There are no gated structures below this level – all flows are shared proportionately down to the head of the watercourses (30ha) via open channel proportional dividers. The turnouts into watercourses are fitted with adjustable proportional modules (APMs): these are intended to be fully open or fully closed, and when open should deliver water proportionate to the area irrigated even if the watercourse water level varies. SMIP was originally designed as a fully-flexible system, but the structured design was introduced in the second phase because of poor performance of the first phase, This was at the same time as the concepts of participatory management were introduced, although (at least in theory) the new design reduced the requirement for active involvement in management.

The flow into the main canal system is very variable since although the intake is on a very large perennial river there is no weir and thus the level fluctuates both seasonally and diurnally due to rainfall and snow melt. This severely affects the amount of water that can be diverted into the main canal. The upper part of the irrigation system is fully gated so that the supply to each secondary and sub-secondary canal can be controlled by DOI. There is usually too little water for continuous supply to each sub-secondary canal, so there is a system of rotations to ensure that each gets a supply corresponding to its irrigated area. Thus the main system above the head of the sub-secondary canal (which is the formal interface between DOI and the WUA) needs to be fully regulated and actively managed. To cope with this situation, each sub-secondary canal receives water for alternate four-day periods (although this may be varied in practice). Informally, the interface for managing water distribution is at the head of the secondary canal since the WUCC makes the key decisions regarding water-sharing between sub-secondary canals. However, DOI remains responsible for maintenance of the secondary canal.

Central management of the main system works relatively well at SMIP at present and ensures fairly reliable and predictable flow into the sub-secondary canals. However, the situation may deteriorate as larger areas are rehabilitated and competition for water increases. There are already problems of communication as it is such a large system, so that users may not be aware of the reasons for canals being closed or gates adjusted. Users are familiar with the standard schedule, but there may be unexpected closures due to rainfall or sediment load in the river which encourage farmers to steal water.

More serious problems occur at a mid-level in the system: there are major deviations from the schedule below the sub-secondary canal head. The flows into some tertiary canals may be adjusted illegally by individual users and may greatly exceed that designed, and there may be additional illegal direct outlets, so that much less water reaches the tail of the sub-secondary canal. As the sub-secondary canal is below the structured level and intended to be fully automatic, the management organization (WUC) has a limited role and is quite weak. It is unable to police the canal and prevent illegal offtakes and checks in the canal – it has inadequate legal authority and little incentive to carry out this task.

The flows into the head of the watercourses are thus not at all equitable, and some face severe water shortages. However, management within this lowest level in the system is slightly better. WUGs were set up to manage flows within a watercourse, since some active management is needed for opening and closing the APMs. It is interesting but not surprising that, of those studied, it is the watercourses which have the greatest shortage, such as T3-4, that have developed the most effective organisations. Such WUGs rarely act in accordance with their constitution or by-laws but may be effective on an informal basis. Elsewhere the WUGs are dormant.

3.3 Kamala Uttar Bahini Irrigation System

3.3.1 Introduction

Kamala Uttarbahini irrigation system nominally serves about 500 ha on the edge of the *tarai* adjacent to the perennial Kamala river. It irrigates what used to be a *birta* landholding granted some 50 years ago. The land was jungle at the time, and was cleared and irrigated by workers brought in by the landlord. Through a gradual process of land reform, immigration and settlement, it is now a densely populated smallholder irrigation system. Irrigation institutions have evolved to manage the system through these fundamental changes. At first they were informal but had strong powers to manage the system and enforce its rules. More recently they have been formalised and registered but paradoxically have lost some of their power to control the system. Nevertheless it continues to function and most farmers are actively involved in and benefit from the system. A much larger irrigation system (25,000 ha) has been developed over the past 30 years by the government immediately downstream, and is now in the process of management transfer.

It is conveniently located on the main east-way highway, giving it access to markets, some opportunities for local off-farm employment and easing seasonal migration opportunities. Although most of the community are immigrants to the area and came because of pressure on land in the hills, this land too is now over-populated and most farmers depend to some extent on non-farm income.

3.3.2 Institutional arrangements

There are two levels of institution, one for the main canal, and one for the 10 branch canals. Each branch canal (irrigating 20-100 ha) is managed by an 'in-charge', some with one or two assistants. Each in-charge and, in the case of large branch canals, one or two others are members of the main committee. The main challenge to management is to capture water from the river. The river is in a wide cobbled-filled bed, so it moves in both level and location, requiring large numbers of labourers to work to divert water into the canal. Work is required before each crop season and often several times during the season, as floods can destroy the temporary intake. There are times when there is a shortage of water in the canal and thus the committee must be able to allocate water between the branch canals and ensure that those who steal water are punished. The management of the branch canals is the sole responsibility of the branch 'in-charge'.

This structure is simple, and has developed to suit the tasks required. There has been a more recent attempt to impose a standard WUA, which was registered with the District authorities but this was done as a bureaucratic requirement to ensure external financing for some improvement and has had little impact. Key features of the actual management system are:

- Strength and authority of leadership, even though not usually democratically elected.
- Continuing ability to manage large numbers of labourers (*urdi)* to maintain the intake which is the most critical communal challenge facing the system. This is a major strength, since without this there would be no irrigation system, but is facing challenges now.
- a system of sharing water at times of shortage – not in a formally documented rotation with strict order and duration of irrigations, but more as an understanding and agreement of how to resolve the issues as they arise. This depends on the authority of the branch and main canal leadership, and is flexible to cope with differing needs (due to soil type, crops, topography, rainfall etc), with norms established when community cohesion was greater.
- Disputes and penalties. There are penalties for failing to contribute labour for maintenance and for taking water out of turn or from unauthorised locations. Earlier these were considered very onerous and infringements were rare as the formal punishment was strictly enforced and accompanied by social ostracism. Now infringements are more common, and not consistently enforced. Defaulters may pay the fine more as a fee for obtaining water when they need it than as a punishment.
- Procedures are simple and understood for labour-based management. Management of finances is however, more contentious and leads to distrust in the WUA

It relies more on strong cognitive social capital, than on formal institutions. This approach does face many challenges – due to migration, changing social norms (such as the *dalit* movement), etc. Although the institution has so far been sufficiently robust to withstand these, they were aware of growing weaknesses and were enthusiastic in taking part in our study. We examined the nature of these challenges and helped the users and WUA to tackle them during the second stage of the study (section 4).

3.3.3 Water Management

There is no permanent intake and several different arrangements have been made at various times. There was an attempt to make a single reliable intake during rehabilitation under the Irrigation Sector Project (ISP) in the early 1990s but this was not successful. Thus the situation is very fluid and the monsoon may cause major changes to fundamental features of the river, necessitating changes to the location and layout of the intake. A key task of the management institution is to plan and implement the necessary changes each year. If this is not done well, the system could totally fail to supply water. The WUA thus has significant responsibilities, which require skill and imagination to solve. They may involve technically more sophisticated tasks than those required of WUAs after management transfer (such as at SMIP). Conversely it is a small scheme and thus a simple structure of WUA is sufficient.

Operation and maintenance of the main canal is the responsibility of the main committee. At times of shortage the branches are divided into two groups and irrigated alternately. It is not possible to allocate water very accurately: some permanent structures were built recently to help with this but they do not divide water proportionately (nor measure it) as there is insufficient head available. The allocation is not equitable – crop water requirements vary, and different crops are grown to suit availability of water in different parts of the system. This can be contentious, as farmers monitor the situation closely at times of shortage and no accurate system is possible. Use of the new structures gives the WUA some help in sharing water but more depends on the credibility of the WUA to enforce the rotation durations and prevent disputes. This indicates that there is a higher level of cognitive social capital than at SMIP. If water is severely short the main committee organise farmers from the whole command area to work at the intake to augment the supply at the system. Farmers who are facing water shortage may request the WUA to arrange this.

Water sharing between farmers along branch canal is even more subjective. Variations in topography make water sharing difficult to manage objectively; some land is difficult to command without checking the canal or using pumps, and water requirements vary as the soil types change significantly towards the tail. There are nominally agreed rotation schedules, but it is difficult to find instances of these being followed rigidly in practice. Instead, the branch 'in-charge' makes an informed judgement of the best allocation at the time and may adjust the rotation accordingly. Given the state of the infrastructure and the variability of water requirements this may be the simplest approach. However, his judgement may take account of an informal system of priority of rights for different users – recent immigrants to the area, at the tail of the system may have secondary rights to water as they have not contributed so long towards development and maintenance of the system. As these are at the tail-end, are ethnically distinct and generally poorer, this approach appears rather inequitable.

