

Water Management and the Poor
– organizing to (re)gain access to water in the Nicaraguan hillsides

DRAFT – PLEASE DO NOT QUOTE WITHOUT AUTHOR’S PERMISSION!

Helle Munk Ravnborg
Senior Research Fellow
Danish Institute for International Studies (DIIS)
Strandgade 56
1401 Copenhagen K
Denmark

Tel: +45 32 69 86 94
Fax: + 45 32 69 87 00

Email: hmr@diis.dk

Abstract

Many rural areas increasingly constitute the arena for increased competition for water, not only between different users within the locality, but also between internal versus external users. In hillsides areas, water is important not only for household consumption but also for productive purposes. Even where formal irrigation systems do not exist, the ability to water crops significantly improves people’s livelihoods. Evidence from many parts of the world, however, suggests that the poor are gradually losing their access to water. Based on research conducted in the Nicaraguan hillsides, this paper illustrates the processes through which access to water is lost by some while gained by others as well as some of the issues involved in water management. The paper shows how everyday water management takes place in the context of complex and often conflictive social relations at multiple and often overlapping levels. Combined, these two features make it hard to imagine that efforts to design a single river basin or watershed institution charged with representing and negotiating different interests relating to water management can succeed and become effective. The examples from the Nicaraguan hillsides, however, allude us to a possible alternative. In their attempts to gain and secure access to water, new organizational practices are emerging which transcend ‘the local’ as well as ‘the static’, and increasingly seek to involve and engage district and national authorities in supporting their claims and adopting a

stronger, but negotiated, role in regulation and arbitration. Therefore, instead of focusing on the crafting of neatly nested water management institutions, this paper argues in favour of supporting the development of an enabling institutional environment which focuses upon making relevant hydrological assessments widely available; broad-based and inclusive public hearing processes; enhancing the legal capacity, particularly among the poor; and last, but not least upon making dispute resolution mechanisms, such as a water *ombudsman*, widely available and accessible, also to the poor, to provide help in settling conflicts caused by competing water management claims as well as by conflicting claims of users and water management institutions.

Keywords

Water management; poverty; institutions; stakeholder representation; access

Author's acknowledgement:

I am grateful to the Danish Social Science Research Council which has provided funding for the research on which this paper is based.

Introduction

Water and poverty are increasingly being linked in the public debate, not least due to the Millennium Development Goals (MDGs) in which access to safe drinking water is stated as an explicit part of the first MDG – to eradicate extreme poverty and hunger (United Nations, 2000). Due to the explicit focus on drinking water, several authors fear that the relationship between water and poverty may be equated with this small – albeit important – subset of water-poverty relationship (Black and Hall, 2003; GWP, 2003; Soussan and Frans, 2003). Particularly in rural areas, the relationship between poverty and water management reaches far beyond the lack of access to safe drinking water. To the rural poor, access to and management of water is important for productive purposes; for ecosystem protection (e.g. to ensure the availability of fish and grazing resources); for environmental protection (e.g. flood as well as drought control); and

finally for cultural purposes. Despite a widespread sense that competition is increasing between uses and users over access to water and that in such situations of competition the poor do less well than others in securing their access to water, there is, however, at present no coherent analysis of the relationship between poverty and water access and use (GWP, 2003). While by no means claiming to provide such a comprehensive understanding of the relationship between poverty and water management, the present paper seeks to illustrate some of the ways in which the rural poor currently lose or face increasingly insecure access to water. The paper argues that this loss of access to water is firmly embedded in social relations at large and thus that poor people's lack of access to water cannot be understood in isolation from other people's and sectors' increasing access to water.

To alter this situation and ensure 'equitable, economically sound and environmentally sustainable management of water resources and provision of water services', which has been stated as the objective at several occasions since the 1992 Dublin Conference on Water and the Environment, is increasingly seen to require Integrated Water Resources Management (IWRM). IWRM is defined as 'a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems' (GWP, 2000).

A recurrent theme in the discussions about IWRM has been how to ensure stakeholder participation, in particular that of poor and marginalized stakeholders, and at which level such stakeholder participation should take place. Drawing from emerging experiences from different parts of the world, this paper argues that while the creation of institutional platforms to allow for stakeholder participation in decision making with respect to water management may be useful, there is a need to address the broader issue of water governance in order to accommodate the concerns with poor people's access to and use of water.

