

# Competing claims for water in the Central Rift Valley of Ethiopia: Global drivers and local opportunities

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**Abstract.** Thanks to favourable policies for agricultural investments, both small scale and large scale irrigated agriculture has expanded rapidly in the Central Rift Valley of Ethiopia. This closed river basin encompasses a chain of three lakes with unique hydrological and ecological characteristics including a biodiversity rich national wetland park. The irrigation development has been associated with the over-exploitation of the limited water resources and the increased competition for land and water resources. Policy makers and other stakeholders seem to have a limited capacity to respond to the negative impacts of the ongoing resource degradation on the local livelihoods and the ecosystem. This paper describes the application of a framework to better understand the competing resource claims in the Central Rift Valley as a basis for identifying and implementing locally-owned and action-oriented R&D options. The framework proved useful to disentangle myths from facts and to highlight the fact that local responses are often constrained by policies at higher societal levels. Maybe more importantly the framework served to build new alliances among stakeholders addressing resource claims in a locally-owned and action-oriented R&D agenda.

**Keywords** negotiation processes, stakeholder processes, action-oriented research and development, horticulture

## INTRODUCTION

Over the past decade, economic liberalization and the globalization of food and non-food systems have fostered investments in agriculture in many parts of Africa, including Ethiopia (UNCTAD, 2009). The Government of Ethiopia embraced these developments within its Agricultural Development Led Industrialization (ADLI) strategy, which forms the cornerstone of Ethiopia's poverty reduction strategy (MoFED, 2006). As part of ADLI, the Government of Ethiopia and international donors actively support the commercialization of smallholder agriculture as well as the development of large scale export-oriented agriculture among others in the Central Rift Valley of Ethiopia.

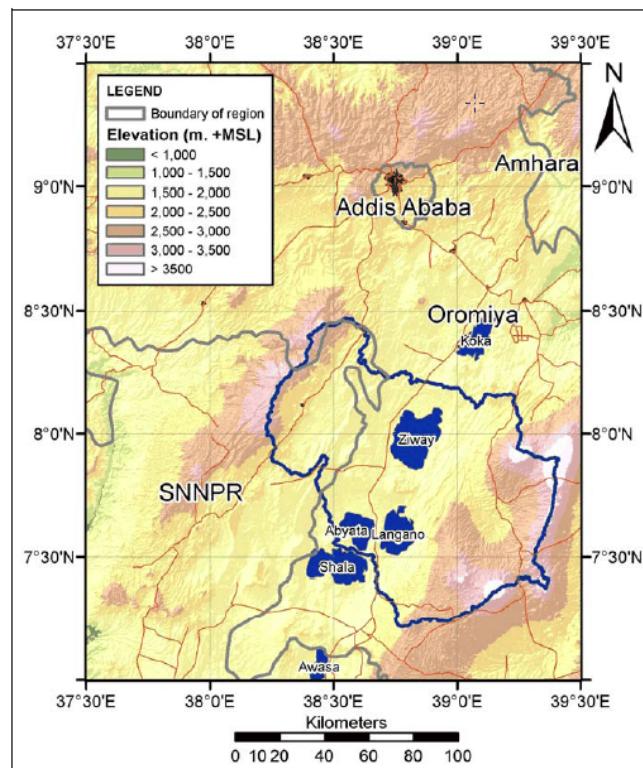
As a result of various driving forces at different scales, both small scale and large scale irrigated agriculture has expanded rapidly in the Central Rift Valley. This development has been associated with the over-exploitation of the limited water resources (Legesse and Ayenew, 2006) and the increased competition for natural resources (Jansen et al., 2007). Local policy makers and other stakeholders seem to have a limited capacity to respond to the negative impacts of the ongoing natural resources degradation on the livelihood of communities and on the ecosystem. There is a lack of proper management of natural resources, and there is an urgent need for

improved resource use planning and integrated land and water management, taking into account the carrying capacity of the Central Rift Valley ecosystem.

This paper describes the application of a multi-scale framework to better understand the competing resource claims in the Central Rift Valley as a basis for identifying and implementing locally-owned and action-oriented R&D options.