3.4 Bijaypur Irrigation Project

3.4.1 Introduction

Bijaypur Irrigation Project (BIP) is a small project serving around 1,000 ha in the hills and lies alongside the Pokhara - Kathmandu Highway on the left bank of Bijaypur River on the outskirts of the Pokhara valley. It was initiated around 200 years ago, but has been upgraded and extended several times – most recently in 1983 although there has been continuing small-scale Government investment on maintenance and minor improvements since then. It is fully agency-managed but a WUA was recently set up with a view to management transfer. The water source is the small but perennial Bijaypur *khola*, which can be augmented via a link canal from the Seti River.

The main canal passes through an army barracks, which uses some of the water in the canal for internal consumption and vegetable production. The command area lies with the boundaries of the rapidly urbanising Lekhnath municipality which means that many residents are not formal users of the system although they may make occasional use for washing or bathing, and they may pollute the canals. Urban waste blocks canals and causes other problems at the tail of the system.

3.4.2 Institutional arrangements

A WUA was formed in 1995 but quickly lapsed; it was reformed in 2001 and registered in District Water Resources Committee with a standard constitution to suit a hierarchical organisation. There is a general assembly (GA) with one representative for each 200 ha of irrigated land. The main committee has responsibilities for the main canal, 4 branch committees look after the four branch canals; *toli* committees are the lowest level and cover the sub-branch canals (typically 10 ha). As the WUA is new, it nominally complies with the provisions of the irrigation policy for women's participation. There is provision for one male and one female member per household and two women have been elected on to the main committee.

Since the project has not been handed over to the users, the WUA does not have formal responsibilities for maintenance. It has however, been active in assisting DOI in planning maintenance, and it has also mobilised local labourers to provide unpaid assistance for emergency repairs (a perennial requirement for the main canal which passes along an unstable hill slope. The WUA also undertakes maintenance as a contractor to DOI, acts as a line of communication between DOI and the farmers, and assists in managing water distribution and resolving conflicts related to this.

DOI retain responsibility for management of the project and employ eight *dhalpa* who manage the canals and structures. These *dhalpa* are formally responsible to the district irrigation office in Pokhara but co-ordinate directly with the WUA or individual farmers on a daily basis. The budget expenditure by DOI is less than Rs 100 per ha on average over the last seven years, and this is mostly spent on paying the salary of operational staff.

3.4.3 Water distribution

With the combined sources of water in the Bijaypur and Seti rivers, there is an adequate total resource, but the main canal passes through an unstable section of the hills and cannot deliver the design discharge. There are also problems with the quality of Seti water, so that is only used at times of greatest shortage.

There are four branch canals off-taking from the main canal. The distribution of water between branch canals is carried out by *dhalpas.* The basis for water distribution is area to be irrigated, availability of alternative sources and demand of the farmers. This flow is controlled by gated head and cross regulators at each bifurcation. Almost the entire length of the branch canals is lined with stone masonry and is aligned on a ridge irrigating from both banks. Each branch canal feeds several sub-branch canals and direct outlets.

Sub-branches are earthen canals and face significant water loss. They are managed, in practice, by informal groups of farmers. As there are no dividing structures within the sub-branch canals, water management is *ad hoc* and is not arranged in the same way in all sub-branches. There are also some gated or un-gated piped offtakes - locally known as *pyans*. There are also many obstructions (known as *thel*) in the canal to raise the water level to command flows into the *pyans*. These *pyans* and *thel* are an important but unofficial feature of water management of BIP, which cause many problems to downstream farmers.

The operation of headworks, sand traps and branch canal gates is done by the *dhalpa*s, but farmers operate structures within the branch canals. Farmers may have some informal discussions with respect to the date of planting and planning distribution water for irrigation, but formal rotational practices are lacking and there are often conflicts during paddy transplantation especially at middle and tail parts of the canals. An interesting feature of this project is the system of *panibause* who form a well-armed labour force dedicated for providing water for their employers. They are employed individually by small groups of farmers, but generally only the richer farmers can afford them. This system thus reinforces the prevailing *might is right* principle of water management.

Maintenance of both the headworks and the main canal is quite demanding. The headworks were partly washed out a few years ago and the main canal often breaches – both requiring occasional emergency maintenance. But due to delays in budget release such emergency works cannot be done entirely by the government budget, and the farmers have become active in initiating such emergency maintenance works. Routine maintenance is carried out during canal closures each *aunsi* and *purne* (new and full moon), which are days when ploughing is traditionally not permitted. Such routine maintenance is mainly concentrated at low levels in the system - cleaning silt traps and small channels - by voluntary labour (known as *jhara)*. The mobilisation of *jhara* is based on the household, irrespective of the area of land cultivated.

4 Approach to Institutional Development

4.1 Introduction

It is clear from the description above that irrigation is not being managed well. However, this simple description does not reveal the subtlety of different attitudes towards irrigation, nor the power relations which control it. In the second stage of the study, we sought to understand this complexity, with a view to strengthening management.

In this second stage, we tested an alternative approach to making irrigation institutions more sustainable, with a better distribution of benefits. A central element in this undertaking was the active involvement of water users in the development of these approaches. This was promoted in two parts.

The first part of the intervention was a diagnostic learning and action planning stage, in order to understand the various interests as highlighted above. Key features of this stage are to:

- Engage with all categories of water users, including all parts of the system, male and female, direct and indirect users, landowners and landless;
- Provide opportunities for expressing divergent views in informal settings;
- Understand the problems of the system from the perspective of these users, and in the context of their livelihoods, which involve many other issues as well as irrigated agriculture; and
- Develop an action plan, which aims to resolve these issues.

The second part was to run a series of "water users' schools", which provided a wide range of water users with the opportunity to discuss these problems and develop potential solutions. In the course of these schools they also developed links with outside agencies and stakeholders who should be able to help in supporting the users in many ways. These schools were run for one morning per week throughout the cropping season so that the participants were able to work through the problems as they occurred and develop their own solutions. The participants included both executive members of the existing water users' organisation and ordinary users, so that the solutions could be introduced into the WUA.

4.2 Diagnostic Learning and Action Planning (DL/AP)

4.2.1 Methods

Large scale irrigation poses great challenges for participatory studies. There are large numbers of stakeholders and many are not locally resident or only occasionally live in the area. Not all have a long-term interest in irrigation – sharecroppers may change each year. Many people use canal water for other purposes (such as watering livestock) or are affected by the use of canals (for example, for access or grazing along canal banks, or due to the influence of canals on groundwater levels and quality).

We used a number of techniques, aimed at engaging as wide a range of primary stakeholders as possible and gathering sufficient knowledge to plan the WUS, on the understanding that gaps in knowledge would be filled during the WUS or even later as both sides gained confidence in each other. After an initial reconnaissance and discussion with the WUA to understand the irrigation layout and settlement pattern, the total system area was divided into hydrological units of about 30 – 50 ha together with the villages where the farmers of this land lived, as this was felt to be the largest number of people who could reasonably be covered at a time. In some villages up to 50% of the population was found to be landless, but many of them are involved in irrigated agriculture (they may have close links with particular landlords, but in general they are not restricted to a particular watercourse command area).

We used well established PRA principles and techniques (such as those outlined in the IIED Participatory Methodology Series – Pretty et al, 1995, and the FAO SEAGA Guidelines – Jordans, 1998), with minor adaptation to suit the requirements of large scale irrigation in Nepal. We coined the term DL/AP in this project to avoid stereotyped application of methods used in earlier projects

There were four overlapping stages to the fieldwork:

- Introductory visits,
- Reconnaissance and mapping
- Small group meetings, and
- Feedback and verification meetings.

We developed our methods slightly as we worked through successive projects. The following description is thus a generalised synthesis of these methods. The various steps are described in greater detail in Gautam, 2003.

