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Water for the Desert: Participation And Integrated Water Resources Management, A Case Study of The Rainfed Desert Region of Matruh, Egypt

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ABSTRACT

Water resources are under dire social, economic and environmental threats, especially in developing countries. Stakeholders' participation in water resource management is widely advocated to address these needs but its outcomes are difficult to trace. Using qualitative field data from the rainfed Matruh region in Egypt, it evaluates the contribution of small-scale stakeholders' participation in advancing IWRM with the variables of equitable allocation, empowerment and sustainability. The concept of IWRM is advanced as a framework to reform water governance since it aims to tackle stakeholders' and water-related sectors conflicting interests. This paper analyses whether stakeholders' participation fosters a sustainable use of natural resources. It argues in its case study that the political processes of water management are rarely considered in IWRM. Consequently, equity and empowerment gains are captured by power differentials, which thus constrain its sustainability potential. By doing so, it expands the literature on IWRM with a political sociology angle.

Keywords: water, IWRM, participation, management, allocation, sustainability, empowerment, rainfed, Egypt.

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To Luc.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS.....	5
I. INTRODUCTION.....	6
II. LITERATURE REVIEW	8
A. CRITICAL REVIEW OF INTEGRATED WATER RESOURCES MANAGEMENT.....	8
1. DEFINITION AND RATIONALE.....	8
2. IMPLEMENTATION	11
B. CRITICAL REVIEW OF PARTICIPATION IN NATURAL RESOURCES MANAGEMENT .	13
1. RATIONALE.....	13
2. EQUITABLE ALLOCATION.....	15
3. EMPOWERMENT.....	17
4. SUSTAINABILITY	18
C. PROPOSED CONCEPTUAL FRAMEWORK: WATER POLITICS IN INTEGRATED WATER MANAGEMENT	21
III. CASE STUDY AND METHODOLOGY.....	23
A. THE CASE STUDY REGION: MATRUH GOVERNORATE.....	23
1. GEOGRAPHIC PROFILE.....	23
2. SOCIO-ECONOMIC PROFILE	24
3. WATER AND LAND RESOURCES MANAGEMENT.....	25
4. THE SUSTAINABLE DEVELOPMENT CENTRE FOR MATRUH RESOURCES PROJECT 27	
B. EGYPT NATURAL RESOURCES MANAGEMENT POLICIES.....	28
1. THE NATIONAL WATER RESOURCES PLAN	29
2. SUSTAINABLE AGRICULTURE STRATEGY FOR 2030.....	30
C. METHODOLOGY	31

35271	4
1. PRIMARY DATA.....	31
2. SECONDARY DATA.....	31
IV. ANALYSIS.....	32
A. IS THE ALLOCATION PROCESS IMPROVED BY PARTICIPATION?.....	32
B. DOES PARTICIPATION EMPOWER LOCAL PEOPLE TO INFLUENCE WATER GOVERNANCE?.....	36
C. DOES PARTICIPATION CONTRIBUTE TO INTEGRATED NATURAL RESOURCES MANAGEMENT?.....	39
D. DISCUSSION.....	41
V. CONCLUSION.....	44
VI. BIBLIOGRAPHY.....	46
VII. APPENDIX.....	55
A. INTERVIEWS TABLE.....	55
B. INTERVIEWS GUIDE.....	56
1. Bedouins farmers interviews.....	56
2. Governorate and SDCMR agents.....	57
3. Elite interviews.....	57
C. WATER HARVESTING EQUIPMENT.....	58
D. MAPS.....	59
E. ELVULMED PROJECT.....	61

ABBREVIATIONS AND ACRONYMS

ARC	Agricultural Research Centre
CAP	Community Action Plan
EEAA	Egyptian Environmental Affairs Agency
GEF	Global Environmental Facility
GOE	Government of Egypt
GWP	Global Water Partnership
IWRM	Integrated Water Resources Management
LC	Local Community
MALR	Ministry of Agriculture and Land Reclamation
MRMP	Matruh Resources Management Project
MWRI	Ministry of Water Resources and Irrigation
NWC	North West Coast
NWRP	National Water Resources Plan
SRSC	Sub-Regional Support Centre
SDCMR	Sustainable Development Centre for Matruh Resources
WH	Water Harvesting
WWF	World Water Forum

I. INTRODUCTION

“Obviously, the issue of water, of access to water, of securing the resource as well as guarantying proper distribution, all these issues are eminently and truly political. [...] Water is at the source of all things. Water is life. “Aman Imam” is something we hear throughout the Great Sahara”. (Fauchon, 2006)

Environmental and social complexities have fostered a paradigm shift in water governance. Integrated Water Resource Management is seen as the clue to answer social, economic and environmental priorities in world of scarce water. Specifically, the key process to achieve sustainable water resource management is stakeholders’ participation. The debate centres on the IWRM capacity to fulfil its equitable and sustainability mandate. The purpose of this dissertation is to explore the linkages between stakeholders’ participation and water resources management in order to determine if their deeper involvement allows for a more sustainable natural resources management.