## CENTRAL RIFT VALLEY IN ETHIOPIA

The Central Rift Valley (approximately between 38°15'E and 39°20'E, and 7°10'N to 8°30'N) totals about 1 million hectare and is part of the Great African Rift Valley. The Central Rift Valley is 150 km south of Addis Ababa, and encompasses a chain of three large lakes, i.e. Lake Ziway, Abyata and Langano (Fig. 1). Lake Ziway acts as the only large freshwater buffer of the region and discharges through the Bulbula river into the terminal and saline Lake Abyata, which is part of the Abyata Shala National Park. The elevation of the Central Rift Valley ranges from approximately 1,600 m above sea level in the valley to over 3,000 m on the east and west. Annual rainfall ranges from about 650 mm near Lake Abyata in the valley up to 1,250 mm in the higher elevations near the borders of the basin. Average annual temperature varies from 19 °C in the valley to about 14 °C in the higher elevations.



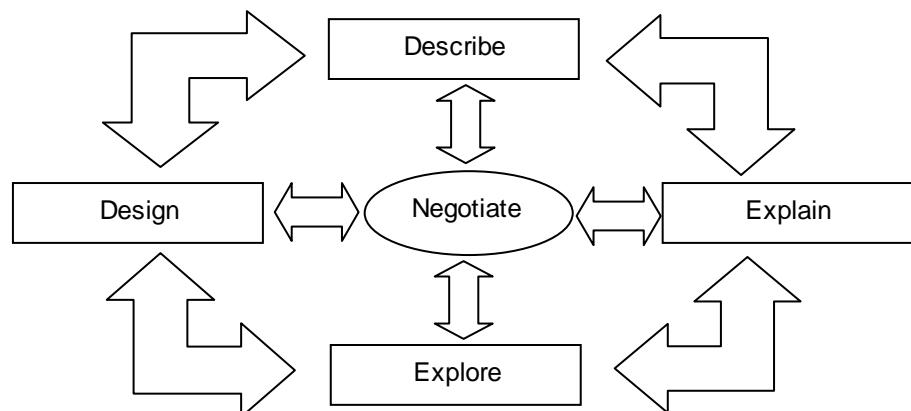
**Fig. 1** Location of the Central Rift Valley in Ethiopia

Since the Central Rift Valley is a land locked basin, i.e., there is no inflow and outflow of surface water, relatively small interventions in land and water resources have far reaching consequences for ecosystems goods and services, and potentially undermine the sustainable use of the area (Ayenew, 2004; Legesse and Ayenew, 2004). Recently, lake levels have dropped across the Central Rift Valley, but most dramatically in the terminal Lake Abyata that has shrunk to about 50% of its pre 2000

level (Jansen et al., 2007). During the same period the irrigated area increased from a few thousand hectares to more than 15,000 ha in 2010. The basin-wide drop in surface water tables has been associated especially with the increase in water extraction for irrigation in the Central Rift Valley (Legesse and Ayenew, 2006; Jansen et al., 2007; MoWR, 2008). In addition, there are a number of other processes of environmental degradation exacerbating the resource claims in the Central Rift Valley. These processes are common for other parts of Ethiopia as well and include the gradual erosion of wood stocks, the over-grazing of common pastures and the lack of proper soil management resulting in decreased land productivity and expansion of cultivated land to marginal areas (Tadesse, 2001).

## METHODOLOGICAL FRAMEWORK

Increasingly, participatory approaches are developed that promote negotiations among stakeholders leading to concerted action and the sustainable management of natural resources (Chambers, 1994; Röling, 1996; Edmunds and Wollenberg, 2001). The question is how science can facilitate and contribute to complex societal negotiation processes involving stakeholders from different disciplines and scale levels. Giller et al. (2008) proposed a methodology that addresses both the different scales at which stakeholders operate and the interdisciplinarity including collaboration with these stakeholders required to integrate knowledge across scales and disciplines. The methodological framework hinges on four analytical and interactive steps that feed into different phases of the **NE**gotiation process, i.e. **D**escribe, **E**xplain, **E**xplore and **D**esign, also known as the NE-DEED research cycle (Fig. 2).