Materials and methods

This article is based on field research carried out over the period from 2001 to 2004 in two adjacent areas in the north-western mountainous region of Nicaragua – the natural reserve Miraflor-Moropotente in the municipality of Estelí, covering an area of 75 km² and the rural part of Condega district, comprising an area of 438 km². Both areas contain dry plains at about 5-700 m a.s.l., sloping mid-altitude hillsides ranging from 700-1100 m a.s.l. as well as mountainous cloud forest and cool, humid plains at altitudes about 12-1400 m a.s.l. The population density is approximately 60 persons/km² in Miraflor-Moropotente and 70 persons/km² in Condega.

The field research consisted of two parts. One part was designed to gain insight into the organizing practices taking place at various levels in the context of access to and management of natural resources. Thus, semi-structured and conversational interviews have been conducted with key actors from ministerial to the local level, in addition to participation in meetings, workshops etc. concerning natural resource management, particularly in Miraflor-Moropotente.

The second part was designed to develop a poverty profile for each of the two areas and to explore if and how the level of household poverty relate to natural resource access and management strategies. Inspired by the reservations expressed by Sen (1981; 1985) towards understanding and measuring poverty and well-being solely on the basis of income or expenditure data, and in line with the increasing recognition among agencies like IFAD (Jazairy *et al.*, 1992), UNDP and the World Bank (e.g. Narayan *et al.*, 2000) of the multidimensionality of poverty and the importance of including poor people's own perceptions in poverty assessments, the poverty profiles developed for this research are based on people's own perceptions of poverty, identified through well-being rankings. The rankings were conducted in a sample of six communities, drawn from the two areas using a maximum variation sampling strategy with respect to factors which could potentially lead to the existence of different perceptions of well-being. The descriptions of different poverty levels resulting from the rankings were 'translated' into indicators. Subsequent analysis examining the extent to which the use of specific indicators was associated with specific types of communities found no such association. Thus, one single set of well-being indicators could be identified for the two areas.

The indicators covered aspects related to sources of livelihood, basic needs satisfaction, animal ownership and access to institutional credit (Ravnborg, 2002a; 2003) and were made quantifiable through the formulation of a household questionnaire.

The questionnaire was administered to two independent samples, drawn through a two-stage random sampling procedure from each of the two areas, based on complete lists of households living in the areas elaborated specifically for this study. The samples comprise 306 households for Mirafior-Moropotente and 363 households for Condega.¹ A scoring system was designed according to which a score (33, 67 or 100) was assigned to each household for each indicator depending on its characteristics. For each household, the scores obtained on each of these eleven indicators were then combined into a poverty index – calculated as the arithmetic mean of the scores obtained on each of the indicators – on the basis of which three poverty categories were defined, namely the poorest, the less poor and the non-poor households. Figure 1 shows the distribution of households according to these poverty levels. Using this procedure, qualitative poverty descriptions are thus turned into an absolute, but locally informed poverty measure. For a more detailed description of the methodology, please refer to Ravnborg *et al.* (1999).

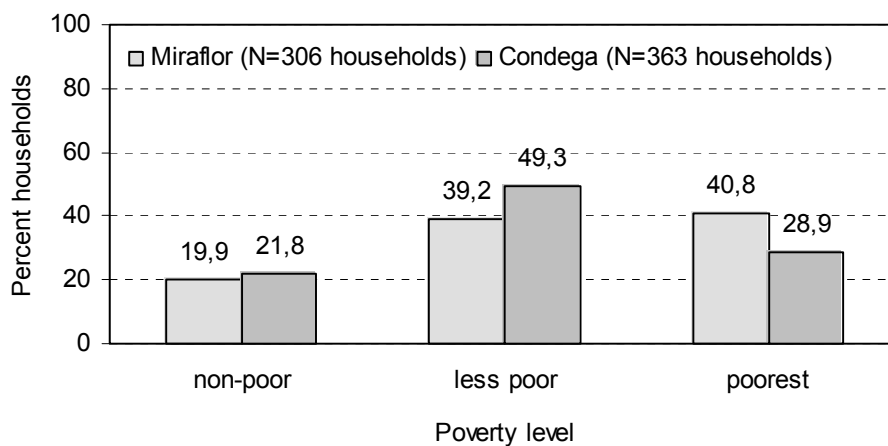


Figure 1
Poverty levels in Mirafior-Moropotente and Condega District (rural), Nicaragua
Percent households per poverty level, by area

Access to water in the Nicaraguan hillsides

The occurrence of many small springs and streams characterizes the hydrological landscape of the Nicaraguan hillsides. Having access to such water resources, i.e. having ability to use or otherwise benefit from them (Ribot and Peluso, 2003), make a significant difference to the well-being of people living in the area.

