Competing for water:
Understanding conflict and cooperation in local water governance
– a comparative and collaborative research programme

proposed by

Danish Institute for International Studies

and

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submitted to
The Research Unit
Danish Ministry of Foreign Affairs

June 2006

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1. Research objectives and expected results

Water is vital to local livelihoods and a key prerequisite for development. In recognition of this, recent years have seen an increasing focus on efforts to ensure effective water management in developing countries, reflected most clearly in the widespread water reforms taking place, often supported through associated donor funded programmes.

Alongside these developments, there is an increasing focus on water as a source of conflict. This has included growing attention to transboundary water conflicts and collaboration, and more recently also a spreading perception that the number and intensity of local water conflicts are growing (Carius *et al.*, undated; Thomasson, 2005). However, while transboundary water conflicts are quite well documented (Wolf *et al.,* 2003), the perception of growing *local* conflicts is based mostly on sporadic accounts of local water conflicts rather than on systematic empirical evidence. Even less is known with respect to how the poor, women and otherwise disadvantaged groups fare in such local conflict and cooperation, and, in general, how they are affected by increasing competition for water (United Nations, 2006). The lack of better insight into these issues limits the ability of Governments and donors to ensure that water policies are consistent with Poverty Reduction Strategies and with the overall objectives of poverty reduction and equal access to resources for men and women as well as for different ethnic groups.

Overall and specific objectives

The proposed research programme aims to contribute to *sustainable local water governance in support of the rural poor and otherwise disadvantaged groups in developing countries* by *improving the knowledge among researchers and practitioners of the nature, extent and intensity of local water conflict and cooperation and their social, economic and political impacts, and how this may change with increased competition for water*. Beyond its cognitive importance, such empirically based understanding has significant implications for the water policy, legal and administrative reform currently taking place in many developing countries, which – if poorly informed on the relationship between competition for water, conflict and poor people's access to water – may cause such reform to be ineffective and exacerbate rather than reduce rural poverty.

Expected results

Based on comparative research conducted in seven countries (Mali, Tanzania and Zambia in sub-Saharan Africa; Vietnam in south-east Asia; and Bolivia, Ecuador and Nicaragua in Latin America), the proposed research programme will provide the following main results:

- Quantitative inventories and qualitative case studies of the origin, nature, extent and intensity of local water conflicts and cooperation in seven countries in Africa, Asia and Latin America, and of their social, economic and political impacts
- Cross-cutting analysis and synthesis of findings from national studies, including typologies of water conflicts and cooperation and contributions to the theoretical understanding of the impact of economic and political inequality on the nature and outcomes of water-related conflict and cooperation
- Recommendations for ongoing water policy, legal and administrative reform developed and disseminated to national decision-makers, practitioners, researchers and relevant Danida sector support and Danida support provided through multilateral organizations
- Enhanced capacity and experience in the partner institutions within poverty-oriented analysis of water conflicts and cooperation

Programme partners:

The research will be conducted jointly in the seven sites by three Danish partners (Danish Institute for International Studies (lead), Nordeco and DHI Water and Environment); and seven national and two international partners (Centro Agua – Valle Alto de Cochabamba, Bolivia; Provincial Government of Tungurahua (PGT) and the Ambato Water Agency (AWA) – Tungurahua province, Ecuador; University of Bamako (UB) and International Institute for Environment and Development (IIED) – Duentza district, Mali; Nitlapan – Condega district, Nicaragua; Institute of Resource Assessment (IRA) and the International Water Management Institute (IWMI-South Africa) – Upper Ruaha catchment, Tanzania; Centre for Agro-Ecological Research and Environmental Studies (CARES) – Nghe An province, Vietnam; and Centre for Integrated Water Resources Management (CIWRM) and IWMI – Itezhi-Tezhi and Namwala districts, Zambia.

Combined this group of partners comprises social scientists, geographers, lawyers, economists, hydrologists, environmental scientists, and agronomists and thus provides a good platform for conducting the cross-disciplinary research envisaged in the present programme description. National government agencies, civil society organizations and practitioners will be involved through national working groups.

