

## Success and Failure in Cooperative Water Resource Management: Case Studies at the Local and Regional Level

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### ABSTRACT

This paper argues that the key to developing resilience to reduced water supplies, due to climate change or resource depletion, is cooperation between stakeholders at the local and international level. Using case studies at two different levels of analysis, the paper also holds that the lack of participatory methods of water management at the local level often feeds trans-boundary disputes and friction. It argues that the solution lies not in the withdrawal of the state from agriculture but in an involved state that transparently interacts with its farming communities.

**KEY WORDS:** Trans-boundary water disputes, climate change, aquifer depletion, farming cooperatives.

### INTRODUCTION

Water management has often focused on the issue of water distribution among the stakeholders of any water management system. The often repeated assumption was that water was an object of conflict at all levels of human organization from the individual farmer onto nation states. The idea was that water was somehow worth fighting for. In of itself, this is not a bad idea. After all, conflict at wither the personal, communal or national level entails many risks and a decision to enter into a conflict relationship needs to be taken rationally. Of course, this idea has been opposed by many researchers in the field of water management (Lowi, 1995). While the focus on conflict is interesting, it also moves us away from studies of cooperative behaviour, and this is a shortcoming that this paper seeks to address. How does cooperative behaviour work in areas where water is scare and where people lack the resources to address water shortages caused by climate change, over-extraction of aquifer water, and poor system-wide coordination and management by the state or states in question?

Increasingly cooperative behaviour in terms of water is no longer an optional, because of the threat paused to local agriculture from dramatic changes in climate and in the availability of water resources. To that end, this paper examines three cases at two levels of analysis. The first case examines the policies within the Nile basin when it fell under one *de facto* authority; the second case examines the recent failures in implementing a common management scheme in the Nile basin. The final and most important case study examines the success at a micro-level of a cooperative in the El Hajeb region in Morocco. It is a case study that focuses on the local as a micro-level component ultimately of the national and where water policies are implemented and where they succeed or fail. "[S]ound water management both require and impel national, regional and international action. But national and supranational strategies alone are not enough. Experience around the world proves that local management is essential to the sustainable exploitation of scarce water supplies" (Brooks,

2002). This paper attempts to combine the international and the local. Each brief case contains a general description, a broad outlines of the policies, their outcomes, and an assessment of the success or failure in implementing a cooperative regime. This paper concludes with some reflections on questions and conclusions that can be gleaned from studying these three cases, and their implications for policy. The Zoubiya Cooperative in the Hajeb district in Morocco was given substance by a group of farmers inspired by International Development Research Center-sponsored workshops to pool their resources together in order to insure effective use of water resources from a canal. In contrast, the repeated attempts of Nile Basin states to form a cooperative regime that includes all of the riparians failed.

Using structured and focused comparison, this study examines the factors that led to the relative success of the small cooperative in creating an integrated bottom up system that pools resources together in order to develop some positive perscriptions for the Nile Basin. The factors examined include diversity, integration, centralization, leadership, and the level of inclusion in both cases. The overall methodological orientation of this paper is qualitative and includes the teams's reflections on time spent on the field. Throughout our research, we have found that the use of inclusive methods and self-organization of the stakeholders is far superior to either imposed solutions, as with the Nile during the years of British rule, or alternatively, attempts by each stakeholder to help themselves at the expense of the others, as is the case with the Nile today. Furthermore, we have come to understand the external environment plays a vital role in shaping and creating outcomes not only through physical intervention but also due to the movement of information that can be generated by the research program itself. To a large extent, our team was surprised with the unplanned and unexpected emergence of the Zoubia cooperative as a direct result of our three year research project funded by the Canadian International Development Research Center – an agency of the Canadian government.