In Nicaragua, as in many other countries, water is constitutionally established as national heritage. Thus, no individual or corporation can own water in a legal sense, but can be granted concessions to specified use of water within a given period by the MIFIC (Ministry of Public Works, Industry and Trade). Yet, in practice, at least in the hillsides, individuals who own land on which there is a water spring, a stream or aquifer enjoy ample rights to that water, at times including what Meinzen-Dick (2003) labels as use, control as well as transfer rights. Rather than being backed by formal legal frameworks, such land ownership-based water rights tend to be locally negotiated and are thus embedded in social relations at large. As an example of such ample and locally negotiated water rights, late 2003, a widow has sold her rights to water from a spring on her land to a group of two communities who wish to use the water for a drinking water supply scheme they are planning to establish in their communities. In return for handing over her rights to the water source, the widow has received payment in cash and kind as well as a series of commitments from the community representatives, among these commitments to prioritize the construction of a house for her in case a housing project will be working in the area and to ensure that a proportion of a water user fee to be negotiated in the two communities will be paid to her (*pers. communication with community representatives, Mirafior, March 2004*).

In the Nicaraguan hillsides the poor are significantly less likely to enjoy land ownership-based rights to water resources than the less poor and non-poor households.² Obviously, this reflects the skewed land distribution and high degree of landlessness which in general prevail in the area, but even when considering only land owning households (Figure 2), the poor are found to be significantly less likely to own land on which there is a water spring or which is crossed by or bordering a small stream or river than the less and the non-poor.

However, as some of the following empirical cases illustrate, holding land ownership-based rights to water is neither a sufficient nor a necessary precondition to enjoy access to water resources. In their Theory of Access Ribot and Peluso distinguish between property and access as ‘the right to benefit from things’ versus ‘the ability to benefit from things’ (2003). Hence, an individual or group who holds land ownership-based rights to use, control and/or transfer water according to locally accepted or negotiated customs and conventions, may experience restricted access to that water due to lack of access to structural and relational mechanisms through which access may be gained, maintained and controlled. These structural and relational access mechanisms include capital and technology, labour and labour opportunities, markets, knowledge, authority, social identity, and social relations of friendship, trust, reciprocity, patronage, dependence and obligation (Ribot and Peluso, 2003). As is evident from poverty assessments undertaken all over the world (e.g. Narayan, 2000) as well as specifically from the Nicaraguan and Honduran hillsides (Ravnborg, 2002a; 2002b), poverty is precisely characterized by lack of access to such structural and relational access mechanisms with the occasional exception of social identity and social relations.

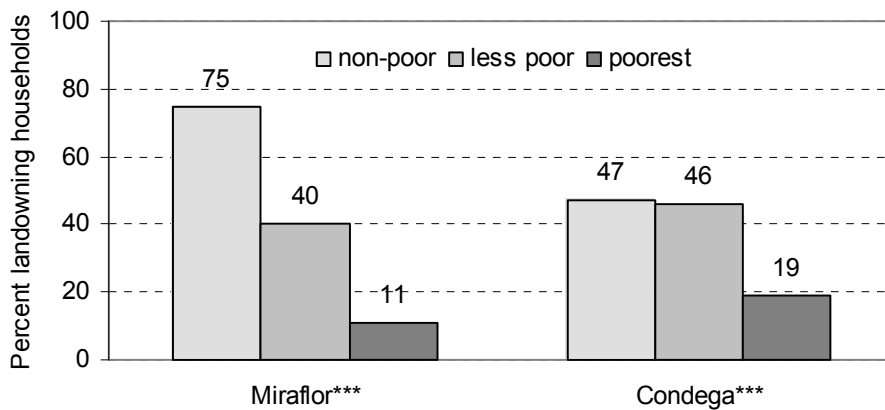


Figure 2
Ownership of land with water springs or streams on their land by poverty level in
Miraflor-Moropotente and Condega District (rural), Nicaragua
Percent land owning households per poverty level by area