2. Background

Water and poverty are increasingly being linked in the public debate, not least due to the Millennium Development Goals and the explicit target to halve by 2015 the proportion of people without sustainable access to safe drinking water and improved sanitation. However, particularly in rural areas, the relationship between poverty and water reaches far beyond the lack of access to safe drinking water. Secure access to water for productive purposes, e.g. irrigation and water retention for crop production; watering of animals; ecosystem protection to ensure fish and grazing availability, as well as for environmental services (e.g. flood as well as drought control), is key to a significant part of the rural poor if they are to move out of poverty (Bruns and Meinzen-Dick, 2005; GWP, 2003; Hodgson, 2004; Hope, 2006; PEP 2005; Molden *et al.*, forthcoming; United Nations, 2006; World Bank, 2005).

As competition for water increases between users and uses, the poor and otherwise disadvantaged groups[1] tend to do less well than others in securing their access to water. In particular, entitlements to access water for productive purposes are often the first to be lost by the rural poor (Barker *et al.*, 2000; Bruns and Meinzen-Dick, 2005). In this context, the current tendency to focus upon drinking water at the expense of the recognition of the wider importance of water to the rural poor (Black and Hall, 2003; GWP, 2003; PEP, 2005; Soussan and Frans, 2003) is unfortunate, among other reasons because it diminishes the likelihood that access to water e.g. for productive uses for the rural poor is catered for in the legal, administrative and institutional water reforms currently taking place in many developing countries (Bruns *et al.*, 2005b).

Besides the fear that increased competition for water leads to poor people losing their access to water and thus further limits their options for moving out of poverty, there is a fear that increased competition for water leads to increasing conflict among users within as well as among different sectors. However, there is little empirical basis to support firm conclusions on causal relationships between increased competition for water and the emergence of conflict and subsequently about their nature, intensity and impact.

Inspired by Wolf and his colleagues (2003), we identify several shortcomings associated with the current evidence of the relationship between water competition and conflict:

- *Sporadic events*. So far, our understanding of the relationship between water competition and conflict has been based upon reports from sporadic events, rather than upon systematic overview of the complete range of water-related events within a given locality. Thus, the widespread sense that the number and intensity of water-related conflict is increasing may just

[1] Groups who are disadvantaged due to political priority given to specific productive sectors or segments of the population, and thus to specific water uses and –users, at the expense of others, e.g. to large-scale irrigation farming at the expense of pastoralists, ethnic minorities or women – all depending on the specific context.

as well be a reflection of improved means of registering and communicating such as conflicts, rather than a reflection of the number and intensity of the conflicts themselves.
- *Excludes cooperative events.* Conflicts tend to be more spectacular and thus easier to identify than events of cooperation. Moreover, as norms, rules, and interests tend to be more explicit during conflictive situations than during times of cooperation, focusing upon conflict often entails methodological advantages. However, excluding cooperative events implies that conclusions about causality between increased competition for water and conflict are, at best, incomplete. Accentuating this, and contrary to prevailing wisdom, Wolf and his colleagues (2003) found that there was no causal relationship between water stress and the likelihood of conflict in transboundary basins and that often, water acts as a unifier.
- *Lack of a temporal dimension.* Conflicts do get resolved. Over time and often through efforts of mediation and negotiation, conflicts, disputes and tensions get resolved and agreements to share or cooperate with respect to given water resources are reached. Snapshots of sporadic events – most commonly conflicts – fail to capture such processes of conflict resolution.
- *Loose definitions.* Terms such as conflict, dispute, tension and war tend to be used interchangeably and without clear definitions with respect to nature and intensity.

The identification of these shortcomings has informed the design of this research programme. Thus, as further described in Section 5, the research will:
- develop *comprehensive* inventories of water-related events within each of the selected sites for the research;
- ensure that the selected sites cover a *wide variety of situations* encountered in the rural areas of the developing countries from the arid Andean highlands with long traditions of intensive irrigation farming; through the mid-altitude, sub-humid to semi-arid hillsides of Tanzania and Nicaragua; the mountainous humid uplands and their associated lowland plains of Vietnam; to the sub-humid and semi-arid wetlands of Zambia and Mali, respectively; and finally to the dry plains of the Sahel, also in Mali. Although not representative in a statistical sense, this range of cases provides a sound basis for drawing reliable and more general conclusions;
- identify *conflictive as well as cooperative* water-related events;
- include a *temporal dimension* so that inventories of conflictive and cooperative water-related events are developed for a 10-year period (1995-2005); and
- define a *water-event intensity scale*, as an initial programme activity, ranging from violent conflict, through milder conflicts in the form of discontent by expressed through formal, e.g. legal or informal but legitimate channels to signing a formal agreement.