The qualitative data collected in the rainfed desert region of Matruh, Egypt, was analysed with the help of participation concepts as an evaluation grid for IWRM. This paper emphasises the political processes that challenge sustainability in integrated management. It attempts this by engaging with the politics of water governance (Mollinga, 2008) and participatory decision-making (Cooke & Kothari, 2001) in order to establish an analytical framework. It will show that stakeholders’ participation does not necessarily lead to more sustainable management for three detailed reasons. Therefore, it posits that power differentials have to be challenged in water

governance. It thus contributes to the discussion on the politics underpinning IWRM and their impact on the most marginalized stakeholders (Hepworth & al., 2011)

With such an end, the following section analyses the relevant literature and presents a conceptual framework, in which participation in IWRM can be examined. The third section gives context to the case study and outlines the methodology. The fourth section discusses the findings and brings a critique to the conceptual underpinning of participation in IWRM. Finally, it draws conclusions.

II. LITERATURE REVIEW

A. CRITICAL REVIEW OF INTEGRATED WATER RESOURCES MANAGEMENT

1. DEFINITION AND RATIONALE

Traced back to the Mar del Plata 1977 conference, the policy framework of IWRM has been advocated as a comprehensive and participatory approach to improve quality, access and sustainability of water resources (Rahaman & Varis, 2005). This paradigm shift has paved the way for new institutions such as the Global Water Partnership. It states that IWRM “promotes coordinated development and management of water, land and related resources, in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital systems” (GWP-TAC, 2000, p.22). Therefore, the dimensions of social and basic human needs, equity and sustainable development are included in the reformed water policy-making (Jonker, 2007).

The political ecology literature (Mollinga, 2008; Allan, 2003) underscores that although this definition appears to encompass the critical variables of sustainable development (Brundtland Report, 1987), the IWRM conceptual framework is constrained by definitional problems, weak assumptions and implementation challenges. Therefore, this literature review engages with the debates on IWRM and its specific promotion of stakeholders’ participation.

Firstly, its elastic definition is problematic to effectively foster a paradigm shift (Biswas, 2004; Allan, 2003). A main criticism emerges from its default meaning for management, which constrains its operationalization (Gyawali & al., 2006). After analysing each element of IWRM, Biswas (2004) demonstrates that perspectives, issues boundaries and parameters fail to be specified. This implies that the use and implementation of the concept can disguise any kind of management and development. Regarding GWP's definition, it can be asked to what extent the IWRM paradigm engenders a change in policy making and practices for water management (Gyawali & al., 2006). Lack of definitional clarity is problematic since it does not provide with any guidance for implementation (Biswas, 2004). It is argued that the flexibility of the definition allows for divergent objectives and priorities, which tends to bypass environmental priorities (Allan, 2003). As an example, the inclusion of livelihoods themes is debated as well as the separation of sustainability from socio-economic concerns (Allan, 2003; 2005; Jonker, 2007). Drawing from the definitional issues of IWRM, it is interesting to evaluate the extent of the change and the nature of concerns induced in reformed water policies.

Secondly, the conceptual underpinnings of IWRM are strongly weakened in the light of politics. It is therefore necessary to critically assess the theoretical foundations of such a framework. The rationale based on Habermas' logic of ideal speech situation and life-world system is shown to rest on unrealistic assumptions of power relations (Saravanan & al., 2009). The communicative rationality school (Cass, 2006) argues that argumentative speech fosters consensual and communicative rational decisions by the negotiation of power as an exchangeable property (Saravanan & al., 2009). Furthermore, it calls for democratic practices and deliberative participation in order to shape new institutions achieving coordination and cooperation (Cass, 2006).

Applied to IWRM, it is argued that the ideal speech situation is the hydrological unit; argumentative speech is the participatory aspect and integration is seen as the output of a consensual decision (Saravanan & al., 2009). Specifically, Pahl-Wostl (2007, p. 9) argues that IWRM requires “integrated decision-making” which provides the justification for participation. This implies that IWRM is a paradigm shift towards a systems approach where the human-environment dimension is reaffirmed by the transformative force of social learning (Pahl-Wostl, 2002). However, despite the comprehensive and pragmatic stance of the systems approach (Saravanan, 2008), it does not fully resolve the social and political impediments to integration.

Actually, a major theoretical problem of the Habermasian approach for IWRM is its overlook of power differentials (Saravanan & al., 2009). With the help of political economy, Allan (2003; 2005) contradicts the assumption of power negotiations transforming the current institutions and power structures. This assumption relies on equal and perfect knowledge and negotiating skills among stakeholders. However this is far from the reality of their capacity, a caveat that can lead to exclusion of less powerful voices (ibid). This provides the basis to argue that IWRM brings together a variety of stakeholders with different objectives, power and organizational capacity. Therefore, the politics of water management need to be brought back into the discussion on IWRM, which hitherto has been considered as a technical fix based on the river basin concept (Allan 2003; Mollinga, 2008).

Moreover, the conceptual understanding of water in the political sociology school contributes to perceive water as socially embedded. Mollinga’s analysis (2008, p. 10) of water politics helps to understand water as ‘a politically contested resource’ and thus, water management as ‘water

control'. Furthermore as Allan (2003) highlights, IWRM overlooks the crucial issue of water allocation, which is a product of local politics and conflict. Such an angle offers the possibility to understand the logic behind the outcomes of water policy reforms. It paves the way to move from an institutional-economic analysis to a socio-historical analysis of water control. This can be found in Mosse's conception (2008) of water as the place of social conflicts, power and authority relations. The focus on water control allows to examine water governance and collective action outcomes according to social organization and local ecologies.