Short term loss of access to water may lead to long-term lack of rights to water

Juan Rodriguez³ is not among the poorest, nor among the non-poor farmers in Condega District. He owns land, around six hectares, has previously enjoyed access to institutional credit, and has managed to let most of his children finish primary school. He is even so fortunate as to be among the 46 percent of the less poor households in Condega district (Figure 2), having a water source on his land and he clearly perceives having the ‘right to benefit’ from this water. Asked whether one has to ask permission from someone or somewhere to use water, he promptly answers “Of course, from the owner”, i.e. the owner of the water who is the owner of the land (*pers. communication, February 2001*). Despite his rights to the water, Juan Rodriguez does not enjoy full access to the water. During the dry season, he explained, he rents out his land – and water – to another farmer (the village chairperson, by the way) because he has not had sufficient capital to invest in the polythene tubes necessary to use the water for irrigating a maize or beans crop. While enjoying some benefit from the water, namely the rent he receives, Juan Rodriguez does not have the access mechanisms enabling him to draw the full benefits from his resource. Asked whether he would cultivate the land himself, did he have the necessary tubes, Juan Rodriguez prompt response was “I would cultivate, yes, obviously!”. Juan Rodriguez is not the only farmer who has not been able to enjoy full access to water resources to which they have the right, and overall the less poor and poorest households seem the least likely to exploit water resources present on their land. In Condega district, 35 percent of the non-poor households who have water resources on their land indicated that they had irrigation, while this was the case for only 17 percent of the less poor and poorest households. Beyond the present restricted access to water and the foregone benefits from its use, the question is whether a farmer like Juan Rodriguez will be able to stick to his land which due to its water sources is becoming increasingly in demand.

Insecure access and the struggle for authority in local water management

The community El Descanso⁴ in Miraflor draws its drinking water from a water spring on the land of a resourceful farmer in a community further upstream. When I interviewed a now former member of El Descanso’s water committee in 2001, he explained to me that he felt insecure with respect El Descanso’s continued ability to maintain access to the water coming from the upstream farmer. El Descanso’s access to the water was established on the basis of a written

agreement between the community and the upstream farmer, in which the upstream farmer granted the community access to use the water for the school and for household consumption, but not for watering crops. The written agreement was, however, not formally legalized, e.g. signed in front of a public notary. Moreover, the fact that there was conflict over the ownership of the land where the water springs between two siblings contributed even further to the sense of insecure access to water. Today, in 2004, this land conflict has been solved and the present owner is willing to continue to honour the agreement of the former owner, but just like her, he is unwilling to enter into a legally binding agreement. The lack of such a formally legalized agreement, in turn, makes it impossible for El Descanso to obtain technical and economic support from ENACAL (The Water Supply and Sewage Company) to improve their water supply, e.g. improve the intake, installing a filter, etc.

In 2001, 42 percent of the households in El Descanso claimed to have experienced problems with their water supply in terms of contamination from animals coming to drink and use of agricultural chemicals close to the water intake, while 15 percent claimed to have experienced lack of water due to water being used for irrigation.⁵ The majority (77 percent) of those experiencing a water supply problem claimed that the owner of the water source was responsible, but had not taken any action directly against the owner, nor through the water committee, to solve the problem. In the community further downstream from El Descanso which draws its water supply from the same water source, 29 percent of the households claimed to have experienced lack of water due to irrigation further upstream while 25 percent of the households had experienced problems of contaminated water. It is mainly the less poor and the poorest households who experience problems of contamination or lack of water.