### The Nile Under British Rule

In some ways, the presence of an imperial power that leads a whole water basin presents an opportunity to institutionalize “total basin” approaches to water management. Between 1899 and 1856, the United Kingdom was in such a position in the Nile Basin. It also held an enormous degree of influence in the sole independent state in the region – Ethiopia. The East African were under British control. Rwanda and Burundi, and Congo were under Belgian rule, but given the differential in power, it is almost certain that the United Kingdom influenced Belgian decision making on the Congo. Italy had acquired Eritrea in 1891, and it quickly agreed not to develop any water resources that affect the Sudan without British approval (Okoth-Owiro, 2004, p. 6). This period is defined by a de-facto imposition of an integrated water demand management regime that greatly favored Egypt. British policy in the Nile was explained in a 1925 letter from Lord Allenby to Ziver Pasha concerning Egyptian fears about British plans for the development of irrigation dams for the Gezira Scheme – a massive irrigated cotton growing project in Sudan: “I need not remind your Excellency that for forty years the British Government watched over the development of the agricultural well-being of Egypt, and I would assure your Excellency at once that the British Government, however solicitous for the prosperity of the Sudan, have no intention of trespassing upon the natural and historic rights of Egypt in the waters of the Nile, which they recognise today no less than in the past, and in giving the instructions in question to the Sudan Government His Majesty’s Government intended that they should be interpreted in this sense.” (Lord Allenby, January 26<sup>th</sup>, 1925 as cited by Okoth-Owiro, 2004, p. 81)

While Allenby clearly acknowledges the diversity of interests in the Nile Basin, there is a clear hierarchy being established in favor of Egypt. The British did not consult any Sudanese traditional rulers or local elites before extending these assurances to Egypt, and they certainly refrained from fully developing the Nile’s resources for their East African possessions, despite the works they built on Lake Victoria. In other words, while their policy was certainly coherent and clearly basin-wide, it was also seen as illegitimate and did not have the support of local communities. Furthermore, it was premised on continued lack of interest in the Nile by Ethiopia due to the latter’s ability to rely on rain-fed agriculture. Given the era, there were no considerations given to the inequality inherent in the power relationships between an imperial metropolitan power like the United Kingdom and the peoples it governed. The British did nevertheless provide the region with capable hydrologists like Harold Edwin Hurst, who argued for an approach that took the whole basin’s interests into account rather than those of a single region (Hurst, 1957). The United Kingdom also helped establish the Gezira scheme which remains one of the largest irrigation schemes in the world and continues to provide a reliable cash income for many Sudanese families. These positives could not however address the fundamental flaw in British water policy in the Nile – theirs was a coercive and not a participatory regime. Ethiopia, Sudanese elites, and even Italy eventually, had to accept British priorities, as embodied in the 1929 Nile Waters Agreement, including preferential treatment of Egypt. There was no assessment of the needs

of the local populations inhabiting the river basin or consultations with them on what they believed their needs are; this is in sharp contrast to the United States Bureau of Reclamations survey of the Ethiopian section of the Blue Nile during the 1960s and their recommendations that flowed from their fieldwork (United States Department of Interior, Bureau of Reclamations, 1964). Even the successful Gezira project as created to meet the needs of British textile mills and its concern with development in Sudan itself was secondary.

### The Nile Today

Cooperation in water management in the Nile basin today clusters around two camps. The first camp is composed of Egypt and Sudan whose relationship is defined by the 1959 Nile Water’s agreement. The second camp includes all the remaining riparians. Unlike British times when there was a clear policy indicating preferences that could be enforced throughout the basin, the current situation more closely approaches the anarchy found in the state of nature postulated by the Realist school of international relations. There have been many attempts to have a basin-wide cooperation and coordination schemes, these included programs of a limited technical mandate like Tecconile to more ambitious projects like the Nile Basin Initiative (NBI), which evolved into a regular international organization. Despite earlier indications to the contrary, Egypt remains opposed to a comprehensive Nile waters allocation regime, which is demanded by the other co-riparians, except for Sudan. In January 2013, the Egyptian Minister for Water Resources rejected the Entebbe Framework document which was agreed upon by all of the non-Arab Nile co-riparian states. The Egyptian government gave three reasons: the need for a treaty that creates rules by consensus instead of majority votes, a need for all the other co-riparians to accept the 1929 and 1959 Egyptian-Sudanese Agreements (a position rejected by all the others at their independence), and finally the need for the treaty to include prior Egyptian approval for any water works constructed on the Ethiopian and Great Lakes sections of the Nile. To highlight its non-cooperation, Egypt further demanded 7 additional cubic kilometres of Nile water for its emergencies (Sanchez, January 13, 2013). Obviously, there is no interest in participatory approaches, because Egypt and Sudan believe that the current status quo serves their interests or at least, their interests as they perceive them.