The introductory meetings were a very important part of the process. They were essential for building rapport with the community and ensuring that both the existing WUA and some ordinary farmers understood the objectives and approaches of the project and were willing to participate in it. This was done in two parts – an initial visit to the WUA to ensure that they were willing, in principle, to participate. In some cases more than one visit was necessary, as there have been many attempts at institutional development in some of the schemes and we often had to overcome a sense of resigned cynicism before we could get down to details. Following a successful outcome to this visit, we collected whatever secondary data was available, including maps and reports, so that we could prepare ourselves for the fieldwork. The next visit involved a larger general meeting to which all farmers were invited, during which we explained and discussed the programme with a larger group of stakeholders. This meeting concluded by preparing a plan for the fieldwork, including identifying the locations and participants for the initial meetings and activities

The general meeting led directly on to the reconnaissance and mapping stage, during which we aimed to get a general overview of the system by brief walks along some canals and preparation of maps. We asked a group of farmers to prepare a map showing the canal system and village, either as a sketch map on paper or on the ground using stones, chalk or marks in the soil. We asked them to do this without reference to topographical or cadastral maps, as the main purpose of this map was to understand irrigation in its social context, and to lead on to discussion of the system and its problems. An important requirement was to understand who is involved in the system including, for example:

- People who live and farm locally
- Short term tenants (either in the village or nearby)
- Local farmers who normally reside in adjacent towns
- Absentee landlords
- Landless

We followed this mapping with preparation of household lists and collecting some basic information on household composition, education and land. This was a lengthy and quite difficult exercise, and sometimes rather contentious. In some cases we did not attempt to collect details of landholdings to avoid these problems, but just recorded whether or not people had land. Once we had a stakeholder list we could do a well-being ranking exercise so that we could categorise stakeholders for the next stage of fieldwork.

Well-being categories
(as defined by tail-end stakeholders on KUIS branch 5)

Very poor:	Landless Uneducated House on *ailani* land Agricultural labourer No livestock	*Poor*:	less than 6 *katha* Sharecropper small house on own land food secure 4-5 months own hand pump
Medium:	land up to 1 bigha Sharecropper Laborious Food secure 6-9 mths	*Well-off*:	Own farm Laborious in farming Food secure 12 mths less land than highly well-off
Very well off:	Large landholding Son has a shop Government job holder Educated Food secure for whole year		

We then worked with relatively large informal groups to prepare general information such as seasonal calendars, a mobility map, Venn diagrams to understand institutional relationships, and transect walks. Our team worked together on the mapping, but then divided up into three groups (social, engineering and agricultural) for the remaining activities.

For other activities, small groups were set up to look at specific issues from the point of view of different social or interest groups. These groups were stratified in various ways according to the objectives, but generally by well-being and gender. Techniques such as water use matrix, gendered task analysis, time trend analysis, a timeline for the system and focus group discussions were used in these groups.

We used local social mobilisers and field assistants to help in the fieldwork and to encourage local people to participate in these exercises. Social mobilisers were given an allowance roughly equivalent to the local agricultural labour rate, but we did not given any compensation to farmers or other participants – apart from occasional cups of tea or light snacks. We tried to keep the meetings as short and interesting as possible, using pictorial techniques wherever possible. All observations were recorded on large sheets of paper, which were later given back to the community. Some secondary information (such as meeting minutes) was also collected during this field work, or from the WUA.

The findings from this study were presented back to the group as a whole, in an 'open day' during which our materials were presented and people invited to make their observations or corrections[5].

We then repeated the exercise in the next canal, until we completed a larger hydrological unit (typically 120-150 ha) which was the level we proposed to intervene at in the water users' school programme. In the case of SMIP the field work was done by watercourse (25-30ha), of which 3-4 formed one tertiary canal.

We then called a meeting at the larger canal level, during which we did a simplified PCPS[6] exercise in order to prepare an action plan which would form the basis of the issues to be discussed in the water users' schools. We grouped areas together because although different parts of the same project may have slightly different requirements there is a lot of overlap, and they would be covered by a single WUS. This ensured that the stakeholders could have a real input into planning without the process becoming too drawn out and repetitive.

We concluded this phase by writing up our findings as a concise report. The sustainable livelihoods framework is a valuable for pulling this information together in a coherent and useful way - this is described further in section 5.3.1. We gave a copy of the report to the WUA for their own records, but it should be noted that this phase of the study was not aimed at gaining knowledge for its own sake. It was primarily a way of engaging the users and planning the WUS. We perceived DL/AP as part of the capacity building and empowerment process so that farmers felt part of the process rather than be regarded as providers of data.

4.2.2 Practical Problems and Solutions

Although the techniques are not in themselves new there are many difficulties in applying them in the field particularly in the context of large scale irrigation:

- It is not possible to involve all people during the familiarisation meetings, so the DL/AP team have to explain the project frequently;
- The study needs to be timed to suit the planning of a water users school which will run during a cropping season, but this may be a busy time when it is difficult to get active participation by farmers
- Social, administrative, topographical and hydrological boundaries rarely match, so social and resource mapping and preparation of stakeholder lists is very difficult.
- Land tenure patterns are often complex and people are reluctant to give reliable data. They may be suspicious of the motives for collecting data (perhaps worrying about Irrigation Service Fee (ISF) payments) and they may be concerned about the legal implications of tenancy arrangements.

[5] In some cases this meeting was combined with the tertiary level meeting (see below)
[6] Problem census-problem solving technique

- Farmers are often more concerned with attracting investment for infrastructure than with institutional development, particularly in the early stages of the study. This is a particular problem when discussing the problems which they face with the infrastructure.
- Local power relations affect attitudes towards the study, and influential individuals who felt that their interests might be compromised by the study sometimes became over-dominant and tried to divert attention to factors outside the village (often management of the main system by DOI).

These difficulties could easily undermine the whole approach so it was important to take very careful account of them, and adopt a flexible approach whilst remembering the overall objectives of the study:

- There should first be a transect walk with key informants to become familiar with the local context as well as the boundaries of the social and hydrological units – it may be necessary to do further or more detailed transects, and possibly with other stakeholders.
- Sensitive issues such as well-being should not be investigated until after the transect walk and mapping to allow time to build up trust with the community, and to clarify the purpose of the ranking (eg that it is not going to be used for ISF assessments, etc.). Participants gained some ownership of the well-being exercise by identifying their own indicators (rather than using a ready-made format of indicators).
- Land ownership data is sensitive, so it is better to concentrate initially on identifying the stakeholders according to land tenure and well-being status, without being too concerned about actual land areas. It is more important to identify all categories of users, than to collect all details of each individual - further details can be collected later once the team has been able to build better rapport with people, or even later by the WUA itself once they recognise and accept the need for this.
- Other household data is usually less sensitive, but it can become tedious if too many variables are collected in the household profiles – people can lose their enthusiasm if this process becomes too lengthy.
- Sometimes too many people want to join the transect walk. This can hamper progress by making it difficult to talk meaningfully and the main transect walk should be done with a small number of knowledgeable key informants. Sometimes it is useful to look at specific problems with different groups later.
- Breaking the programme up into a series of short exercises with different small groups, with careful facilitation, helped to keep the discussions focused on our wider objectives.

In all, the DL/AP process was liked by farmers as they were entirely involved in the whole process and remained enthusiastic throughout and they did not feel the frustration that they had with past more 'extractive studies', although it still required skill and sensitivity to retain their interest throughout the process.

It was always important to remember that the tools were a means to an end – for involving people and finding out information. It was not the map itself, for example, that was important but the way that preparing the map involved local people, made them feel that their knowledge is respected and important, helped in building our understanding of the system, and enabled us to plan the WUS curriculum.

4.3 Water Users' School

4.3.1 Approach

Water Users' Schools were envisaged as an entry point activity for involving local stakeholders in improving management and governance of the irrigation system. More specifically they were expected to:

- Increase the practical knowledge of users in sustainable irrigation management, by helping them to identify and solve problems themselves
- Help users and WUAs to identify and introduce practical measures to promote good governance in the WUA and their sub groups

- Increase participation of vulnerable stakeholders such as female-headed households and landless farmers in irrigation management
- Encourage links between water users and WUAs and other local institutions and agencies
- Make users more aware of the role of Government, and the relevant policies, legislation, rules and regulations regarding water management.