Rather than approaching the owner of the water source, the water committee in El Descanso has tried to call upon various external authorities primarily MARENA (Ministry of the Environment and Natural Resources),⁶ which has the highest presence in the area due to Miraflores' legal status as a protected landscape, in order to support them in their efforts to obtain legal rights to the water source, but so far without luck. Moreover, in 2002, El Descanso, in collaboration with downstream communities called upon MARENA, MAGFOR (Ministry of Agriculture, Livestock and Forestry), INAFOR (National Forestry Institute) and the municipality, but not upon MIFIC

(Ministry of Public Works, Industry and Trade) to which water management corresponds, to inspect and take action against upstream farmers who allegedly had installed motorized pumps for irrigation and thus depriving downstream communities of their drinking water supply.

One aspect complicating the negotiations on achieving legal access to the water from the upstream farmer has been the regulation of the use of water in El Descanso. As mentioned, the present informal access to water was granted to El Descanso on the condition that water would not be used for watering crops. However, the temptation to violate this condition is high in a semi-arid environment where the ability to water crops makes a significant difference to the livelihoods of people struggling to sustain their living from relatively small plots of land, just as it does to more resourceful farmers with larger landholdings. Thus, rather than strictly sanctioning the watering of crops, attempts have been made locally to negotiate the extent to which watering of crops should be permitted. Claims are made of individual farmers making agreements with the community water committee which allow the collection of water from the village water supply system during the night, e.g. in a small household tank or reservoir, which can then be used during daytime to water crops.⁷ Using water directly from the water supply system during daytime for watering crops, however, would not be permitted as this would prevent water from reaching water taps further downstream, particularly during the dry season.

Beyond doubt, such less restrictive norms for how to manage water, particularly with respect to watering crops can be meaningfully negotiated locally as norm specifying amounts and the timing – both during the day and during the year – of water withdrawals for watering crops, particularly if information is provided from outside agencies concerning the total amounts of water available from the water source at different times of the year and approximate amount of water to be reserved e.g. for human consumption. However, the lack of support from external authorities in the form of institutional presence as well as clear legal and regulatory frameworks for water management critically impede the successful implementation of such locally negotiated water management norms. Hence, in the current situation, the enforcement of locally negotiated water management norms is the responsibility of the local water committee. During the past few years, there has been struggle for leadership of the local water committee and the leadership has changed. Apparently this has not been a struggle over whether or not watering of crops should be

allowed as both the members of the former and the present leadership of the water committee use water for their crops. Rather, it has been a struggle over the authority to interpret and – selectively – enforce locally negotiated water management norms in the community as well as over access to an institutional platform from which to access external authorities, e.g. to denounce what is claimed to be the illegal water use of other community members.

As is the case for most local organizations, the poorest households are the least likely to be members of village water committees. In the communities in Miraflor having a local water committee, only five percent of the poorest households were members of the local water committee as compared to around 20 percent of the less poor and non-poor households. In Condega, 11 percent of the poorest households were members of the local water committee compared to around 20 percent of the less poor and non-poor households.

Generally, therefore, the poor stand a lower chance to hold the necessary power to enforce locally negotiated norms as well as to call upon external authorities if these are at all well-defined and present, to intervene in cases of what they may regard as unfair or ineffective local water governance.

Stakeholder representation in water management institutions

It is based on such concerns of the extent to which current water governance cater for the poor that the last decades' water governance reforms have emphasized stakeholder participation. As Jaspers states, “stakeholder participation is a condition which has to be fulfilled to make water resources management effective” (Jaspers, 2003:82) and he sees stakeholder participation as significantly facilitating enforcement of water resources management.

Several attempts have been made of crafting stakeholder-based institutions both as water users' associations, particularly in relation to irrigation schemes, and as river basin councils or boards (Jaspers, 2003; Wester *et al.*, 2003; Funder and Ravnborg, 2004). Based on a detailed account of the processes of institutionalizing stakeholder participation in river basin planning and

management in Mexico and South Africa, Wester and his colleagues conclude that while the mining and industrial sectors (in South Africa), the suppliers of water to larger towns and the commercial farmers are well-organized to represent and articulate their interests, the millions of rural poor smallholders are not. In Mexico, the failure to include poor stakeholders, in part, can be explained by lack of political will in the government to hand over power to river basin councils, and a decision that only “water users with a water license will be eligible to elect committee members, thus excluding the vast majority of the basin’s population” (Wester *et al.*, 2003:804). It is among the water user committee members that representatives for the river basin council are elected. Although ‘technical’ solutions to alter such latter biases in stakeholder representation are straightforward, the more profound question is whether the political will exists to craft institutions in ways which would be inclusive of the poor. In South Africa, there are indications of a higher degree of political will to include the poor and ensure their effective participation. Yet, rural small-scale farmers are still struggling to get organized and have been found to be “unaware of the provisions of the new water law and the CMA process [the process of organizing the Catchment Management Agencies]” (*ibid.*:208).