While superficially the status quo resembles the situation under the British, there are also some significant differences. First, the problems of climate change and water resource depletion warrant a reconsideration of pre-existing arrangements. Second, what can Egypt really do about upstream states acting unilaterally? Finally, the partition of Sudan and the clear alignment of South Sudan to Ethiopia and Uganda suggest that the balance of power in the basin has changed, so previous arrangements are likely to change. The current regime is not participatory in terms of allocation. The NBI and Tecconile were intended to foster cooperation among the co-riparians in order to build up to the point of working on allocation regimes, but this has clearly not happened. The reasons for failure include the lack of clear leadership by any state in the Nile basin, the inability of the existing structures to account for the diverse needs in the basin, and finally, the issue of the

ownership of the water has been politicized to a great degree. It is very difficult to see how a country that contributes nearly no water to the Nile basin can expect to continue using it without the implementation of cooperative agreements with its neighbours. The positions taken by Egypt ultimately reflect the relative inability of structures to learn that circumstances have significantly changed and what worked in the past cannot work anymore. Egypt believes that no agreements reached by the other riparians have any validity, but the larger question remains – what can Egypt suggest, request or impose in a situation where it the southern Sudanese border has been moved northwards by hundreds of kilometers? To that extent, it is time for all stakeholders in the Nile Basin to accept a radical change in the relationship that does not grant one grouping of states the sole and final say on the future of the river.

### The Zoubiya Cooperative

Despite possessing the information and the resources concerning the need to cooperate, the Nile basin states remain locked in disagreement as both the climate and demographics rapidly change. At another level, cooperation is taking place out of necessity and out of a desire to take advantages of incentives provided by government. One such effort is the Zoubiya cooperative, which was created in January 2<sup>nd</sup>, 2009. Initially, it was composed of 17 small farming households in 10 families comprising of about 130 people. The heads of farming households include men and women. At its founding, the cooperative controlled about 15 hectares of land in total. It is located in the El Hajeb district, near Meknes, Morocco. The cooperative was formed in order to take advantage of government incentives to build water reservoirs to store water from a local canal, fed by a spring called Bitit, and distribute it in a timely manner through drip irrigation systems. The cooperative was inter-tribal, meaning that its membership was not limited to the tribal community dominant in its area, and its leader, Mr. Mohamed Abou Yaala, moved into the area from another part of the country. The aim of the cooperative is to increase the production of vegetables, milk, olives and almonds through the use of drip irrigation to actualize economies of scale and to build resilience in the face of reduced rainfall and a declining water table caused in part by climate change.

In the course of meeting with and interacting with the cooperative, our research team was surprised to learn that the group achieved cohesion after attending our kick-off workshop in May 2009. Aside from presenting the farmers with the dangers of climate change, the workshop allowed local farmers to directly address questions to officials from the Sebou Basin Hydrological Agency (ABHS in its French acronym) and to officials of the Provincial Agricultural Directorates (DPA in their French acronym). Under ordinary circumstance, this level of contact would not take place. The farmers took advantage of this unprecedented access and learned about the government's incentive programs for water conservation. Of course, these programs were designed to be viable in the sense that while there was to be no coercive measure taken to urge farmers to integrate their miniscule holdings, they were encouraged to form cooperatives in order to qualify for assistance to build reservoirs that store water for use in drip irrigation through grants and low-interest loans. The Zoubiya cooperative members had attended the workshop as individual farmers,

but they left it as a cooperative. They were also assured that provided they follow the described administrative processes, they would be able to secure funding for their project.

On March 26<sup>th</sup>, 2010, the cooperative held its annual meeting and decided to apply for funding from the ABHS and the El Hajeb DPA to finance the construction of a reservoir. The aim was to move away, slowly but permanently, from irrigation through furrow inundation to drip irrigation without having to dig wells and otherwise affect the water table. The government agencies approved the funding and the reservoir was built. The cost of the reservoir and its associated drip irrigation systems was about 90 thousand euros, with about 20 percent of the funds being provided by the cooperative's members. Today, the Zoubiya cooperative controls about 50 hectares of land in total; 15 hectares are under drip irrigation while the rest of land is irrigated using the traditional furrow inundation. As of 2012, the cooperative was trying to irrigate another 12 hectares using drip irrigation since its advantages have clearly materialized. The water reservoir can hold up to 3600 cubic meters of water. To fill the reservoir, the cooperative uses 22 hours out of its 40-hour allotment of canal water, which is released every five days. With the reservoir in place, the cooperative can irrigate crops daily, which has enabled it to increase its output of vegetables and olives.