**Fig. 2** Methodological framework to analyze competing claims on natural resources and to support stakeholder negotiation processes (modified from Giller et al., 2008)

See Giller et al. (2008) for a more comprehensive background of the methodological framework and a detailed description of its components. Here we briefly describe the four iterative steps of the framework and their relationship with the societal negotiation processes. Focus in the first step (Describe) is on identifying the various driving forces of the competing claims in an area and the relevant stakeholders. Analysis of the resource base and its dynamics sheds light on the rate of change and future developments under business-as-usual conditions. The second step (Explain) aims at better understanding of the resource dynamics and the magnitude of the competing resource claims by developing and applying a suit of simple and complex quantitative approaches. The third step (explore) includes the identification of

alternative resource management options including institutional barriers based on scenarios, participatory needs assessments, etc. Step four (design) consists of concerted R&D actions aimed at mitigating competing claims, improving resource use efficiencies, and getting a process going to address required changes in the policy and institutional system at different levels to provide sufficient innovation space to reconcile competing claims. New insights and knowledge gained in the four steps can support societal negotiation processes that are ongoing in different policy arenas and stakeholder networks in a given conflict situation. By providing input to these processes, science can increase the transparency of the debates and assist in developing creative and integrative solutions that cross disciplinary borders.

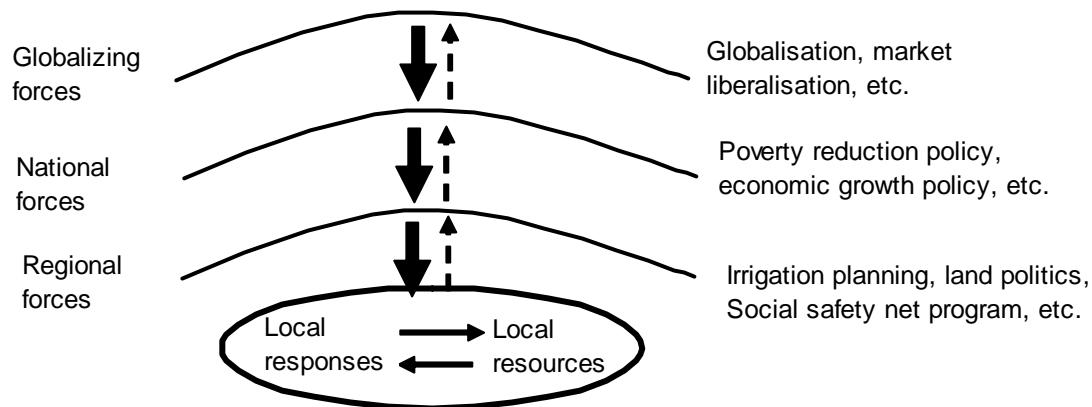
## **NEGOTIATION PROCESS: CENTRAL RIFT VALLEY WORKING GROUP**

The environmental degradation in the Central Rift Valley, especially the drop in the water table of the terminal Lake Abyata received broad public attention and laid the foundation for a multi-stakeholder platform. The Central Rift Valley Working Group was established early 2006 by a group of professionals with a stake in the sustainable development of the area. The objective of the Central Rift Valley Working Group is to promote a basin wide integrated land and water resources development and management approach in the Central Rift Valley. The objectives of the working group encompass the (i) generation, documentation and dissemination of information and knowledge, (ii) fostering collaborative response to development issues, (iii) lobbying, advocacy and awareness raising, and (iv) networking and experience sharing.

The Central Rift Valley Working Group consists of representatives of the public sector (e.g. federal and regional government organizations), private sector (e.g. tourism enterprises), academia but particularly civil society organizations with a stake in different types of local development projects. The Central Rift Valley Working Group does not have a formal governance structure and membership. It is rather a loose network of interested parties and individuals that are devoted to the sustainable development of the Central Rift Valley, each from their own perspective. A core group of the civil society organizations takes the responsibility for organizing meetings, often with rotating chairmanship. Participation in the meetings of Central Rift Valley Working Group is on voluntary basis implying that the composition of the Group meetings is subject to variation. Two important incentives for attending the meetings are the possibility for networking, information sharing and the presence of donors. For example, one of the civil society organizations provides funds for demand-driven action research facilitating joint research activities of academia, civil society organizations and the private sector. Since the Central Rift Valley Working Group has no legal mandate participating stakeholders can therefore only decide on problem-solving actions that are within their own control and capacity. Complex issues requiring broad solutions at other scales, for example, new legislation can only be addressed by the federal or regional government. The Working Group can, however, influence government policy through advocacy, lobbying and raising awareness (see objectives of the platform). Since its foundation, the Central Rift Valley Working Group has been a major platform for initiating collaborative research and knowledge dissemination to support the policy dialogue on sustainable development in its focus area.