3. Conceptual framework

As witnessed by the many ongoing water reform efforts around the world, the need for better rules for coordinating water use and resolving conflicts accentuates with increasing competition for water. As noted by Bruns and Meinzen-Dick (2005:3), 'similar pressures to define property rights have emerged for land as it has become scarcer, but whereas changes in land tenure institutions are more familiar, studied, and debated, changes in water tenure have received much less attention.'

With water as a fluid and highly variable resource in quantity, quality and time, water tenure is more difficult to specify than land tenure. Yet, considerable advancement has been made, however, during the past decades to conceptualize water rights (Bruns and Meinzen-Dick, 2000 and 2005; Meinzen-Dick, 2003; the conference *African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*), and efforts are emerging which seek to accommodate and integrate formal and customary water rights (Bruns *et al.*, 2005a; Rogers and Hall, 2003).

However, as is the case for other resources, holding 'rights' – whether formal or customary – is neither a sufficient nor a necessary precondition to enjoy access to water (Bruns *et al.*, 2005b). In their *Theory of Access*, Ribot and Peluso (2003) distinguish between *property* and *access* as "the right to benefit from things" versus "the ability to benefit from things," the latter in turn being

gained, maintained or controlled through structural and relational mechanisms. 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). Politically or economically powerful stakeholders might obtain access to water to which they have no formal or customary rights, just as poor farmers with landownership-based rights to water may not enjoy access to that water due to lack of capital and technology for making effective use of that water. In this way, poor people's access to water does not only depend upon their rights to water but also upon the nature and level of political and economic inequality which shape the institutions – whether formal or customary – registering, sanctioning and enforcing these rights as well as the economic and technological opportunities to benefit from existing water rights.

Recent empirical studies of natural resource management and –conflicts furthermore suggest that processes of gaining, maintaining and controlling access are highly dynamic processes in which stakeholders actively negotiate, manoeuvre and shift positions (e.g. Juul and Lund, 2002). In doing so, they draw on but also actively recreate existing institutional frameworks and social, economic and cultural structures (Berry, 1993; Cleaver, 2002). In order to capture this dynamic, the research project will apply a combined structure/actor perspective (Giddens 1984, Bourdieu 1997). Hence apart from the structural features mentioned above (the institutions, rules and socio-economic resources held by stakeholders), the study will also explore the actual *processes* of water conflict and cooperation.

Thus, in addition to assessing the social impacts of water-related conflict and cooperation, the research programme aims to contribute to the understanding of the mechanisms through which political and economic inequality shapes the nature and outcomes of water-related conflict and cooperation.

4. Research questions

Based upon the background and conceptual framework outlined in the previous sections, the research programme seeks to answer the following research questions:

1. What is the extent, nature and intensity of local water-related conflict and cooperation in developing countries?
2. Which factors – bio-physical, socio-economic, political and institutional – are associated with different types of local water-related conflict and cooperation?
3. What is the causal relationship between competition for water and the nature, extent and intensity of water-related conflict and cooperation?
4. To which extent do the poor and otherwise marginalized groups enjoy access to water for domestic as well as for productive purposes?
5. To which extent are the poor parties to different types of water-related conflict and cooperation?
6. What are the social impacts of local water-related conflict and cooperation, particularly for the poor and otherwise marginalized groups?
7. What is the impact of political and economic inequality upon the nature and social impacts of local water-related conflict and cooperation?
8. How can national governments and donors address water governance issues in ways which help to resolve conflicts and foster cooperation while ensuring pro-poor and sustainable outcomes?

5. Methodological framework

a. Overview of the national and sub-national water policy, legal and administration context

To understand the formal national and sub-national water policy, legal and administrative context which sets part of the arena within which situations of competition, conflicts and cooperation are played out, the first programme activity will be to undertake a review of policies, regulations, and authorities involved in water governance at the national and sub-national level in the seven programme countries. The review will be based upon already existing knowledge among the

programme partners and others with respect to the water governance frameworks and ongoing reform in the seven countries (e.g. Boelens and Zwarteveen, 2005; Bustamante, 2002 and 2006; Cotula, 2006; De Vos *et al.*, 2006; Djire *et al.*, 2005; Juma and Maganga, 2005; Kabudi, 2005; Meinzen-Dick and Nkonya, 2005; Mwaruvanda and Lankford, 2005; Pedersen, forthcoming; Ravnborg, 2005; Van Koppen *et al.* forthcoming). The review will be updated throughout the research programme, and as our understanding develops of how conflicts and cooperation over water evolve in practice and are shaped by and shape water governance at the national and sub-national level, it will form the basis upon which recommendations on ongoing water policy, legal and administrative reform will be developed.