Its success has attracted additional farmers, with membership reaching 28 farming households, including 17 led by women farmers. The cooperative and its members are generally willing to cooperate with each other and have set up informal conflict resolution mechanisms. Remaining challenges include marketing the dramatically larger harvests and transportation. During a 2011 presentation to farmers from the neighbouring region of Ain Chegag, Mr. Abou Yaala stated that the project was a success: "we did not have any money at the beginning of our project prior to 2009; our work lacked organization. But currently, we have a project that costs 2 million dirhams which changed our daily lives and our future." The cooperative's inclusion of women farmers makes it rather different from some of the other associative structures in the region. Women could be and are included because the form of landholding in the area of the cooperative is private rather than tribal or communal, thus women can inherit or buy property without regard to tribal laws that limit landholding to males. Zoubiya reflects the outcome of a single event held as part the three year IDRC-funded research program we held at Al Akhawayn University. We help many similar events and we do not know what other unintended changes took place at the local level. These events conveyed the support provided by the government under the current *Maroc Vert* program for agriculture. Its relative success has had several implications for the project and for water management in light of climate change.

In terms of leadership, the cooperative experience shows us that well-motivated and ambitious local leaders are essential to success. The cooperative was able to coalesce due to both the introduction of the information about the future and due to the presence of good leadership. In terms of diversity, the Zoubiya cooperative is a good example of inclusion. The area it is located in tends to belong to a set of local tribal communities, but its membership is open to all local farmers. Third, the cooperative has handled the issues

that emanate from issues related to the distribution of social power well.

In terms of gender, it has embraced female farmers as full members, and it has at the same time implemented a weekly meeting where disputes are discussed and resolved. Fourth, it is important to note that while government incentives played a critical role in helping create and strengthen the Zoubiya cooperative, it was ultimately self-organized and not imposed. Finally, the cooperative outlines the vital and important role that can be played by the state in terms of creating a positive environment for the adaptation of appropriate responses to water shortages caused by climate change and resource depletion. Left alone, the dynamic of self-help can easily lead to a tragedy of the commons with water resources as each farmer digs a well legally or illegally – with most people actually not knowing what the laws are or what the regulative role of the ABHS is as shown by one of our surveys. The coercive role of the state is also ineffective in terms of dealing with some of the farming communities that have communal lands and status protected in law and custom.

The Zoubiya cooperative case shares some features with the Gezira scheme and through it, British policy in the Nile. In both cases, leadership, external inputs, and the movement of information to the farmers were crucial. It also differs significantly from the scheme in the sense that it was self-organized rather than centrally imposed. It was not the result of coercive processes and differed vastly in scale. In addition, the Zoubiya cooperative is designed to meet immediate local needs, while the Gezira scheme was designed to feed the textile mills of the United Kingdom at the time of its establishment. In terms of outcomes, both projects can be said to be generally successful.

### ANALYSIS

The emergent themes of this paper are diversity, integration, centralization, leadership, and the level of inclusion of all in each of the cases. While there are some differences, some emergent themes are more salient than others. It is important at this juncture that the Zoubiya cooperative is a success story born out of the action-research orientation of our project, and there is a clear need to expand what was learned from it over the Middle Atlas region. Many farmers, as a survey we conducted indicates, are simply unaware of the regulations surrounding water and are not aware of government programs designed to help them, despite an overall awareness that the climate is variable and changing. In general, the most successful case is that of the Zoubiya cooperative. One difficulty inherent in the comparison is that the Nile's present is deeply influenced by its British controlled and influenced past. It was the British who re-established the Egyptian irrigation service and provided it with personnel, so the second case study assumes the first. While the current context in Morocco remains state-centric, the Zoubiya case study appears to point to an alternative way of creating and managing relations between farmers and bureaucracies set up ultimately to insure that the sector remains in good health. Table 1 below summarizes our findings by theme. In a 2004 article, M.N. Allam, a professor of irrigation at the University of Cairo, argues that there are difficulties implementing participatory methods in Egypt with Water Users Associations (Allam, 2004). In many ways, it is an unfair expectation. How can a country that has seen the

centralization of water policy at the level of the state for millennia transition to decentralized decision making and participatory methods? The centralizing tendency was reinforced during colonial times, and it will be very difficult to move away from it. Nevertheless, experiences like Zoubiya are likely to occur here and there, and it is possible to derive some ideas from them.