It should be stressed that they were intended to strengthen the WUAs and not to work as a substitute for them. They were only run for a short period (one or at most two seasons), to help the WUA to work effectively and in the interests of all stakeholders. This accounts for the intensive nature of the WUS and does not imply that the WUAs will need to continue to work on the same basis once the WUS are complete.

The concept of a water users' school is not a new one, but it was adapted from the farmers' field school approach (FAO, 2001) with some key modifications for this project. The fundamental approach is one of learning by doing. This has previously been used in integrated pest management schools (1995 onwards), and later adapted to irrigation through the on-farm water management (OFWM, in 1997) and integrated crop and water management (ICWM, in 2002) programmes run through various DOI projects – particularly the Nepal Irrigation Sector Project. These all aimed at developing skills amongst the farmers, through an effective programme of transfer of knowledge, using adult learning techniques.

The WUS in this project differed in some key respects from previous FFS. They

- Were planned on the basis of the DL/AP studies in each project, so that the approach and curriculum was tailored to local needs
- Required purposive selection of participants to ensure representation of all stakeholder groups
- Included group activities (for institutional development, management of canals etc)
- Aimed to enable participants to identify, understand and solve problems, not teach them solutions – the WUS is based on the concept of problem identification and solving, rather than transfer of knowledge
- Specifically aimed to disseminate knowledge and findings to non-participants, using the concept of Minor Schools, which also helped ensure a cyclic learning process.

The "catchment" for each WUS was a sub-unit within the sub-project irrigation system identified during the DL/AP, and the WUS provided a forum for weekly meetings in the field, to solve problems as they occur. It ensured a basis for free discussion of the issues and enabled the stakeholders to get to know each other better and understand the problems in a non-threatening environment. Field activities were chosen so that the participants would learn about the most important features of their system and would be helped to understand and solve problems about these.

Although the emphasis was on the participants working together to solve problems of managing the whole unit, rather than to learn individual skills, some agricultural sessions and a demonstration plot are included so that they could learn agricultural techniques.

Each school was managed by a locally-based NGO. About 25 participants were selected by the community using criteria agreed during the diagnostic phase to be representative of all groups, and including some committee members of the WUA. We aimed at 30-50% participation by women, with each 'well-being' and ethnic group being represented

proportionately, thus ensuring a significant involvement by landless farmers. The school was held at a central location and there was a small field plot (0.2 ha) associated with it.

The main WUS was supported by three or four minor schools – one in each of the communities studied separately at the diagnostic study phase. Members of the main school acted as resource people for the minor school, which were run on the following day. These schools helped to develop the shared understanding of the issues and potential solutions, and also to disseminate the outcomes of the major school.

For each issue, the WUS participants were divided into smaller groups to discuss it from their different perspectives, and then report back their observations and findings to the WUS as a whole. This process was supported by specialist facilitators and technical resource people. Where possible resource people were selected from agencies with whom the WUA needed to develop better linkages, such as irrigation or agricultural extension offices. These resource people were more used to traditional training techniques and therefore had to be made fully aware of and in agreement with the approach. In some cases they were involved in the diagnostic phase as well, but in others they were briefed subsequently.

4.3.2 Achievements – self evaluation

We included a participatory self-evaluation in the curriculum. One of the first sessions involved the participants evaluating their existing system – both the performance of their institution and the standards of water management, using criteria which they first decided amongst themselves. They then repeated the process at the end of the school, enabling them to assess the changes over the season. This was useful for several reasons

- It introduced the concepts of monitoring and evaluation
- It enabled the participants to understand the impact of the school objectively
- It led directly into a discussion of the issues which were identified as useful criteria

Although the process was not objective, and there were biases because people were likely to state that conditions have improved, it did enable people to look at the process in a rational and impartial way. The concept of indicators was a difficult one to introduce, so the list of indicators had to be modified slightly for the post-evaluation. Results for the head WUS at KUIS are given in the box below.

Indicators	This Year	Last year
Ability to divert more water in the canal from the river.	2	1.75
Ability to protect the canal from uphill stream's damage by diverting water in proper drainage	1.25	1
Equitable water distribution	4.25	2.75
Ability to make users participation in O&M / *urdi*	2.25	1.75
Clarity and acceptance of rules and regulation	3.5	2.25
Ability to implement the decision	3.25	2
Opportunity to take part in WUA activities openly	4	2.25
Record keeping ability	3.75	1.75
Communication ability	4.5	3.25
Ability to enforcement of the rules and regulation.	2.75	2
Co-ordination and linkage ability	2.25	1

In some areas the improvement was small, but much greater changes were observed in other areas. It was an exceptionally difficult year in terms of the physical conditions in the river for diverting water, and thus only a very small improvement (15% change in score) was observed in this. However, they made good progress (50% increase) in sharing out this limited resource in a more equitable way. The ability to manage large numbers of labourers (*urdi*) for maintenance of the intake is a long-established feature of this WUA so again there was a small change (30%) in this, but they made greater improvement in procedural aspects of resource mobilisation – for example developing and enforcing rules (50%) in an inclusive way. There are an increasing number of women-headed households in this area, as a result of seasonal male migration. Before the WUS women were excluded from both decision-making and participation in O&M which meant that they were subject to penalties and fines. As a result of the school, the

committee of the WUA was informally enlarged, pending elections, with five women, and women were included in the General Assembly and permitted to take part in routine O&M activities

We also undertook a 'community impact assessment study' to assess the impact of the school more widely than on the direct participants. This concluded that the WUS had:

- improved irrigation management at BIP and SMIP, particularly by improving standards of maintenance, and helped the WUA at KUIS to cope better with unusually adverse river conditions, by developing better procedures and involving women in a more substantive way;
- a positive impact in the way the various committees worked, and in the quality of the rules and regulations

There was a major impact in terms of the awareness of the participants in a broad range of issues related to irrigation management, but of course we are mainly interested in moving beyond awareness to actions. We did observe some significant improvements:

- **BIP**: sub-committees were formed to manage sections of the branch canal; procedures and record keeping were improved; ability to mobilise farmers for collective work was increased; and leadership became better motivated to manage the system.
- **SMIP**: responded to pressure from members to organise some meetings at WUG and WUC level, but most people felt that new elections are essential to give the WUA credibility; as this could not be arranged because of the political situation, they relied on more informal arrangements for improving management.
- **KUIS**: branch committees gained status and became more active and responsive to farmer needs; the main committee improved its procedures and was able to mobilise exceptional resources for maintenance; and women were included in decision-making as well as being permitted to participate in field activities (previously they were obliged to pay penalties).

4.3.3 Comments on the Approach

The WUS proved to be very popular, and appeared to have a very beneficial impact. There are, however, several areas where further comment is appropriate

(i) Participant selection

It is important that participants are chosen carefully, to ensure that all sections of the community are represented. We developed a series of criteria for selecting participants, but special care is needed to ensure that some groups are not omitted – for example women from certain ethnic groups. Landless men were also generally too busy to attend on a regular basis, but we were able to get participation for specific sessions – so the curriculum design needs to take this into account. The status of participants within their household is also important, and some household heads sent children to participate but were not willing to act on their learning. The mix of 'ordinary farmers' and WUA members is important, in order to ensure that views are both understood and acted on. It is, however, not possible to come up with rigid selection criteria: it is more important to get 'buy-in' to the concept of the school and to be flexible during the first few sessions when some people will drop out and others will join. The criteria we adopted are given below.

CRITERIA	REQUIREMENT
Total Number	25 to 30 participants
General Personal Characteristics	Interested, self-motivated, respected, committed to participate in the school for the full duration of the WUS, active in farming/agriculture, willing to disseminate what they learn
WUO Office Bearer	between 6 – 9 out of the total number of participants; they should make up no more than 1/3 of the total number of participants
Position on Branch/Tertiary canal	number of participants from each cluster should be proportional to the number of households in each cluster (as defined in DL/AP, eg watercourse)
Age	aged between 22 – 60 years
Ethnic Group	number of participants from each ethnic group should be proportional to the ethnic distribution of households in each grouping by cluster
Women	minimum 10 women participants in each WUS; number proportionate by cluster and well-being category
Well-being Category	Representation proportionate to number in each well-being category.