b. Inventories of events of local water conflicts and cooperation

A key aim of the proposed programme is to generate a systematic and empirically based understanding of the extent, nature and intensity of local water-related conflict and cooperation. To do so, a main component of the proposed programme is to develop comprehensive inventories of *all* reported events of either conflict or cooperation between social actors of which at least one is or represents a group of actual or potential water users[2] for the seven sites during the period 1995-2005 and of a representative sample of *unreported* events.

Reported events of water-related events of conflict or cooperation means events which have been registered with formal, public institutions such as (i) *agreements on water related issues*, registered with the formal legal system, e.g. at water agency; a notary public; local government etc. or using a government or non-governmental organization or programme as witness or intermediary, e.g. in the case of a domestic, irrigation or livestock water supply project; (ii) *complaints or denunciations registered* with formal as well as informal institutions perceived to form part of water governance such as the environmental or water attorney, the environmental or water ministry, local government, the water directorate or agency, the water supply agency, irrigation committee, pastoral committee; village headmen, customary dispute intermediaries, government or externally funded projects engaged in water supply or management; and (iii) *media reported events*, e.g. events reported to or by local or national newspapers, television and radio broadcasting companies.[3]

Unreported events of local water-related conflict or cooperation are events which have not been reported through formal channels outside e.g. the community, the borehole committee, the irrigation committee. In addition to the reported events, comprehensive records of *unreported* events of water-related conflict and cooperation will be collected through interviews with members of local drinking water, pastoral as well as irrigation committees and customary institutions as well as less formalized groups from a random sample of approximately 50 communities/neighbourhoods (both rural and urban) selected for each of the seven research locations. These records will be fed into the inventory. Aiming for comprehensiveness requires particular attention to ensure that information is captured on water-related events experienced not just by the local elites but also by disadvantaged groups within communities such as the poor, women and ethnic minorities.

In contexts with formal and functioning registration of water use rights such as Tungurahua, Ecuador, rich information may be obtained on reported water-related events whereas in contexts of weak or non-existing formal registration of water use rights such as Condega, Nicaragua, information on reported water-related events is expected to be sparse relative to the information which may obtained through field work on unreported events.

c. Database to identify factors associated with water-related conflict and cooperation

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2 Such groups of water users could be a community, a group of irrigation farmers, an environmental civil society organization, etc.

3 A brief exploratory study undertaken jointly by Nitlapan and DIIS in preparation of this programme during April and May 2006, identified seven government sources of information on water-related events for the district of Estelí, Nicaragua, in addition to a wide range of NGOs, development project offices, broadcasting companies, newspapers (Wheelock and Barrios, 2006).

All of these conflictive and cooperative water-related events will be characterized according to a number of features describing the event (*event descriptors*) as well as according to features describing the context (*context descriptors*) in which the event took place. The following is an indicative list of descriptors which will be further refined by the participating partners during initial email conferences and the inception workshop. This includes the water event intensity scale which will be developed drawing on e.g. Thomasson (2005) and Wolf and his colleagues (2003).

Event descriptors	***Context descriptors***
Origin and duration – beginning and (if applicable) conclusion of event *Type of event* – inter-user event, i.e. dispute or cooperation between different types of users; intra-user event, i.e. dispute or cooperation among a particular type of users; user/regulator events, i.e. dispute or cooperation between users and regulating institutions *Use type* – e.g. hydropower, irrigation, etc. *Claim features* – quantity or quality claims *Parties to the event* – urban/rural; domestic water supply organizations; irrigation committees; pastoral communities; environmental organizations; large-scale individual land owner; industrial enterprises; poor/non-poor; indigenous/non-indigenous; men/women *Institutional involvement* – formal and informal institutions involved or called upon during the event *Intensity of conflict/cooperation* – ranging from violent conflict through milder expressions of conflict to agreements of cooperation and water sharing *Status of the event* – resolved (in the context of conflict); enduring or uncontested (in the context of cooperation	*Bio-physical* – location; rainfall; altitude; main hydrological regime, e.g. availability, demand and flow of water *Socio-economic* – population density; land distribution; main water users and use patterns; degree of utilization of water for hydro-power, industry, commercial agriculture, small-scale agriculture, satisfaction of domestic water demands, pastoral water use *Political and institutional* – coherence between formal and actual water governance; overall effectiveness of water rights administration; existence of institutions for water conflict resolution; representation of the poorest in water governance institutions; representation of the poorest in political institutions in general.