## DESCRIBING AND EXPLAINING RESOURCE CLAIMS

It is beyond the scope of this paper to report in detail on the first two steps of the methodological framework, i.e. the description and explanation of the resource claims in the Central Rift Valley. Here, we present a schematic representation of the scales at which different policies and regulations affect responses of local stakeholders in the Central Rift Valley (Fig. 3).



**Fig. 2** Various driving forces at different levels in the Central Rift Valley (modified from Giller et al., 2008)

Market liberalization and globalization of food and non-food systems have fostered large scale investments in horticulture and floriculture for export purposes in the Central Rift Valley. This development is further supported by national policies, for example, through the provision of tax holidays and the tax-free import of inputs for investors. In addition, Ethiopia's poverty reduction policy as described in ADLI places agriculture at the centre of its growth strategy. The strategies under ADLI include among others the facilitation of smallholder commercialization through crop diversification and a shift to high value crops. Promoting irrigation is one of the intervention areas of ADLI to realize these goals. International donors embraced ADLI also as a solid framework to channel development aid through civil society organizations operating at grassroots level: various civil society organizations operating in the Central Rift Valley provide smallholders united and cooperating in legally registered Water Use Associations subsidised irrigation infrastructure (pumps, tubes). The various policies at different scales drive irrigation development in the Central Rift Valley and increase the claims on scarce water resources. However, also claims on land and livestock feed increase as the need for land driven by investments in irrigated agriculture generally goes at the expense of common grazing lands close to freshwater resources. Requests for land by investors, channelled by the federal or regional government to district levels, are first satisfied by providing common grazing land as no financial compensation needs to be paid to farmers. The reduced availability of common grazing land results in new biomass (feed) claims elsewhere in the Central Rift Valley.

This brief and highly schematic narrative of a part of the policy structure contributing to increased resource claims in the Central Rift Valley illustrates the space within local responses need to be generated to mitigate such claims. Local responses depend on the available local resources, but are constrained or enabled by policies developed at higher societal scales. The bold arrows in Fig. 2 indicate that driving forces from higher to lower scales are generally much stronger than the feedback

(dashed arrow in Fig. 2) that can be provided by lower scales to the higher policy scales.

Different quantitative studies have been conducted often together with participating organizations of the Central Rift Valley Working Group to quantify important relationships helping to understand resource claims in the Central Rift Valley. Results of these studies can be found in reports, presentations and policy notes available from the website [www.crv.wur.nl](http://www.crv.wur.nl). A summary of the major findings and recommendations of the various studies:

- Recent reductions in the lake levels in the Central Rift Valley are associated with land developments especially the expansion of furrow-irrigated horticulture.
- Although the furrow-irrigated horticulture sector provides income to a growing part of the population in the Central Rift Valley, the little information available suggests that its economic and environmental performance can be improved considerably.
- The potential impacts of emissions (nutrients and biocides) from horticulture and floriculture systems on the surface water resources should be further investigated.
- There is an urgent need to identify alternative livelihood strategies for the local population that consume less fresh water resources such as tourism, improved management in rainfed agriculture and fisheries/aquaculture.
- Further uncoordinated exploitation of the land and water resources may have dramatic consequences for the local population and development options as the only fresh water lake (Lake Ziway) may become a closed lake resulting in increased salinity levels.

## **FROM GLOBAL DRIVERS TO LOCAL ACTION**

Through meetings of the Central Rift Valley Working Group and organization of stakeholder workshops research findings were verified and, if needed local knowledge incorporated before engaging in other discourses. This process of knowledge verification and generation contributed both to the social learning of participants of the Central Rift Valley Working Group and to the broader policy dialogue required for improving natural resources planning, management and decision making in the Central Rift Valley. An important task of science in the descriptive and explanatory steps of the methodological framework (Fig. 2) is to demystify prejudices and to reveal misconceptions with respect to past and on-going developments in the Central Rift Valley.

Some of the findings and conclusions were difficult to accept by policy makers and other stakeholders as they conflicted with government policies, with on-going activities of civil society organizations and with the common beliefs and opinions of stakeholders. Especially, the finding that the furrow-irrigated horticulture sector was the largest consumer of fresh water was an eye opener for many stakeholders and difficult to accept by policy, and by civil society organizations participating in the Central Rift Valley Working Group. The furrow-irrigated horticulture sector consists mainly of smallholders that receive financial and technical support from government institutions and civil society organizations as part of development programs to reduce poverty and to spur economic growth. Other conclusions indicated the need for more research, for example, on the possible environmental impacts of agro-chemicals associated with the increased intensification of agriculture in the Central Rift Valley. This conclusion was more easily accepted by stakeholders but revealed the lack of

public institutions in Ethiopia that are in charge of and responsible for monitoring water quality. This indicated at the need for new institutional arrangements at a level beyond the acting ability of the Central Rift Valley Working Group.