### CONCLUDING THOUGHTS

An important aspect of the development and success of the Zoubiya cooperative was the free flow of information between its farmers and the officials of the ABHS and the El Hajeb DPA enabled by the workshop environment. Given the particular context of action research, an important question would be how to make contact between farmers and officials routine? This raises questions about institutional cultures in the water and agriculture agencies, and how to reform them in a way that insures their transformation. It also raises questions about how farmers perceive the state and how they relate to it.

A second aspect of the experience concerns the nature of the title held by the cooperative members compared to other areas where land was held on communal lines; are some forms of landholding more amenable to cooperative organization than others? If that is indeed the case, how can states address this question without being seen to trample upon the rights of communities such as tribes and clans with which it has pre-existing land-holding arrangements that assure the continuity of communal identity. From the Zoubiya cooperative, we learned that one path towards gender equality is female ownership of property and participation in water users' associations; for countries with a stated goal of improving the status of women, participatory approaches appear crucial in agriculture.

The third aspect of the experience concerns the role of the state in agriculture. Agriculture is not an ordinary industry; no matter how economics textbooks classify it and no matter how many times the "corn laws" example is invoked by those advocating the withdrawal of the state from it. In the case of Morocco and doubtlessly all the remaining North African states, the social, political and economic consequences of the collapse of agriculture due to unsustainable methods and climate change would bring instabilities and chaos that would make the Arab Spring appear as minor disturbance. It is a sector that needs to transition and change, but not in a dictated, top-heavy way. The question should not be whether the state is involved, but how its involvement can literally yield the best fruits. This means that the bureaucracies must be developed, well paid and encouraged to develop deeper ties with the communities they serve.

There is a relationship between how countries organize water management internally and how they relate to their neighbours in transboundary disputes. If the approach is that a hydrologist draws up a plan and imposes it; then farmers' resistance would be the least of his or her concerns. An approach that does not begin with the farmers themselves would not reach them or be known by them, let alone earn their rejection/cooperation. Such a hydrological service would not be able to talk to its peers in neighbouring states and take their interests into account either, unless the discussion focused on purely scientific questions rather than allocation policies between states (Shahin, 1984). Most

Table 1: Assessing the themes in each case study

Theme	The Nile under the British	The Nile Today	The Zoubiya Cooperative
Diversity	Acknowledged with a preference for British interests, which were aligned with Egypt's.	Acknowledged but without a consensus on allocation.	Acknowledged and not allowed to divert from the overall aims.
Integration	Highly integrated at the level of policy and decision making.	Fragmented into two camps pitting Egypt and Sudan against the rest.	The cooperative is integrated with water works and a reservoir.
Centralization	Highly centralized imperial decision making.	There are two competing poles of centralization: Cairo and Addis Ababa.	De-centralized, participatory decision making with conflict resolution.
Leadership	British hydrologists well trained technically but without local roots. Given the colonial era, the system is non-participatory.	Excellent technical hydrology and Egypt leads in the study of the discipline. Difficulties in implementing participatory methods.	Emergent and grass-roots based. The leadership of the cooperative emerged from the membership.
Assessment	While the Hurstian model is attractive, it risks centralizing decision making and non-cooperation.	Clearly, the current situation is untenable; there is neither an imposed consensus nor cooperation.	The cooperative engaged in dialogue with the authorities, but this experience has not become widespread yet.

states today assert that they represent the political will of a cultural community. What is often missed is the deep relationship, hidden in plain view, between "culture" and "agriculture." Allowing farming communities, and indeed countries ultimately, to simply disappear in the face of climate change and resource depletion when they could be encouraged to adapt and develop resilience would betray all what water management and hydrology were created for.

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