Nevertheless, while the strenght of IWRM is claimed to bridge together the multi-dimensions and inter-linkages of water (Mollinga, 2008), it remains weak in addressing power differentials and conflict resolution. Accordingly, it is interestingly pointed out in the literature (Saravanan & al., 2009; Mollinga, 2008) that such challenges are well established but little are the suggestions to overcome them. Therefore, this literature review explores how the integrated approach deals with the politics of water allocation to achieve its goals of being equitable and sustainable. Drawing on the politics underpinning water management, this paper reaffirms that IWRM can achieve its objectives only if it addresses the socio-political nature of water management.

2. IMPLEMENTATION

The weaknesses highlighted throughout the analysis of the definition and conceptual framework of IWRM require consideration when it comes to implementation. The integration concepts lack clear directions and guidelines for practice (Saravanan & al., 2009; Anderson & al., 2008). Stemming from its definitional vagueness, IWRM is implemented in different approaches, such as top-down or bottom-up (Ballweber, 2006; Saravanan & al., 2009). Regarding allocation issues,

it is argued by Jonker (2007) that adding allocation issues does not provide further guidance, while Gyawali et al. (2006) advance that blindness to allocation engenders misleading practices. The different shades of IWRM institutional practices combined with the absence of evaluation criteria are problematic for the research to identify and analyse policy outcomes (Biswas, 2004). This implies different results and thus difficulty for comparative analysis (Anderson & al., 2008; Matthews, 2011). Therefore, it is necessary to address the IWRM approach with regards to the definition and the implementation practices adopted.

One implementation caveat is the concentration of integrated tasks of effectiveness and coordination in one governmental body (Saravanan & al., 2009; Ballweber, 2006). Effectively, it is argued (Biswas, 2004; Sajor & Thu, 2009) that integrating issues and sectors, such as agriculture, land and water management, is an overarching task that may lead to more centralization although local level management is advocated by IWRM. However, this fails to explain why some IWRM based water management were implemented with success such as in South Africa (Pollard & DuToit, 2008) and others not. This calls for investigating how the caveats are taken into consideration.

Besides, major impediments to IWRM in terms of coordination stem from the socio-political process of integration. Competition between government agencies undermines coordination and cooperation (Saravanan & al., 2009). This points to analysing the enabling environment established by legislative and institutional instruments that facilitate IWRM implementation (Saravanan & al., 2009). In order to bridge this gap, Jonker (2007) advances that integration at the level of achievements and not practices is more likely to lead to integrated management. This

implies to make use of IWRM as a framework and not a process in order to assess if it achieves its social, economic and sustainability goals.

Nevertheless, addressing integration as a process requires understanding it as “intensely political” (Gyawali & al., 2006, p. 12). Stemming from the strategic nature of water, its governance often falls into the intricacy of the “shadow state” to preserve security and hegemony (Mirumachi & Allan, 2010, p. 13). This implies looking at the relations between the state, the local government and the local communities to examine the extent of the integration of stakeholders and competing interests (Anderson & al., 2008). Before addressing the participatory techniques of IWRM, it has been shown that IWRM is difficult to operationalize as its definition is too vague and too narrow, avoiding the contentious issues of water allocation and re-allocation. Thereby, the particular focus on water politics is endorsed to review stakeholders’ participation in water management.

B. CRITICAL REVIEW OF PARTICIPATION IN NATURAL RESOURCES MANAGEMENT

1. RATIONALE

The rationale of the participatory approach considers stakeholders’ involvement as a mean for social learning, empowerment and agency (Pahl-Wostl, 2007; Cass, 2006). It further argues that participation contributes to sustainability and adaptive capacity and induces a more equitable management (Von Korff, 2010; GWP-TAC, 2000). It is also thought to empower the most vulnerable by promoting their local knowledge and strengthening their bargaining power (WWF, 2006). Through the active participation of empowered stakeholders and equitable allocation of

water, participation contributes to sustainable water management and overall, sustainable development.

Originally, the claim for participatory approaches in water resource management stems from the literature on co-management and community-based natural resources management for better environmental policy-making. Firstly, this can be traced back to the literature arguing against the failures of top-down approaches to development and environmental management. In the line of Chambers (2005), this school of thought advocates bottom-up approaches, stressing the need for indigenous knowledge and local agency to be at the root of developmental decision-making. Secondly, it is linked to the proponents of community-based natural resources management (Ostrom, 1990). This model demonstrates that local ownership of resources and local decision-making are more appropriate to yield sustainable resource management. However, this latter approach focuses on economic and institutional features based on the rational choice theory. This is problematic since it does not allow for politics and power relations to play into natural resource management amid stakeholders (Agrawal & Gibson, 1999).

In fact, one of the weaknesses of community-based approaches is its conception of the community as static, recipients as passive, bypassing marginalized social groups, their institutions and entitlements (Leach et al., 1997). For Mosse (1997, p. 470) this is challenging since traditional institutional arrangements at the base of community management are 'in state of collapse'. Therefore, Agrawal and Gibson (1999) suggest a focus on multiple interests and stakeholders that influence natural resources conservation outcomes. These missing elements stand as one part of the explanation for the ambiguous results of community-based natural resource management in practice.