This information will be entered into a database which will make it possible not only to provide an overall assessment of the extent, nature and intensity of local water-related conflicts, but also through statistical analysis (multiple scaling and regression analysis) to identify factors associated with local water-related conflict and cooperation and thus help to establish the causal relationship between competition for water and water-related conflict and cooperation. The assessment of the main hydrological regimes for the research locations will be undertaken by DHI in close collaboration with hydrology experts in the seven countries, who will be contracted for a shorter time period, applying simulation models, developed at DHI. [4]

d. Linking poverty, water access and water-related conflict and cooperation
Another key aim of the proposed programme is to assess the extent to which the water-related interests of the poor are represented in the events of water-related conflict as well as water-related cooperation. This assessment is proposed to be made through two lines of research:

- *A questionnaire-based survey* designed to enable an assessment of rural poor people's access to water as well as their use and management of water for domestic as well as for productive purposes vis-à-vis that of non-poor people. Thus, the questionnaire will contain two sets of questions: one set consisting of questions needed to develop poverty profiles for each research

[4] DHI has existing working relations with hydrology experts in Bolivia, Nicaragua, Tanzania, Vietnam, and Zambia, and in Ecuador, this expertise forms part of the programme through the Ambato Water Agency, which already applies the MIKE basin simulation software. In Mali, hydrological expertise will have to be identified.

location (e.g. Ravnborg *et al.*, 1999); and another set consisting of questions related to actual use and management of water for domestic and productive purposes, strategies employed to gain, maintain and control access to water, and problems experienced in this respect. The questionnaire will be administered to representative samples of rural households drawn from communities (20-30 communities) included in the sample for the inventory of unreported events (sample size of a minimum of 400 households per site).[5]

- *Process narratives of selected conflictive and cooperative events – in-depth case studies* to clarify the impact of water-related conflict and cooperation for the poor and women, and to understand the role of formal and informal institutions in *de facto* conflict and cooperation processes. In each site, three to five water-related events will be selected through a consultative process involving all research partners on the basis of the water event inventories and ensuring that in each country, cases will be selected to represent different types of events with respect to i) the water event intensity (from violent conflict through milder expressions of conflict to situations of water sharing and joint management); and ii) with respect to the institutional involvement ensuring the representation of both reported and unreported events. In each case, it is envisaged that qualitative, semi-structured interviews will be undertaken with direct stakeholders in the conflictive and cooperative events, exploring their actions and counter-actions in the course of the event (e.g. what claims and alliances they made, to and with whom, what social and economic resources they applied, which constraints they encountered, how they responded, etc.) (Lund, 1998). This will be supplemented by focus groups interviews (e.g. women's groups, poorest households) as well as a limited number of purpose-designed appraisal techniques (including household strategy and impact mapping, organizational mapping and scoring). Where possible, accounts held by indirect stakeholders to the conflictive or cooperative event will also be explored. In addition, scenarios developed through the *hydrological simulations*, will be introduced as additional inputs for the focus group interviews both with an aim to enrich the focus group interviews and to further develop the simulation tools to provide tools which can be applied on the spot in stakeholder meetings. Based on the above, process narratives will be produced for the selected event, on which basis analysis, synthesis and qualitative comparison can be made.

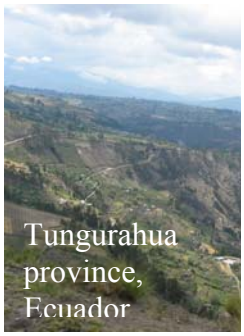
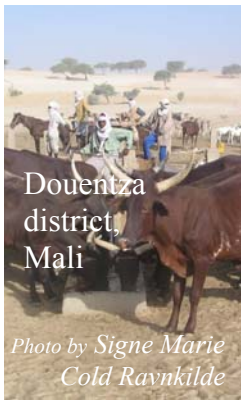
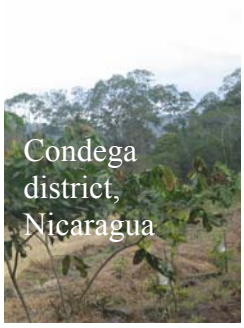
6. Research locations