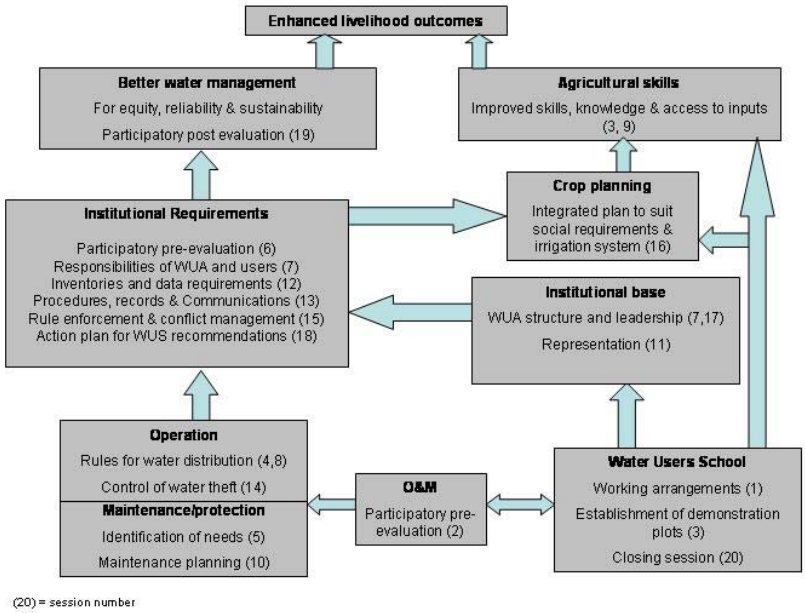
It is important also to remember the purpose of wanting wide participation – ultimately we want the WUA to be inclusive (reflecting the interests of all stakeholders) and we believe that it will not be sustainable if it is not. This will not be achieved if we have to coerce people to participate against their will. We need to encourage all categories, by making the WUS serve their interests, so that they see the benefit of participating.

(ii) Timing of WUS sessions

The timing of the WUS and duration of each session is difficult to optimise. We wanted to run the schools throughout the main cropping season, which meant that we asked people to devote significant time to the WUS during the peak agricultural time. Some people requested that we should run the school during the winter when there is some agricultural activity but it is less intensive. However, this is a time of year when many people (including some of those we most wanted to help) go elsewhere in search of work. As a compromise, we adjusted the timing of some sessions – those during paddy transplanting at some schools were kept shorter.

(iii) Curriculum

There is scope for refining and improving the curriculum. This was based on the findings of the DL/AP, but this still needed to be translated into a curriculum. In some aspects, we anticipated the methods required by the solution and ran sessions, for example, on improved record-keeping and on communications. We then found that these sometimes duplicated aspects of sessions on maintenance which concluded that there needed to be better communication and record-keeping for organising maintenance labourers. A more rigorous 'end product' based curriculum (ie recognizing that, for example, rules and procedures are a means to an end and should be discussed in the context of the required output) would have avoided this problem. This is illustrated in the figure (for SMIP).



(iv) Understanding of the approach and facilitation skills

The approach relies on well-motivated facilitators, with a good understanding of the approach and objectives as well as strong facilitation skills. This is quite a demanding requirement and means that everyone involved in the process needs some degree of re-orientation. This may take considerable time. We allowed for this by developing the study programme itself in a participatory way, initially with the central study implementation team, and then with the locally-based NGOs.

We were fortunate in that there are many experienced IPM trainers in many parts of Nepal who are able to run FFS effectively. However our objectives and approaches were subtly but significantly different and it took some time to reorientate them to the requirements of a WUS. Nevertheless the network of professional IPM trainers and more junior 'farmer trainers' who have 3 months training is an invaluable resource. Where such skills were not so readily available, we used local NGO personal who had developed comparable ability in facilitation through other work.

Despite the large number of training manuals, there are still some gaps in the availability of suitable training materials. Materials from other sectors (particularly agriculture and forestry) should be drawn on to adapt the more conventional irrigation training guidelines to suit this new approach.

(v) Minor schools

Minor schools are an essential part of the programme, but tended to be misunderstood. The choice of nomenclature 'minor' proved to be unfortunate, and a suitable word should be adopted so that participants do not regard them as

inferior in any way. The 'major schools' are longer and more comprehensive, but they also require a greater commitment by the participants to spread the word, to discuss the findings and to facilitate the minor schools. The minor schools are essential for ensuring that the views of all are understood, including those who are unable to make the commitment needed from major school participants but who may be the people we most want to engage with.

(vi) Agriculture

There is a strong demand for agricultural training, and FFS provide an excellent means of achieving this. We included a demonstration plot in each school and included a short period on agricultural topics in each weekly session. This was highly valued and we faced repeated requests to increase this. It became clear that WUS do provide an ideal forum for combining agricultural extension with irrigation management development. However, there are a number of options for either including agriculture in the same programme or managing them separately but in a co-ordinated manner by the Department of Agriculture which would need to be considered further. This is also closely related to issues of the duration and curriculum for the school, and follow-up activities

(vii) WUS in context of long-term support requirements for WUAs

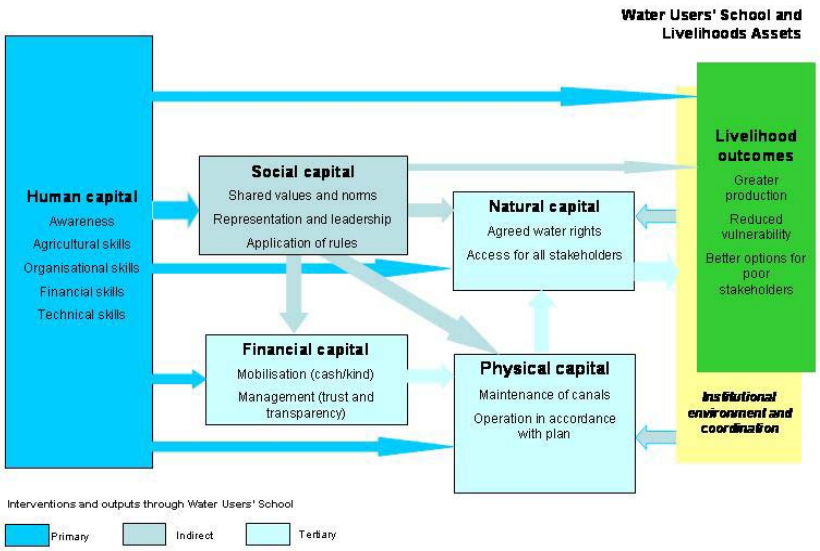
A single season WUS had a profound impact on the WUA and on the way the system is managed, but it should not be regarded as sufficient. There will need to be some follow-up albeit on a much more limited scale. This would include:

- Support with monitoring implementation of action plans agreed during the school
- Acting as a catalyst for solving problems encountered, such as facilitating discussions with WUA committees which sometimes reach deadlock over perceived problems in the past (particularly related to financial matters)
- Providing further technical assistance to resolve problems encountered, such as improved systems for water distribution
- Providing specific training, such as financial administration for WUA committee members
- Providing additional agricultural training and support

This could be provided by some combination of further WUS, facilitation of periodic meetings (probably monthly), routine follow-up by line agency staff, and specific short training courses. We do not envisage running two seasons of WUS as the normal solution: we feel that the existing curriculum can be refined so that it can cover the important topics more effectively within the same time frame. Nevertheless a two-season programme may be appropriate in some cases. This will also depend, for example, on the extent to which agricultural extension is built in to the curriculum. Another consideration is the complexity of management which varies from scheme to scheme reflecting a range of issues – from physical scale and layout, to social characteristics and institutional history.

4.3.4 Water Users' Schools in a livelihoods context

The sustainable livelihoods framework (section 5.3.1) is useful for helping to understand irrigation systems. This framework also provides a key to targeting interventions in a way that will enhance people's livelihoods. The water users school provided a forum for investing in human capital in a way that would help build social capital. This process would also enhance development of the other capital assets – physical, natural and financial. The livelihoods framework, with the understanding built up during the DL/AP phase, makes it possible to design a WUS curriculum which is targeted to the needs of the individual farmers and suited to the context of the irrigation system.