Subsequently, an implication of participation in IWRM is a management that takes place at the most appropriate level, which entails decentralization (GWP-TAC, 2000). This implies democratic processes of local knowledge inclusion, local ownership of decision-making and equity concerns (Ribot, 2003). However, empirical studies have found little support or mixed results for democratic decentralization in the case of natural resource management due to the resistance of national authorities to transfer power (Ribot & Larson, 2004; Lemos & Agrawal, 2006). Besides, according to Biswas (2004), participation and decentralization are unlikely to help integration since it reduces responsiveness from the central authority and reinforces a one-size-fits-all scope. Therefore, expectations of better quality policies induced by participatory approach rationale are limited by the politics of presence, informed participants and lack of representativeness (Cass 2006). Given such background of weaknesses in the conceptual basis of participation in water governance, it draws attention to the political dynamics at the core of participation methodologies.

2. EQUITABLE ALLOCATION

An assessment of participation approaches in water management needs bringing back political processes to evaluate allocation outcomes (Allan, 2003; Luzi, 2010). One main conceptual problem of participation approaches is their conflation with equity and equal representation of interests (Lele, 1991). Therefore, Allan (2003) advocates for prioritising resource allocation so as to achieve sustainable development. According to his view, water allocation is a political process made of coalitions of interests. This means that the IWRM framework will be successful only if allocation issues among sectors and stakeholders are tackled.

Furthermore, Mosse (1997) challenges the notions of democracy and equity embodied in water policies. In fact, it is claimed that participative processes lead to systematically to unjust and illegitimate exercises of power, therefore implementing a 'new tyranny' (Cooke & Kothari, 2001). This entails that the bargaining force of powerful stakeholders limits the potential of participation and inclusiveness to be beneficial for local-level and less resourceful groups (Zeitoun & al, 2011). This stems from the dual logic of participatory mechanisms of local level integrated planning and upward accountability. In practice the latter prevails and thus reasserts social hierarchies (Mosse, 2001).

Regarding stakeholders, the socio-political processes of integration also influence the extent of their participation (Saravanan & al., 2009). On one hand, the identification and selection of stakeholders by government is problematic as it often consolidates resource control and use at the expense of disadvantaged groups (Mollinga, 2008). On the other hand, stakeholders also adopt strategic behaviour and overlapping roles to compete for legitimacy, power and gains, thus subverting the process (Saravanan & al., 2009; Kothari, 2001; Zeitoun & al, 2011). In fact, it is argued that participatory techniques are determined to fail under elite capture (Corbridge & Kumar, 2002). This argument establishes that the inadequacy of the poverty definition leads to the failure of participation methodologies to understand community as differentiated. Therefore, this paves the way for strategic behaviour and misrepresentation from the elite, in order "that they might capture some benefits, to make sure that their political power [is] not easily challenged" (ibid, p. 10).

The phenomenon is reinforced by politics of patronage from the state, either to pursue its legitimising aims or to expand its state power and political support (Agrawal & Nelson, 2008). Nevertheless, one can argue against this determinism of failure on the basis that over the long-term elite capture can be overcome if effective checks and balances exist (Classen & al., 2008). It provides the opportunity to address the varied chances for elite capture to materialize in IWRM. These concerns for equitable allocation highlight the requirement to take into account a dynamic stakeholders' analysis when investigating IWRM implementation (Gyawali & al., 2006).

3. EMPOWERMENT

The discussion on equity outcomes of participatory technologies underscores the issue of empowerment carried by advocates of participation. Empowerment is thought as local knowledge promotion and claims-making capacity enhancement for the most vulnerable (Forsyth & al., 1998). The IWRM principles assert that empowerment is targeted in order to challenge the power order (Rahaman & Varis, 2005). However, the empowerment claim is criticized for being mostly rhetoric (Saravanan & al., 2009). It actually operates as reinforcing control over the population and co-opting dissent and radical viewpoints (Cass 2006). These critics extend from the main shortcoming of participatory approaches in water policy: the failure to tackle power disparities (Cleaver, 1999, Allan, 2003; Mirumachi & Van Wyk, 2010).

With respects to local knowledge, it is argued that political selection of stakeholders helps to reassert control and power hierarchies by dominant elements of a community (Kothari, 2001; Mosse, 2001). Therefore, local knowledge is made appropriate for the project objectives. In addition, the problem of policy incorporation of participatory process limits the potential for local

knowledge to be included in decision-making (Cass 2006, Saravanan et al., 2009; Biswas, 2004). This is explained by the fact that participatory practices overlook genuine collective decision-making institutions by insisting on formal institutions and making participation mandatory (Cleaver 1999). Consequently, this conception of participation allows for the collusion of local power hierarchies with project priorities undermining empowerment for the most vulnerable (Mosse, 2001).

Therefore, the 'empowerment differentials' are major impediments to the success of participatory water decision-making as they restrain engagement and effective participation (Mirumachi & VanWyk, 2010). Power imbalances help to perpetuate status quo in water management (Zeitoun & al, 2011). Based on this concern, it is claimed that there exists only few empirical evidence of participation yielding empowerment outcomes (Cleaver, 2001). Actually, it is advanced that participation does not make a difference in power relations but transform them (Masschelein & Quaghebeur, 2006). In fact, participation introduces new injunction for the stakeholders to achieve freedom. This approach displaces responsibility for development from the powerful to the powerless thus, allowing efficiency of interventions to be praised (Cleaver, 1999). As a result, despite increased visibility of local stakeholders, they do not gain actual say in decision-making (Mirumachi & VanWyk, 2010). This analysis allows adopting a critical stance towards the empowerment assertion of IWRM projects.