The selection of the seven sites for the proposed research programme (please see table below) has been guided by the following criteria:

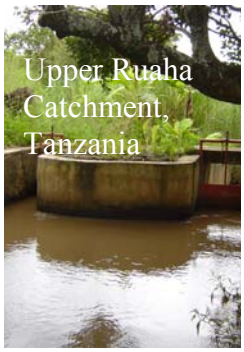
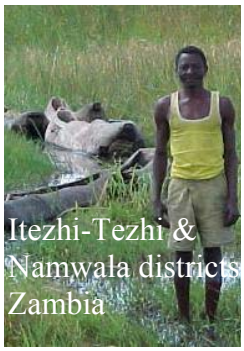
- presence of a multitude of water uses such as small-scale farming, domestic water consumption, irrigation, livestock keeping, and industry, including hydro power generation;
- avoidance of *exclusive* focus on "hot-spot" sites, i.e. sites with extreme records of water-related conflicts;
- geographical spread of sites across continents and agro-ecological zones;
- representation of diverse conditions with respect to water availability and population density;
- focus on Danida programme countries; and
- existence of previous research experiences and established research partnerships.

Research locations, characteristics, prominent water issues and country research teams

[5] A similar survey is planned to be conducted in Ambato watershed from August to October, 2006, coordinated by Helle Munk Ravnborg as part of the research project "Payment for Environmental Services as a mechanism for promoting rural development in the upper watersheds of the tropics" undertaken jointly with CIAT and Condesan/Cuencas Andinas as part of the CGIAR Water and Food Challenge programme, partly financed by Danida.

	Characteristics Area; population; # communities; altitude (m asl) & Rainfall range (mm)	Prominent water issues	Country research teams[6]
 Valle Alto de Cochabamba, Bolivia	2,205 km^2 78,717 persons 150 communities 2,700 – 3,100 m 300 – 800 mm	Latent competition between traditional irrigation agriculture and increasing urban needs – occasionally breaking into violence. Legal pluralism (and confusion – water law dating back to 1906) and lack of coordination of access, use and management (e.g. Alurralde, 2006; Boelens & Bustamante, 2005; Boelens & Dávila, 1998; Westermann & Bustamante, *forthcoming*).	▪ Rocío Bustamante (SCR), Centro Agua ▪ RA1 ▪ Olaf Westermann (Post doc.), DIIS ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist
 Tungurahua province, Ecuador	3,335 km^2 447,000 persons 2,200 – 4,300 m 400 – 2,000 mm	Andean community-based irrigation; emergence of non-traditional users of water (e.g. commercial, export-oriented farming, municipal water use) accentuates need for formalizing water rights. Almost all available surface water formally given in concession while a large proportion of customary users of water have not had their water rights formalized. Contamination from pesticide use causes problems to rural domestic water supply (e.g. Boelens & Boornbos, 2001; Boelens & Hogendan, 2002; Boelens & Gelles, 2005; HCPT, 2004)	▪ Asael Sanchez, AWA, (SCR) ▪ Daniel Casañas (RA), PGT ▪ Olaf Westermann (Post doc.), DIIS ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist
 Douentza district, Mali *Photo by Signe Marie Cold Ravnkilde*	18.903 km^2 149.000 persons 255 communities + pastoral groupings 200 – 1,000m 100 – 600 mm	Multiple and often conflicting uses of water sources such as seasonal and temporal lakes between different users (farmers, fisherfolk, pastoralists); competing uses and competing authorities governing access to key water resources such as wetlands (dry season grazing used by pastoralists obtaining access through traditional authorities versus rice cultivation, sometimes by women, obtaining access through modern authorities (e.g. Bocoum *et al.*, 2003; Cotula, 2006; GoM, 2002)	▪ Moussa Djire (SCR), UB ▪ Daouda Mamadou (RA), UB ▪ Ced Hesse (ISR), IIED ▪ Lorenzo Cotula (ISR), IIED ▪ Ph.D.1, DIIS and GI, CU or IU, RUC ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist
 Condega district, Nicaragua	371 km^2 30,000 persons 64 communities + Condega town 520 – 1,485 m 700 – 1,800 mm	In hillsides, water use for irrigation is emerging but at an individual and informal level. Water rights established on the basis of land ownership, if not by water grabbing, and rarely legally backed. Many communities lack domestic water supply. Downstream, water is increasingly used for the growing tobacco industry, municipal water supply and other industrial uses. Contamination from pesticide use increasingly causes problems to rural domestic water supply (e.g. Municipio de Condega/Octupan, 2002; Ravnborg, 2003; *forthcoming*)	▪ Ligia Gómez (SCR), Nitlapan ▪ RA2, Nitlapan ▪ Helle Munk Ravnborg (SR), DIIS ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist

[6] SCR – Senior Country Researcher; RA – Full-time research associate; ISR – International Senior Researcher; SR – Senior Researcher; SS – Social Scientist.

 Upper Ruaha Catchment, Tanzania	21,500 km^2 1,3 mio. persons 1,000 – 2,500 m 600 – 1,500 mm	Water used for rainfed as well as irrigation farming, environmental uses and hydropower generation further downstream. High influx of migrants, mostly pastoralists and agro-pastoralists. Attempts to formalize water use rights claimed to cause concentration of access to water with powerful stakeholders and break down of traditional water sharing and conflict resolution mechanisms (Maganga *et al*. 2004; Sokile *et al.*, 2005; Van Koppen *et al.;* 2004)	▪ Faustin Maganga (SCR), IRA ▪ Barbara Van Koppen (ISR), IWMI ▪ Simon Mwansasu (RA), IRA ▪ Ph.D.2, DIIS and GI, CU or IU, RUC ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist
 Nghe An province, Vietnam	16,442 km^2 2,9 mio. persons 0 – 2,700 m 1,312 – 2,228 mm	Up- and lowland rice cultivation (rainfed and irrigated). Increasing economic differentiation between uplanders and lowlanders. Also logging and infrastructure development in important river basin (Ca River). Watershed management, IWRM and land reform programmes ongoing (Bruns, 1997; Vien *et al.,* 2001)	▪ Tran Duc Vien (SCR), CARES ▪ Quang Nguyen (RA), CARES ▪ Thomas Skielboe, Nordeco ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist
 Itezhi-Tezhi & Namwala districts Zambia	20,300 km^2 129,100 persons 1,020 m 535 – 795 mm	Large wetland areas with multiple user conflicts: fisherfolk, smallholder farmers, estate farms, national power company (dam), Protected Area authorities etc. (e.g. Chileshe *et al.*, 2005; Robinson, 2001; Schelle & Pittock, 2006)	▪ Imasiku Nyambe (SCR), IWRMC ▪ Emelia Mweemba (RA), IWRMC ▪ Chimwang'a Maseka (RA), IWRMC ▪ Mikkel Funder (SS), Nordeco ▪ Roar Askær Jensen (SR), DHI ▪ Hydrology specialist

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TIME SCHEDULE

Project Starting Date: 01/04/07
Project Completion Date: 31/03/10

Period:	Host Country:	Activity:
01.04.07 – 30.04.07	Denmark & 7 programme countries	Programme start up, formation of country research teams and national working groups, developing ToR and signing collaboration agreements, transfer of funds
01.04.07 – 30.06.07	7 programme countries	Establish overview of institutional and legal context
June 2007	Denmark	Inception workshop
01.07.07 – 31.05.08	7 programme countries	Undertake data collection for inventory (archives, interviews, etc.) and establish inventory database
01.10.07 – 30.06.08	7 programme countries	Undertake household questionnaire surveys on poverty and water access and management
01.06.08 – 30.09.08	Denmark and 7 programme countries	Joint analysis and synthesis from inventories and questionnaire survey
01.10.08 – 31.03.09	Denmark and 7 programme countries	Writing of journal articles/book chapters and production of television documentary in preparation of the 5th World Water Forum
01.10.08 – 30.06.09	7 programme countries	In-depth case studies
01.01.09 – 31.08.09	Denmark and 7 programme countries	Joint analysis and synthesis from in-depth case studies
01.07.09 – 31.03.10	Denmark and 7 programme countries	Writing of journal articles/book chapters and national dissemination of main programme findings
December 2009	Denmark	Final programme workshop and international conference
Whole programme period	Denmark and 7 programme countries	Email conferences (as specified in detailed activity plan below) and national working group workshops