This is illustrated in the figure above. Our primary activities (shown in darker colours and broader arrows) were targeted at developing human capital, but we did this with the specific objective of building

social capital. This in turn had impacts on financial, physical and natural capital. We aimed to develop skills which would directly develop the financial, natural and physical assets, but the impact of this skill-based training component was greatly enhanced through the measures to build social capital, which is needed to help manage other assets.

The interpretation of DL/AP findings using this framework makes it possible to target interventions to suit each project. This guided us in developing the different emphases in the three case study projects we worked on. For example:

- At SMIP we stressed developing the awareness and skills which would encourage shared values for making and following rules. We anticipated that this would lead directly to improved maintenance by the users and then more gradually towards reduced water theft, greater transparency in financial management, and a more equitable distribution of water. Each step in this process would result in reduced vulnerability and enhanced livelihood outcomes
- At KUIS we gave greater focus on representation of users to enable a more equitable distribution of water, and on managing the transition from labour-based to cash-based maintenance
- At BIP we supported the newly registered WUA and helped to give it direction, by emphasising the need for rule-based water management rather than reliance on employing individual water guards, and thereby reduced water theft and introduced a rotational system. We promoted improved communication with other water users for encouraging better maintenance and reduced pollution of the canals.

5 Synthesis of findings in context of institutional development

5.1 Introduction

Through this process of DL/AP and water users' schools, we are developing a framework for promoting WUAs. We have identified six elements which we see as fundamental for this:

- Tailoring methods to local conditions: each scheme is different and needs solutions to be identified individually;
- Organizing our understanding: irrigation systems are complex and multidisciplinary - we need a comprehensive understanding without being overwhelmed in data. The Sustainable Livelihoods Framework is valuable for this
- Working with water users: we need to work with the users to involve them understand their issues and help them to develop an action plan. This requires an inclusive and participatory approach
- Investing in Social and Human Capital: through a "water users school" we have helped develop human and social capital and thereby enhanced development of the other capital assets. The nature of this school will depend on the needs of the individual scheme
- Providing O&M for institutions: WUAs will continue to need support
- Having a supportive policy and legal environment: implement policy and laws that enable the WUAs to carry out there function.

5.2 Tailor to local conditions

Irrigation is not simple and homogeneous: projects are all different and most have had a complex history, and have many facets. We have to recognize and work with this diversity, but we do need guidelines to help institutional development. In doing so, we should remember that:

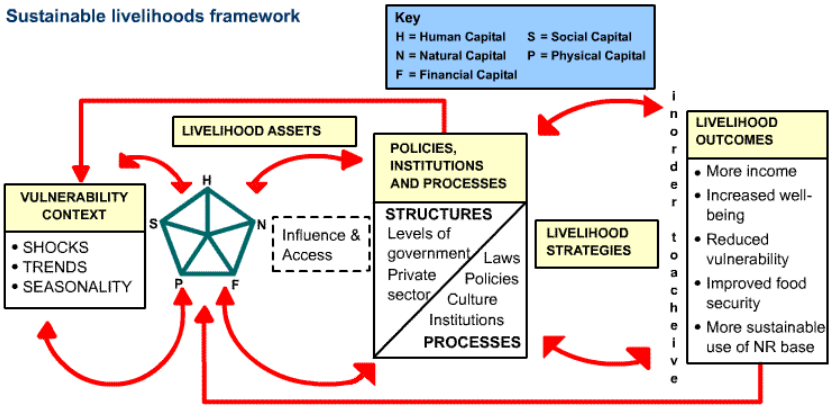
- The guidelines should provide a framework – not a straightjacket
- We need a multi-disciplinary team to bring a range of perspectives
- The slate isn't empty – we must recognize the need to work with what is there
- We should adapt the timetable as necessary, and go at a sensible pace without being a slave to targets

It is easy for outsiders to forget that irrigation schemes have changed a lot within the memory of the direct stakeholders. The history of development of the scheme, past attempts at institutional development, and changes in policy and approaches all have an impact on local people which may be missed by outsiders who view the scheme at a single point in time.

5.3 Organizing our understanding

5.3.1 The sustainable livelihoods framework

We have stressed the multi-faceted nature of irrigation – social, technical, institutional and agricultural. But we need to bring some order to this complexity. The sustainable livelihoods framework, illus-trated here, is very useful for this (IDS, 2003). This framework is a useful and powerful tool, but it is still unfamiliar to many field workers and they may be reluctant to use it. We have therefore attempted to simplify the application of the framework.



Our emphasis in the diagnostic phase was to understand the five assets and the vulnerability context from the perspective of different users so that we could gain an understanding of their livelihood strategies. This enabled us to identify, with the users, the key areas and methods for intervention during the water users' schools.

We presented this in a simple matrix to make it easier to understand and summarise:

- Human capital – education, knowledge/understanding, skills (agricultural, technical, organisational, financial), labour/time
- Social capital - values and norms, organisation, power
- Physical capital – access to infrastructure, standards of maintenance, appropriateness of design
- Natural capital – access to water and land, protection of resources
- Financial capital – income from employment, other economic activities, ability to contribute resources for management and maintenance
- Vulnerability context – seasonal variations in rainfall and, river morphology; agricultural prices and access to inputs; seasonal employment and migration; trends in community cooperation, etc

Stakeholder Category	Human capital	Social capital	Natural capital	Physical capital	Financial capital	Vulnerability Context	Contribution of Irrigated Agriculture to Livelihoods
Poor - tail							
Poor – mid /head							
Poor female-headed households							
Medium							
Well-off							
Short term informal tenants							
Non-resident farmers							
Absentees							

The matrix provides a simple checklist to help verify that we covered the most important issues with each group. In some cases the information was indirect, or incomplete (such as for absentees), but the framework helps put all available information into context.

During the WUS stage, we targeted interventions at key areas which were identified in this, as illustrated below:

Human capital	Social capital	Natural capital	Physical capital	Financial capital
Awareness of programme and activities Skills in agriculture, institutional management, water management, infrastructure maintenance	Representation of stakeholders, development and application of rules, improved communication systems Collaboration on water management, cleaning canals, control of illegal outlets, field channels, etc Enforcement of rules	Better access to water (due to improved schedule, rotations, well-maintained canals etc)	Better maintained canals, existence of field channels	Ability to collect *bighatti* and manage resources transparently

It is also possible to use a similar approach for evaluation of the impact of the school, and we can analyse the changes in assets, vulnerability and impact on contribution of irrigated agriculture to livelihoods for the same stakeholder groups using a similar matrix. The way that stakeholders have been able to enhance their assets, or recover from shocks and stresses will give an indication of the sustainability of the intervention in terms of the impact on their livelihoods.

Our focus in the water users' schools was on developing social and human capital (see section 5.5), which had an immediate impact on physical capital, through improved collective action on maintenance of infrastructure. Thus further notes on relevant aspects of these assets are presented below, together with comments on the institutional environment within which people lived and worked at the time of the DL/AP.

5.3.2 Human capital

Human capital represents the skills, knowledge, capacity to work, and good health that together enable people to play a part in the good governance of the irrigation system, and to make effective use of the other four types of livelihood assets. Key aspects related to irrigation management include:

- Literacy/access to public information about the activities and decisions of the water users' institution. Poorer households and women are more likely to be illiterate (25% female illiteracy cf 50% for male at SMIP, and 25% of households have no literate member (85% of these poor or very poor). Thus literacy must be considered for communication systems and training programmes
- Knowledge (and skills to apply the knowledge) of the rules, procedures, technologies that apply to the operation and maintenance of the irrigation system and its institutions, and to the effective use and husbandry of the water resource. In the past, WUA training has had limited impact, as it has been brief and stereotyped, with little reinforcement or follow-up and no dissemination so the knowledge did not get beyond direct participants. It was mainly given to office holders, but made no provision for turnover in office holders. It was clear that despite some strengths in collective action and indigenous skills to run the irrigation system, there are significant weaknesses in knowledge/understanding/skills for institutional development and governance, including roles and responsibilities of members and officers, system financing; system operation and water management; infrastructure maintenance; and agricultural practices
- Time/labour available to participate in the management of the irrigation system, since many stakeholders have other priorities and demands (e.g. migration, off-farm employment, household tasks) which compete for the time available to participate in irrigation management activities such as attending meetings, holding office, participating in training, keeping informed about system O&M developments, participating in *jhara / urdi*; etc :

5.3.3 Social Capital

Social capital relates to the formal and informal social relationships (or social resources) which contribute to desirable governance outcomes: These social resources are developed through investment in values and norms, organisations and structures; and power and processes.