In general, multi-stakeholder platforms do not automatically lead to solving complex resource problems and the active participation of stakeholders in solutions aimed at mitigation of competing resource claims (Warner, 2007). We, therefore, organized a participatory workshop with representatives of more than 30 local organizations to jointly develop a vision for the future development of the shoreline of Lake Ziway, including the identification of priority R&D activities contributing to the realization of this vision (Hengsdijk et al., 2009). This explorative phase of the methodological framework (Fig. 2) resulted in the identification of four priority areas for action-oriented R&D taking into account the understanding of the resource claims and the acting ability of local stakeholders:

1. A pilot on commercial smallholder horticulture to support the sustainable intensification of the sector, i.e. improving the socio-economic performance while reducing its environmental impact.
2. Water quality monitoring in response to the risks for pollution of fresh water resources by the agricultural intensification in the Central Rift Valley.
3. Buffer zone development along water bodies to conserve soil and water resources and the natural landscape.
4. Tourism promotion as an alternative livelihood strategy for the local population that consumes considerably less water than the agricultural sector.

These four R&D areas are currently being implemented in collaboration with local partners and represent the design stages of the framework presented in Fig. 2. All four R&D areas involve new public-public and public-private partnerships supported by scientific research, and they address different scales. For example, the horticulture pilot is mainly embedded in local development organizations and local government authorities, but the water quality monitoring and buffer zone activities go beyond the local level as they also involve the liaison with the private sector and knowledge of the current legislation defined at national level, such as different environmental proclamations and land ownership rights. The tourism component is being implemented in collaboration with a locally based private tourism association working for sustainable tourism in the region.

## DISCUSSION AND CONCLUSIONS

Systems facing competing resource claims require transdisciplinary and cross-sectoral approaches across different scales as such systems are used, managed and governed by different groups of people operating at different scales (Giller et al., 2008). Since these groups have often conflicting objectives solutions are complex and involve political considerations and decisions. The stakes are high in the Central Rift Valley, where both the public and private sector focus on irrigated agriculture as one of the important means to alleviate poverty and to increase the economic growth of a country with a large part of its citizens structurally depending on food aid. The national government provides tax holidays and other financial incentives to large-scale investors in irrigated agriculture, while many civil society organisations depend on donor funding allocated for the promotion of irrigated horticulture as a means to alleviate widespread poverty under smallholders. Various stakeholders face important dilemmas in their policy to stimulate agricultural intensification, while environmental considerations are not

addressed. Science has contributed to better understanding that current developments in the Central Rift Valley are unsustainable and that various stakeholders are part of the problem and thus need to be involved in finding appropriate options and solutions. At least one of the donors in the Central Rift Valley Working Group changed its policy concerning its support of civil society organizations focusing on irrigated smallholder horticulture. Emphasis in the donor program shifted from promoting irrigation towards improving water use efficiency and service provision to improve the performance of existing irrigation smallholders.

The methodological framework feeding into a stakeholder negotiation process was important for disentangling myths from facts, but maybe it was even more important for connecting various stakeholders that did not know each other before but had similar objectives and interests. Due to the recent policy decentralization process in Ethiopia collaboration among the federal, regional and district authorities has not yet been well established resulting in little coherent policies and poorly structured information flows among different policy levels and among other stakeholders from both the public and private sector. The Central Rift Valley Working Group allowed building new alliances to jointly identify and implement R&D projects within the mandate and authority of stakeholders. This led to new public-private-civil society partnerships but also new coalitions among public institutions addressing, for example water quality monitoring, for which institutional responsibility is currently lacking at federal and regional policy levels in Ethiopia. Lack of understanding of the functioning of the socio-ecological system of the Central Rift Valley may not be the major problem, rather the lack of science and knowledge for policy development at different scales and for developing the adaptive capacities of local stakeholders to respond adequately to new and changing socio-ecological conditions. Although science needs to be modest about its role in complex resource-constraint situations such as in the Central Rift Valley, we show in this paper how science can contribute to the development of local opportunities to mitigate resource claims.

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