4. SUSTAINABILITY

The sustainable development definition used here is from the Brundtland Report (1987): "sustainable development is development that meets the needs of the present without

compromising the ability of future generations to meet their own needs". The argument for participation in IWRM is structured by the complexity and intersection of social and environmental changes against which only integrated management is able to achieve the goals of equity and sustainability (Pollard & DuToit, 2008; Pahl-Wostl, 2002). However this assertion is contested on the grounds that IWRM does not bring any change to current management practices, thus its sustainable potential is limited (Biswas, 2004).

Despite the lack of measurement tools for sustainable development (Biswas, 2004), sustainability outcomes of participation in IWRM can be assessed. In fact, Jonker (2007, p.14) defends that achievements of sustainable natural resource management can be located into IWRM if they lead to "resource protection, appropriate land use and efficient water use". This implies especially that the interlinkages between land and water are considered. Furthermore, Allan (2003) points out how short-term objectives often prevail over environmental considerations in water policy-making. In his view, it is necessary to understand sustainability as the political process mediating the interests and priorities of the economy, society and environment. This implies approaching sustainability beyond the watershed and away from water policy-making as a technical fix, embodied in the river basin (Gyawali & al., 2006). This highlights how sustainability is achieved as the outcome of a discursive framework, which tackles allocation problems among stakeholders (Allan, 2005).

This literature review has set out the debates on IWRM. It has acknowledged the conceptual deficiencies of such framework on the basis of water politics. In fact, it was shown that integration is all but technical, and inherently political (Gyawali et al, 2006). Based on the theoretical underpinnings of integration, it has demonstrated that conflicting interests and power

were not sufficiently considered in IWRM. Highlighting power and political relations contests the communicative, rational and deliberative rationale of integration. Inevitably, despite an international inclination towards IWRM, its substantial outcomes and implementation are thin and difficult to observe (Matthews, 2011).

Bearing in mind, the limitations of the IWRM framework, this review has looked at integration in terms of achievements. Therefore, by scrutinizing the participatory features of integrated management, it has set out how the participatory methodologies interplay with IWRM. In this context, the instrumental use of participation for equitable allocation is flawed by an unrealistic vision of the community and often results in elite capture. It is then highlighted how the empowerment promises of participation for sustainable resource use are far cry from a reality of social control reassertion and vulnerable people's exclusion.

Finally, including the practical aspects of integration and the theoretical concerns for participatory methodologies, the claims of IWRM as path to sustainable management have been examined. Adding up to the previous requirements of equitable allocation, challenged power relations and integrative policy-making, the sustainability objectives of IWRM have to be faced with the requests of intra-generational equity and co-ordinated resources use. Therefore, examining integrated participatory water management along the line of politics and power differentials allows determining whether integration is "politically feasible" (Allan, 2003, p. 5) and whether it happens (Saravanan & al., 2009).

C. PROPOSED CONCEPTUAL FRAMEWORK: WATER POLITICS IN INTEGRATED WATER MANAGEMENT

Building on this, the present paper departs from the rational choice and economic theories. In line with Mollinga (2008), it reaffirms the role of politics in water as a “politically contested resource” in order to assess if stakeholders’ involvement can lead to a sustainable use of natural resources. It links the political ecology approach with a conception of community as socially and politically complex and differentiated to evaluate the outcomes of participation in IWRM. Therefore, it looks specifically at the power relations of water control at the state-community level and within the community.

As part of the answer to the main research question, it takes Allan’s (2003) stance regarding allocation as resulting from political processes. Since a major aim of integration is to achieve equitable allocation among stakeholders, it uses the concept of elite capture and patronage (Corbridge & Kumar, 2002; Agrawal & Nelson, 2008) to examine whether water allocation brought about by IWRM is equitable at the community-scale and at the national scale.

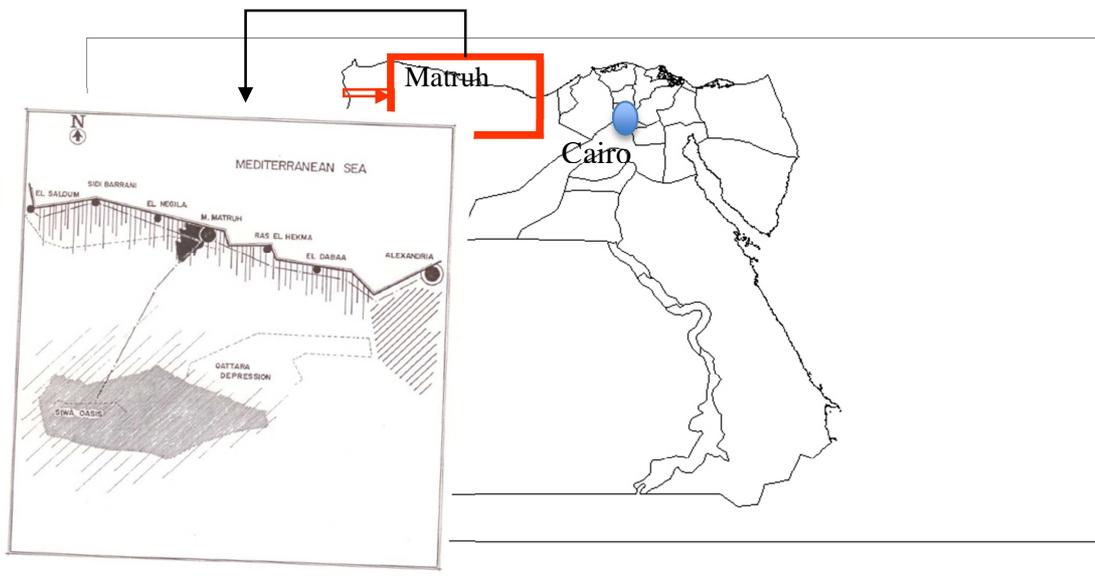
Furthermore, in order to examine the extent of change in policy-making, IWRM is judged on the grounds of empowerment of the most marginalized in the decision-making process (Clever, 2001). This entails looking at the extent of their claim-making capacity, local knowledge inclusion and central authorities responsiveness in a dialectic of power transfer (Ribot, 2004).