- Values, norms and rules for good governance. Communities of water users share norms, rules, and sanctions about how resources should be shared, and how they should organise themselves to use and manage the irrigation resource. This includes relationships of trust that facilitate co-operation.

  Heterogeneity and migration may weaken social ties, although in some cases a mixed ethnic composition is seen to be a source of strength (probably related to the relative numbers in different groups, their duration in the area, and factors which encourage them to work together in other fields). In some groups there are customs and values that discourage women from speaking in public, and from influencing irrigation-related decisions. In many cases users have little sense of identity with the irrigation system – even in cases where

they actually owned the system. Some individuals feel they are entitled to meet their full water demands rather than be obliged to share a limited water supply in an equitable manner. They believe it is the responsibility of a higher authority to supply sufficient water to meet everyone's full requirements.

There are few practically agreed rules. Responsibilities are ambiguously defined and may be contested – or even if defined they may be ignored. The WUA has no capacity or legal power for enforcement. Poor communication, financial recording and management contribute to unaccountability and lack of trust.

Organisations/structures. Recognised and socially sanctioned water users groups/organisations in which relationships are governed by accepted rules and norms of entitlement, participation and spheres of activity are needed.

There is weak membership identity, as land holdings are fragmented in different areas, there are many absentees and short term unregistered tenants; and there is incomplete stakeholder representation. Although the legislation permits all users to be WUA members, the constitution restricts this to land owners (including absentees). This thus excludes sharecroppers (who have no formal right to land), landless water users and most women (since only 5% of land is registered in women's names). More recent constitutions (such as BIP) specifically provide for one male and one female member per household.

The structure of WUAs is standard and there is minimal stakeholder involvement in devising their institution. This is normally of a "nested" structure (although traditional irrigation tends to have a simpler, "flatter" structure), and this may not meet the needs of all parts of the system equally well – there was a gap at tertiary level at SMIP.

- Power and processes. All water users need to be able to have influence or exercise power, and to have claims, or obligation for support, from others.

  The leadership is often disconnected, with limited water user involvement in initial selection of leaders and subsequent elections postponed. Decision-processes tend to exclude most water users, as meetings are irregular, decision-making processes are not transparent, and there is poor communication of formally and informally reached decisions. Individual connections often provide advantage and those who can, use personal relations to solve water needs. On a positive note, key individuals (who may be, but are not necessarily the WUA chairmen) are able to exert a powerful influence to influence performance of the system. Collective networks are not strong and there is little mutual reinforcement between the WUA and other community based organisations (CBOs).

These observations can be summarised in a matrix to put them into context of the system as a whole, as shown below:

Ranking	DL/AP Wellbeing Indicators	Social Capital/Irrigation Institutions	% of Area farmed	% of HH
Landless Family				
Poor Family				
Middle class Family				
Wealthier Family				
Female headed household			–	

5.3.4 Physical capital

Physical capital in the context of irrigation management cannot be considered in isolation. There are overlaps with social capital (for example how is maintenance organised, or canals protected) and natural capital (eg the need for infrastructure related to provide differing water requirements to suit land type and level). However, it is important to understand the nature and condition of the infrastructure in this wider context.

- Nature of infrastructure. We need to understand the existing infrastructure in its developmental context, including history and changes in size, layout and design philosophy; expectations for farmers to construct certain parts (field channels, watercourses themselves); the size of the scheme; the type of design – including operational requirements and complexity; arrangements for alternative sources of water (wells, drainage, reuse/seepage); and understanding of the design principles by the users. At SMIP traditional small-scale FMIS were replaced by a flexible but incomplete modern large-scale system, which was then completed to a new design concept, yet still relying on farmers to build field channels.

- Condition of infrastructure. Maintenance depends on institutional arrangements (division of responsibilities between DOI and WUA); willingness of users to collaborate in maintenance; resources that they can mobilise for this; the approaches they adopt for protection of canals, removing weed growth and sediment and structural repairs; maintenance skills. This may have different impacts on different users (perhaps according to their location and socio-economic status – although this is very variable). Standards of maintenance are often poor and vary according to the location in the system, and there have been many 'illegal' adjustments to the system (additional uncontrolled outlets, informal checks etc) at SMIP either because of perceived deficiencies (incorrect outlet location, inadequate provision of cross-drainage) or reluctance to commit resources to maintenance. Cattle may also be grazed or crops grown on canal banks. At a local level, users may do just sufficient to keep the canal operational, but maintenance at higher levels is more likely to be neglected.

5.3.5 Institutional environment

WUAs do not exist or operate in isolation. The internal structure of the WUA and relations between tiers of the organisation (and between individuals and the WUA) is discussed under social capital (section 5.3.3) . In this section, the relations of the WUA with external institutions and the direct links between water users and other institutions are considered.

- Joint management arrangements – the division of responsibilities, the clarity of and agreement with this, the resources available for discharging responsibilities. At SMIP there is some reluctance for the WUC to take on their formal responsibilities for canal maintenance, and all levels of the WUA consider that their resource base is inadequate for these tasks. They also reluctant, and perhaps have insufficient authority, to take on their role of policing water theft.

- Relations with VDCs and DDCs, and role of VDCs in system management (both formally and informally). As there is no elected local government it is difficult to assess this at this stage. At SMIP the VDC is barely involved, and perhaps feels excluded. In other schemes the WUA chairman may also be a VDC member, but VDCs appear to take little formal role in irrigation management, despite the provisions of the local self-governance act. They are reluctant to take on responsibilities for fee collection, as they see this as an unrewarding task which may affect their ability to collect land revenue. DDCs have responsibilities which impinge on irrigation management – for example award of contracts for quarrying, which affected water acquisition at KUIS.

- Informal local institutions. There are established local practises (known as *panchayati)* for resolution of minor conflicts in many places, which appear to be more important than the formal procedures through the VDC – although the individuals involved may often be the same.

- Support services. Both the WUA and the farmers require a range of support services. The WUA needs support in institutional development, technical design and management. This is usually channelled through the WUA chairman and is not necessarily communicated much more widely – farmers at SMIP appeared not to know much about these interactions. Farmers may seek support directly from DOI, and are less likely to do this via. By contrast, links with DOA are on a more individual basis, and the DOA has its own network of lead farmers – connections between WUAs and DOA tend to be weak. WUAs may get assistance from many other agencies, and it appears that leaders are chosen partly because of their external connections and their ability to form these links. At KUIS, for example, the WUA had links with the Ministry of Water Resources, District Soil Conservation Office, the local MP, DDC/VDC members and others.

5.4 Work With Water Users

We stress the need throughout the programme to work with water users, to understand their situation, help them identify solutions to the problems they face and then implement these solutions. There are three steps to this

- Diagnose the current situation - the first part of DL/AP

- Develop an action plan – the conclusion of the DL/AP

- Implement the action plan – initiated and facilitated by the WUS, but continued after the end of the WUS by the WUA and the users themselves, possibly stimulated by some additional external support.

The framework described in section 5.3 provides a convenient way to summarise the present situation, identify potential solutions, and target interventions (both during the WUS and afterwards) so that they have maximum impact on livelihoods.

5.5 Invest In Human and Social Capital

The key to improving irrigation management is to strengthen human and social capital, and to do so in a way that develops the other capital assets. It is important to note that different stakeholders may have different values or viewpoints – and this should be apparent from the livelihoods analysis described earlier. For example, rich farmers may not share the belief of others that they should share water in a equitable manner; landless people may anticipate that ultimately their views are not taken into account, and so may not consider it worth investing the time in participating in the programme.

. The method of learning is important, and we stressed the need to:

- See learning as mutual and to be shared
- Be aware of how people learn, both individually and collectively
- Keep an open mind
- Learn by doing
- Encourage reflection and innovation
- Maintain flexibility and openness
- Learn from unforeseen events and incidents

Participatory learning methods are the most effective in this context, but it is important to remember the diversity of educational backgrounds and levels of literacy which affect willingness to participate and choice of techniques

5.6 Provide Continuing Support for Institutions

There is always a temptation to leave WUA too soon – one of the drivers for participatory irrigation management is to reduce the government involvement in irrigation, but this will not be achieved effectively with just a short programme. Although the WUS is a key element, there will need to be some follow-up – probably at a much lower level of investment. This still requires intermittent involvement and commitment to supporting the WUA, including technical backstopping and some training. This will have financial implications which must be budgeted for.