A similar situation was encountered in Chile (Bauer, 1997; 2004) which had detrimental consequences in terms of small-scale farmers losing their access to water. Bauer describes how, according to the 1981 Water Code, water rights have become completely separated from land ownership and can be freely bought, sold, mortgaged and transferred like any other piece of real estate. The Water Code provides for the legislation, i.e. formal registration, of previously held water rights as well as the granting of new rights free of charge whenever there is water physically and legally available. These rights are granted by the state through the National Water Directorate (DGA). However, in the 1980s, the government did not undertake information campaigns about the Code’s new features or how to apply for new rights or regularize old ones. “By the time peasants and their organizations learned of the new procedures, available water rights in many areas had already been granted by the DGA or regularized by those more legally adapt” (Bauer, 1997:650)

The difference between the Mexican and South African attempts of institutionalizing stakeholder participation in terms of the emphasis placed on including the poor in water management and the

extent to which formal options exist for participation of small-scale farmers illustrates the importance of political will on part of government agencies and the way institutions are crafted. At the same time, however, the limited success in South Africa of achieving genuine participation of the poor, points to the limitations of policy-driven institutional reform when the way in which social and economic relations shape the access to and management of water as well as the general interaction among stakeholder representatives is not clearly recognized and addressed. In this vein, Cleaver questions the extent to which new institutions can be crafted at all to be 'representative and facilitate consensus on complex and often conflictive issues of natural resource management (Cleaver, 2002). Likewise, Wester and his colleagues conclude that if the social and economic relations shaping water management and the interaction among stakeholder representatives is not taken into account, "participatory processes may further institutionalize power differentials, a real danger in both Mexico and South Africa" (Wester *et al.*, 2003:809).

Implications for scales of action

The urge to create stakeholder-based water management institutions has to a large extent been associated with the establishment of hydrologically defined water management institutions such as river basin or watershed management institutions. The argument has been made that in order to achieve integrated water resources management, water resources management on hydrological boundaries is a *sine qua non* (Jaspers, 2003). However, as argued by Funder and Ravnborg (2004) and as illustrated by the above empirical cases, 'everyday' water management is undertaken at multiple and often overlapping levels depending on the issue at stake and factors such as the topography and social relations at large. Such levels range from a group of neighbours managing a water spring or a group of individuals in a couple of communities having a stake in a drinking water supply scheme to other and much higher levels of management, e.g. in the case of a large, downstream irrigation or urban water supply scheme. As no single, hydrological unit would fit as the most optimal unit for the management of water with respect to such different issues, let alone the highly diverse social realities determined by a range of political, institutional, economic and socio-cultural factors within which water management takes

place, this ‘messiness’ has to be accepted as a fact of socially embedded natural resource management (Cleaver, 2002). However, there is clearly a need for water management at these multiple and overlapping levels to be informed by hydrological assessments of availability of water.

In their paper, Funder and Ravnborg (2004) argue in favour of taking water management functions rather than the organizational unit and level as the point of departure for thinking about how to ensure effective water governance in general and inclusive stakeholder participation in particular. Among the water management functions they identify (see Table 1), only ‘hydrological assessments’ need to be undertaken within a strictly hydrologically defined boundary while the ‘allocation of water rights’ needs to be institutionalized in a way that combines both hydrological concerns (to avoid that water which is shared, e.g. by two districts, is not allocated twice) and political concerns, i.e. in a setting which facilitates inclusion of stakeholders, negotiation of priorities and competing claims, and not least where mechanisms exist for holding representatives accountable.