Finally, it assesses the input of participatory technologies to IWRM for sustainable development. This is done in line with Allan's (2005, p.191) concept of sustainability as "the discursive outcome of the articulated concerns of society, economy and environment". Therefore, it explores the contribution of participation for integration achievements (Jonker, 2007). This research focuses on the structure of participation; the capacity built from the process, and the management outcomes arising from the process (Abelson et al., 2001).

III. CASE STUDY AND METHODOLOGY

This section outlines the case study geographical and socio-economical characteristics. Then it highlights the paradigm shifts in water and agricultural Egypt's national policies. The reason for this selection is that Egypt is a cornerstone for students of water due to its unique dependence on the Nile water and the scarcity and other challenges it faces (MRWI, 2010). Furthermore, the government of Egypt has pledged to the principles of IWRM.

A. THE CASE STUDY REGION: MATRUH GOVERNORATE



Map 1 Source: (Bonnet, 2011).

1. GEOGRAPHIC PROFILE

Egypt benefits from genuine water endowments from the Nile River (55 billion m³), which most provision is delivered by riparian countries. However the case study area is mainly rainfed and does not benefit from Nile water, water users associations are not present. The area is located in Matruh Governorate, on Egypt's Northwest Coast (map 1). It is spread on a beautifully preserved

seacoast from Marsa Matruh city to the Libyan frontier on 320 km and extending inland on 60 km. The area is located in a semi-arid, arid region. Annual rainfall is low and erratic, average of 155mm, which is scarce to meet agricultural needs (World Bank 2004). There exist a small potential for groundwater but with concerns for its quality (GEF, 2001). Nevertheless the water governance framework encourages local people's participation and leadership. The project selected in the Matruh governorate is considered "a pioneering effort for the Government of Egypt, being the first integrated natural resource management project involving local tribal populations in rain-fed areas." (World Bank, 2003, p. 2).

2. SOCIO-ECONOMIC PROFILE

The region is inhabited by estimated 230 000 people around 30 000 households (GEF, 2001). The inhabitants belong to Bedouin tribes, previously living on nomadic patterns. In fact, since the 1960s with the support of international organizations, the GOE through the arm of Ta'amir As-Sahari¹ has achieved "one of the Arab world's most successful attempts at state-sponsored sedentarization" (Cole & Altorki, 1998b, p. 138). Therefore, they now live in permanent houses with recent amenities. The population's main occupation is agricultural activities such as livestock, barley-production and figs. In the region, 76,7 % of the population live with less than 1.25 US\$ a day and 23,3% between 1.25 and 2 US\$ a day (Alary & et al., 2011). Poverty is mainly due to drought, however the local population manages to live from off-farm activities and keeps a cheerful mind-set.

¹ Desert Development Agency

The Bedouin society relies on strong traditions, identity and customary law (*urf*), while being also influenced by broader changes within the Egyptian society (Cole & Altorki, 1998c). The population is divided among 6 major tribes, made of 42 sub-tribes organized in households (*bayt*) of 3-4 generations. Social status and entitlements are based on lineage and kinship. Community's leaders are *sheikhs* seating on village law councils. Although historically, relations of ascendancy tied the major tribe, Awlad Ali to the Murabitin tribes; their impact on today's local power relations is debated (Cole & Altorki, 1998c; Zoughby et al., 1992). Nevertheless, Awlad Ali descents are more influential on national politics, with seats in national parliament, on local decisions and more successful in entrepreneurship today (Cole & Altorki, 1998c).

3. WATER AND LAND RESOURCES MANAGEMENT

The area presents the challenges of rainfed and dryland areas. Firstly, the combination of recent sedentarization, population growth and on-going land privatization has increased pressures on natural resources (Salkini & Moselhy, 2007). A decade of drought combined with fragile and low productivity soils results in the loss of biodiversity and land productivity fostering desertification (Oweis & Hachum, 2009; World Bank, 2003). Secondly, the area main challenge is sustainable water management for domestic and agricultural uses. The region is endowed by 218 watersheds in the form of *wadi* (valleys), which present potential for water harvesting (figure 1). WH is defined as “process of inducing, capturing and storing rainwater or stream flow to improve soil moisture for subsequent users” (Oweis et al., 2007, p. 1). In the region, WH techniques consist of water catchment by dykes to control the runoff, and storage facilities such as cisterns and reservoirs (appendix C). WH presents the potential for improvement in land rehabilitation, vegetative cover and aquifers. It also has socio-economic potential for stabilization and living

standards enhancement by accessing drinking and agricultural water. Originally, water was collected in roman cisterns and runoff management was held with earthen dykes for farming on the valley. However, these techniques require an integrated watershed management to take into account ecological, socio-economic and political concerns in order to achieve sustainable land and water management (Shiferw & al., 2009).