5.7 Supportive Policy and Legal Environment

Water users' associations do not exist in isolation, and their ability to function and continue to perform their role effectively depends crucially on their institutional environment. Policies and legislation are never perfect: progress towards the ideal is gradual. Two particular areas where responsibilities are unclear or contested are collection of financial resources for operation and maintenance, and dispute resolution. The WUAs have inadequate powers either to finance O&M or resolve conflicts. Although there are deficiencies in other areas, there is a greater problem with implementation of the policy than with the policy itself.

In general, there should be:

- Clarity and consistency of legislation;
- WUA should have sufficient powers and enforcement authority enable it to carry out its duties;
- Legislation and by laws which are suited to local needs and circumstances; and
- Supportive institutional priorities and incentives.

6 Conclusions

Although the initial review of WUAs carried out at the start of this project showed that they are often ineffective, the methods which were tested and have been outlined in this paper have been found to be effective as a way of strengthening management of irrigation projects. In particular, we have shown that:

- Institutional development for irrigation needs to be tackled very sensitively; it should be tailored to the needs of the individual project, and should not be rushed but with care WUAs can be very effective;
- Participation is essential, but it must be broadly based – without excluding some categories of stakeholders – and there should be a real involvement in decision-making
- The process of diagnostic learning / action plan (DL/AP) followed by a season-long water users' school (WUS) is a very effective way of strengthening WUAs. These build the commitment to participation in irrigation management, an understanding of the issues and ways to solve problems, and ensure that the process of institutional development is embedded in the community rather than being externally driven
- The DL/AP is short but of critical importance: irrigation schemes are different and face different challenges; it is difficult to understand them and to summarise this complexity in a way which is helpful for improving their management; and there are numerous stakeholders who need to be aware, informed and involved effectively. However, we did find that the methods adopted were effective in engaging the stakeholders and in gaining sufficient understanding of the system.
- The final output of the DL/AP took the form of a locally-specific action plan, but there were some common themes which led to our plans to develop human and social capital through the medium of water users' schools:
  - The need for technical support and training in a wide range of topics cutting across several domains
  - The need for a greater awareness of issues affecting the irrigation system (including roles and responsibilities, and the ways individual actions affected others)
  - The need to take remedial measures themselves, which would depend on the users co-operating actively, which will depend on first strengthening or modifying social bonds and norms
- Through the method of running the schools (including minor schools) and the selection of participants, the WUS were effective in change perceptions significantly, and in a way which led directly into action in critical areas. The impacts varied according to the project, and there was a difference in emphasis in the three case study projects we worked on. For example:
  - At SMIP we developed the awareness and skills which would encourage shared values for making and following rules, leading to improved maintenance by the users
  - At KUIS we encouraged broader representation of users to enable a more equitable distribution of water, and on helped in managing the transition from labour-based to cash-based maintenance
  - At BIP we introduced rule-based water management rather than reliance on employing individual water guards, and thereby reduced water theft and introduced a rotational system.
- Continued low-level support will be needed to ensure the benefits are sustained, particularly in the following season to ensure that activities agreed at the end of the WUS are implemented. The WUS should be the first step in providing "O&M" for the institution – it is not sufficient simply to establish and give initial training to a WUA. This approach will also only work if there is a supportive policy and legal environment, where the policy and laws enable the WUAs to carry out their functions, and where government institutions support individuals and WUAs.

Abbreviations

AMIS – Agency-managed Irrigation System
APM – adjustable proportional module
BIP – Bijaypur Irrigation Project
CBO – Community-based organisation
DL/AP – Diagnostic Learning/Action Planning
DOI – Department of Irrigation
FFS – Farmers' Field Schools
FMIS – Farmer-managed Irrigation System
GA – General Assembly [of a WUA]
ICWM – Integrated Crop and Water Management
IMT – Irrigation Management Transfer
IP – Irrigation Policy
IPM – Integrated Pest Management
ISF – Irrigation Service Fee
ISP – Irrigation Sector Project
JM – Joint Managed [Irrigation System]
KUIS – Kamala Uttarbahini Irrigation System
NGO – Non-governmental Organisation
NISP – Nepal Irrigation Sector Project
O&M – Operation and Maintenance
OFWM – On-farm water management
PIM – Participatory Irrigation Management
PRA – Participatory Rural Appraisal
SEAGA – Socio-Economic and Gender Analysis
SMIP – Sunsari Morang Irrigation Project
VDC – Village Development Committee
WUA – Water Users' Association
WUCCC – Water Users' Central Co-ordination Committee
WUCC – Water Users' Co-ordination Committee
WUC – Water Users' Committee
WUG – Water Users' Group
WUS – Water Users' School

Glossary

ailani – unregistered 'waste' land
aunse – new moon
bigha – unit of area (equivalent to 2/3 ha)
birta - land grant in Nepal
dalit – 'untouchable' according to the Hindu caste system
dhalpa – gate operator
birtawal – landlord who is granted a *birta* landholding
jamindar – landlord
jhara – unpaid labour contribution
khola – river
panchayati - traditional system of village elders for conflict resolution [unrelated to and not to be confused with the panchayat regime of government which prevailed before 1990]
panibause – water guard
purne – full moon
pyans – informal outlet
tarai – plains at the south of Nepal
thel – informal obstruction in a canal to raise water level
urdi – system of labour contribution on farmer-managed irrigation
warabandi – system of rotational irrigation mainly practiced in the Punjab

Acknowledgements

The authors are indebted to the three NGOs who implemented some of the DL/AP studies and managed the water users' schools. Numerous people from DOI, DOA and other agencies were involved in this project in many ways and in various capacities, and we most grateful to them. The WUA officials were generous with their time and commitment to our work, and finally we would like to thank all the water users who were involved directly and indirectly in this study. The financial support of DFID and comments on earlier reports is gratefully acknowledged.

References

Albinson B and Perry C (2002) Fundamentals of Smallholder Irrigation: the Structured Irrigation System Concept, IWMI Research Report 58, Colombo, Sri Lanka, 2002

Berkoff, J (1990) Irrigation Management on The Indo-Gangetic Plain, Technical Paper 129, World Bank, Washington

Dixit, A (1999) *in* Rethinking the Mosaic-Investigations into Local Water Management, ed Moench, Caspari & Dixit

FAO (2001) Participatory Training and Extension in Farmers' Water Management, FAO Land and Water Digital Media Series No14, Rome

Howarth, SE & Lal, NK (2002). Irrigation and Participation: rehabilitation of the Rajapur Project in Nepal, Irrigation and Drainage Systems, 16 111-138

IDS (2003) Sustainable Livelihoods Distance Learning Guide, livelihoods-connect@ids.ac.uk, www.livelihoods.org

Jordans E (1998) SEAGA Sector Guide: Irrigation, FAO, Rome

Krishna A & Uphoff (1999), Mapping and Measuring Social Capital, Social Capital Initiative, Working Paper No 13, World Bank, Washington DC

Lam, W F (1998) Governing Irrigation Systems in Nepal, ICS Press, California

Mott MacDonald (2002), Guidelines for Good Governance, Stage I Report, DFID KaR Project R8023, Cambridge

Narain, V (2003) Institution, Technology and Water Control, Orient Longman, 2003

Ostrom E (1992). Crafting Institutions for Self-governing Irrigation Systems, Institute for Contemporary studies San Francisco

Pradhan, P (2002). Water Users Associations towards Diversified Activities: Experiences of Nepal and other Countries, Indiana Workshop in Political Theory and Policy Analysis

Pradhan, R (2000). Water Land and Law: Changing Rights to Land and Law in Nepal, FREEDEAL/WAU/EUR, Kathmandu

Pradhan T (1996) Gated or ungated: water control in government-built irrigation schemes, PhD thesis, Wageningen

Pretty, JN, Guijt I, Scoones I, Thompson JN (1995) A Trainer's Guide for Participatory Learning and Action, IIED, London