Table 1

Main water governance functions

<ol style="list-style-type: none"> 1. Overall policy development (<i>priorities and principles for water management</i>) 2. Water resource policy/regulatory framework (<i>water ownership, access and management obligations; monitoring; institutional framework</i>) 3. Domestic water supply policy/regulatory framework (<i>standards, coverage, price policy for water provision; monitoring; institutional framework</i>) 4. Hydrological and environmental water resource assessments (<i>water availability and environmental needs</i>) 5. Allocation of water rights (<i>permanent or temporal withdrawal and discharge rights; monitoring</i>) 	<ol style="list-style-type: none"> 6. Inter-level (‘transboundary’) coordination and negotiation (<i>deal with interdependencies between levels/units for water allocation</i>) 7. Intra-level coordination and negotiation (<i>deal with competing claims from multiples users and for multiple uses</i>) 8. Independent appeal and dispute resolution (<i>provide investigation and arbitration in cases of dissatisfaction with negotiated settlements</i>) 9. Independent knowledge production (<i>assess state of the water and social, economic and environmental impacts</i>)
---	--

Beyond the fact that the need for hydrologically based water management institutions can be questioned, Barham reminds us that “gains in human freedom and democratic self-rule have never been given but have always been won, sometimes only after long and bitter struggle” (Barham, 2001:190). By transferring authority from conventional political and administrative institutions like district and national governments and ministries to hydrologically based institutions, there is a risk of losing the spaces and mechanisms for democratic control and accountability which have gradually been gained.

Conclusions

Despite the lack of a comprehensive understanding of the relationship between poverty and water access and use, evidence from many parts of the world suggest that competition for water is increasing and that the poor gradually are losing their access to water. Empirical evidence from the Nicaraguan hillsides presented in this paper supports this claim. Moreover, the cases from the Nicaraguan hillsides illustrate that the appropriate scales of water management depend of the issue and the context, i.e. the topography, the institutional, political and social setting. Thus, rather than assuming that a single hydrological level would be the appropriate level for dealing with this wide range of water management issues, acceptance should be encouraged of the fact that water management takes place at multiple and often overlapping scales.

In terms of ensuring water governance which is inclusive of the concerns of the poor, this means that rather than aiming to craft a single organizational structure assumed to be capable of identifying, representing and negotiating the interests involved, the aim should be to create opportunities for participation – an enabling institutional environment. Key elements of such an institutional environment would be widespread access to water-related knowledge and information, i.e. to general hydrological assessments of the quality and quantity of water available within specific geographical areas; enhancement of the capacity among water users, particularly poor water users, with respect to legal and regulatory aspects of water management; broad-based hearing processes in relation to new water management initiatives, e.g. legislative or investments; and last but not least making dispute resolution mechanisms, such as a water

ombudsman, widely available and accessible, also to marginalized stakeholders, to provide help in settling conflicts caused by competing water management claims as well as by conflicting claims of users and water management institutions. It is this type of help which community members from El Descanso in association with downstream communities called for in 2002 and still are waiting for.

References

- Barham, E. 2001. "Ecological Boundaries as Community Boundaries: The Politics of Watersheds", *Society and Natural Resources*, Vol. 14, pp.181-191.
- Bauer, C.J. 1997. "Bringing Water Markets Down to Earth: The Political Economy of Water Rights in Chile, 1976-95". *World Development*, Vol. 25, No. 5, pp. 639-56.
- Bauer, C.J. 2004. *Siren Song. Chilean Water Law as a Model for International Reform*. Washington, D.C.: Resources for the Future.
- Black, M. and Hall, A. "Pro-poor Water Governance". In: Asian Development Bank. 2003. *Water and Poverty – A Collection of Thematic Papers*. Prepared by the Water and Poverty Initiative for the 3rd World Water Forum held in Kyoto, Shiga and Osaka, Japan, 16-23 march, 2003. Pp. 5-14.
- Cleaver, F. 2002. "Reinventing Institutions: Bricolage and the Social Embeddedness of National Resource Management". *European Journal of Development Research*. Vol. 14. No. 2, pp. 11-30.
- Funder, M. and Ravnborg, H.M. 2004. "Addressing Water Conflicts: Governance, Institutions and Functions". In: Ravnborg, H.M. Ed. 2004. "Water and Conflict – Conflict Prevention and Mitigation in Water Resources Management". *DIIS report*. Copenhagen: Danish Institute for International Studies.
- Global Water Partnership. 2000. *Towards Water Security: A Framework for Action*. Global Water Partnership.
- Global Water Partnership. 2003. "Poverty Reduction and IWRM". *TEC Background Papers*. No. 8. Global Water Partnership, Sweden.
- Jaspers, F. 2003. "Institutional Arrangements for Integrated River Basin Management". *Water Policy* Vol. 6, no. 5, pp. 77-90.
- Jazairy, I., M. Alamgir and T. Panuccio. 1992. *The state of world rural poverty. An inquiry into its causes and consequences*. International Fund for Agricultural Development. London: Intermediate Technology Publications.
- Meinzen-Dick, Ruth. 2003. 'Water Rights Issues in Agriculture'. In: Jinendradasa, Sithara.S. (ed.). 2003. *Issues of Water Management in Agriculture: Compilation of Essays*. Comprehensive Assessment, Colombo. Pp. 63-67.