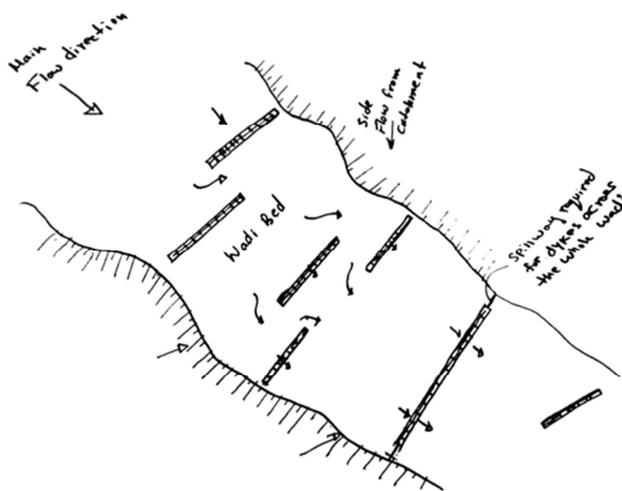


Figure 1. Source (Frasier, 2005)

Tribal and lineage land tenure is rooted in *urf* and village councils are in charge of dealing with land and water disputes (Cole & Altorki, 1998b; Salkini & Moselhy, 2007). However, territorial boundaries are actually determined by access to water, which allows to access grazing land. Therefore, tribal control over water wells induces control over territories and resources (Cole, 2003). As a result, the less powerful and poor families only have access to poor quality resources. However, desert land is state property, Bedouin people are only granted *usufruct* over the land, (World Bank, 2003). Yet, the history of state intervention for the development of water supply has led to self-asserted privatization of water points and consequently of rangelands (Cole & Altorki, 1998c). Additionally, new crops production has engendered consequences such as more intensive land use patterns leading to land degradation and desertification (Cole & Altorki,

1998a). This points to the centrality of integrated resources management to solve the region's urgent needs. However tribal constraints have to be understood first.

4. THE SUSTAINABLE DEVELOPMENT CENTRE FOR MATRUH RESOURCES PROJECT

In order to tackle the environmental degradation trends in the NWC desert areas, the GOE accepted a loan of US\$22 million equivalent from the World Bank in 1994, on the basis of a co-financed project: the Matruh Resources Management Project, completed 2002. The project was to be extended by a follow-up project, but this was not accepted by Egypt's Parliament and for political reasons. Subsequently, the responsibility for the project has been transferred to the SDCMR, which follows the same structure.

“The underlying strategy [is] to develop a structure within the traditional tribal system that would encourage active participation by the local Bedouin community in the sustainable management of the natural resource base and in alleviating rural poverty” (World Bank, 2004, p. ix). The project endorses a multi-sectoral and decentralized approach, with a participatory design in order to target the poorest and promote integrated natural resources management (World Bank, 2003). The approach is implemented as a response to the critics of previous projects in the region for their lack of participation, equitable distribution and their ‘misuse of authority’ (Cole & Altorki, 1998c, p. 102). Bedouin population's participation is based on the organization of 38 Local Communities designed with respect to tribes boundaries and pre-existing WH techniques. Within these LCs, each 50 families choose a representative, *mandoub*, for their demands to the project. Tribal *sheikhs* approve the representatives' selection, and some *mandoubeen* can be *sheikh*. The

38 LCs are distributed into 5 Sub-Regional Support Centres, which provide training and technical support to the LCs in order to elaborate an annual Community Action Plan. The *mandoubeen* are therefore responsible for transmitting demands and distributing the project activities.

The main government stakeholder is MALR. Water management is mainly under its supervision since the area is not supplied by Nile canal. MALR's objectives for rainfed areas are improving water use efficiency with modern techniques for WH (MALR, 2010). Its socio-economic objective is maximizing the sustainable returns of rainfed agriculture so as to support and improve the livelihoods of the local population. Finally it also commits towards preserving agricultural land from desertification, with activities of rangelands and biodiversity protection. With respects to the NWRP (2005b), MWRI is intensifying and expanding the WH techniques such as large reservoirs in the NWC. These actions are framed in coordination with MALR's activities in order "to be implemented with a high degree of stakeholder participation and stakeholder ownership" (MWRI, 2005b, pp. 4-18). The region insertion in national plans is based on integrated management and stakeholders' participation. However the specificity of rainfed areas poses challenges to the national integrated framework. Therefore, it is necessary to address the achievements of these integration efforts.

B. EGYPT NATURAL RESOURCES MANAGEMENT POLICIES

Water is central to all economic activities in Egypt, especially for agriculture, which consumes 85 % of the overall water supply and generates one fifth of Egypt's GDP (Abdel-Aziz, 2003). As a part of a broad paradigm shift towards neoliberal economic model, GOE intends to foster

intensive agriculture and industrialization (Abdel-Aziz 2003). However pursuing economic development has exerted strain on its natural resources: land resource is over-exploited and intensified agriculture has degraded its water resource (Al-Nagaar, 2003). This hampers their future conservation and sustainable management (EEAA, 2009).