- Narayan, D. with R. Patel, K. Schafft, A. Rademacher and S. Koch-Schulte. 2000. *Can anyone hear us? Voices of the poor*. Oxford: Oxford University Press.
- Ravnborg, H.M. with the collaboration of Escolán, R.M, Guerrero, M.P., Méndez, M.A., Mendoza, F., de Páez, E.M., and Motta, F. 1999. *Developing regional poverty profiles based on local perceptions*. CIAT publication no. 291. Cali: Centro Internacional de Agricultura Tropical (CIAT).
- Ravnborg, H.M. 2002a. “Perfiles de Pobreza para la Reserva Natural Miraflores-Moropotente, Municipio de Estelí, y el Municipio de Condega, Región I, Las Segovias, Nicaragua”. *CDR Working Paper 02.5*. Copenhagen: Centre for Development Research.
- Ravnborg, H.M. 2002b. “Poverty and Soil Management – Relationships from Three Honduran Watersheds”. *Society and Natural Resources*, Vol. 15, pp 523-39.
- Ravnborg, H.M. 2003. “Poverty and Environmental Degradation in the Nicaraguan Hillsides”. *World Development*, Vol. 31, no. 11, pp. 1933-46.
- Ribot, J. and Peluso, N.L. 2003. “A Theory of Access”. *Rural Sociology*. pp. 153-181.
- Sen, A. 1981. *Poverty and famines: An essay on entitlement and deprivation*. Oxford: Clarendon Press.
- Sen, A. 1985. *Commodities and capabilities*. Amsterdam: North Holland.
- Soussan, J. and Frans, D. 2003. “The Role of Water in the Development of Sustainable Livelihoods of the Poor”. In: Asian Development Bank. 2003. *Water and Poverty – A Collection of Thematic Papers*. Prepared by the Water and Poverty Initiative for the 3rd World Water Forum held in Kyoto, Shiga and Osaka, Japan, 16-23 march, 2003. Pp. 83-91.
- United Nations. 2000. “United Nations Millennium Declaration (55/2)”. Available at <http://www.un.org/millennium/declaration/ares552e.pdf>.
- Wester, P., Merrey, D.J. and de Lange, M. 2003. “Boundaries of Consent: Stakeholder Representation in River Basin Management in Mexico and South Africa”. *World Development*, Vol. 31, no. 5, pp.797-812.

Endnotes

¹ Unless another source is indicated, in the following information about the population of Miraflor-Moropotente and Condega stems from this household questionnaire survey.

² The same conclusion is reached on the basis of data from similar questionnaire-based research from three hillsides watersheds in Honduras (Ravnborg, 2002b), where between three and 23 percent of the poorest household had land with a water spring or stream, compared to between 47 and 64 percent of the non-poor households.

³ The name of this and followings persons interviewed have been changed to honour the spirit of confidentiality in which the information was given.

⁴ The name of the community has been changed to honour the spirit of confidentiality in which the information was given.

⁵ These two categories are overlapping so that a total of 49 percent of the households claimed to have experienced water problems, combining contamination and lack of water.

⁶ It should be noted that issues related to water management correspond to MIFIC and, in the context of water supply, to ENACAL, while MARENA only has the authority to intervene in water management related issues in cases of contamination or otherwise environmentally harmful water uses.

⁷ One of the arguments used to back this norm is that 'otherwise water running during the night would just be wasted' – an argument which obviously would only hold true if there wasn't a reservoir of sufficient capacity at the water intake.