The recent concerns over the availability and quality of water resources have fostered policy change in Egypt water governance. With donors' intense involvement in Egypt's policy landscape (Shalby et al., 2004), the shift away from state intervention has induced the adoption of IWRM and water demand management. Focusing on efficiency and environmental protection, MWRI has institutionalized water users associations, now responsible for the sustainable use of the resource (Abdel-Aziz, 2003).

1. THE NATIONAL WATER RESOURCES PLAN

MWRI implemented the NWRP in 2005, with the support of the Dutch aid agency. The NWRP explicitly endorses the IWRM framework "to improve the performance of the water resources system to ensure that the national economic and social objectives are achieved and that environment and health are protected." (MWRI, 1997). It also adopts the specific feature of participatory approach underscoring a new institutional framework (MWRI, 2005b). Stakeholders' role in the national water management is enhanced towards more responsibility, co-operation and consultation. Accordingly, the NWRP acknowledges the need to foster decentralization in order to promote involvement and say of stakeholders at the local level (MWRI, 2005b; Shalby et al., 2004). With respects to MALR, within the inter-ministerial IWRM Committee, it supervises the plan and contributes to the environmental aspects of water

management at the on-farm level (MRWI, 2005a). However the NWRP is not binding for other ministries (Luzi, 2010). However, “the NWRP is considered as a model example document towards development of an IWRM plan” (Arab Water Council, 2005, p. 19).

2. SUSTAINABLE AGRICULTURE STRATEGY FOR 2030

MALR’s strategy towards 2030 does not explicitly adopt an integrated approach towards natural resource management. However pointing out the overlap and conflicts between the activities of different ministries and agencies, it advances essential features of integration such as coordinated implementation and investments (MALR, 2009). This emphasis on cooperative implementation and participatory planning reveals the inclusion of MALR’s policy into an integrated management framework. However this strategy was adopted in October 2010 and is now facing the current stalemate of Egyptian politics.

Concerning natural resources management, MALR’s (2010, p. 11) strategic objective is the “sustainable use of natural agricultural resources”. However, this strategy is framed in the food prices crisis context (MALR, 2009). This implies a policy for water management of rationalizing water and land use, increasing water use efficiency in on-farm irrigation, agricultural land and water productivity. Given its mandate, MALR appears more able to concord with the definition of IWRM as “co-ordinated development and management of water, land and related resources” (GWP-TAC, 2000). This policy overview shows that the key stakeholders of water management, MRWI and MALR have pledged to the principles of integrated natural resources management.

C. METHODOLOGY

1. PRIMARY DATA

The research was composed of two-week fieldwork for qualitative primary data collection in Egypt, Matruh governorate and Cairo in July 2011. This was realised within Elvulmed French research project on Mediterranean societies facing global changes. First, semi-structured interviews were conducted among nine individuals of the Bedouin community in Matruh. The criteria for selection were their geographical repartition, age and their acceptance to be interviewed. As part of these interviews, two were specifically conducted with a *mandoub* in Neguila and Hawita tribe's *sheikh*. Secondly, directors from the units of the SDCMR; and agents from the governorate departments were interviewed. For their conduct, the author collaborated with Egyptian interviewer, who translated and facilitated the communication. Therefore, it was chosen not to record the interviews, however the author made notes. Thirdly, three elites interviews were conducted with the head of the SDCMR, the former MRMP Deputy director and the national Agricultural Research Center supervisor. The author conducted these elite interviews in English. As a total, seventeen semi-structured interviews were conducted (appendix A). Additionally, the author discussed with Professor Tony Allan about her research and IWRM issues.

2. SECONDARY DATA

The secondary data resources were based on academic journals, also national policy papers and World Bank and GEF reports regarding the MRMP. In addition, some empirical analyses specifically on the Matruh region were found at the American University in Cairo.

IV. ANALYSIS

This section addresses the weaknesses of participation contributions for IWRM. It challenges the participation impact on water allocation and contests the empowerment gains for the local population in water governance. Finally, building on this, it assesses the potential of such approach for sustainable water use.

A. IS THE ALLOCATION PROCESS IMPROVED BY PARTICIPATION?

It is addressed whether the water distribution is equitable at the *wadis* level with cisterns and dykes and at the regional scale. The interviews among the local population reveal a general satisfaction with the project activities and outcomes. However, three main issues arise as major problems for an equitable allocation of water.

Firstly, the *mandoubeen* system for families' interests representation was pointed out as being inequitable by 44 % of the interviewees. The most frequent criticism is that it benefits the rich and the *mandoub's* relatives more often than those in need (2). Several examples were given of the *mandoubeen* allocating cisterns along preferential lines and asking for bribes (3). As a result, some families do not receive any funding for their equipment:

“We did not get anything from the project [...] because the mandoub system is not working, they distribute to relations or to rich people” (6).

On balance, these examples were nuanced by cases where the *mandoub* resorts to lottery mechanisms to allocate equipment or allocates it to the tribe's *aqla* (wise men) to appease conflicts (3). However the lottery is not considered equitable for the poor, from which they may not benefit (13). Nevertheless, the families can change their *mandoub* by writing a demand to the project. These *mandoubeen* were actually changed after the first phase but not since. Tribal *sheikhs* mediate conflicts between families. Interestingly, this problematic was already identified during the first phase as "regressive" (World Bank, 2004, p. 11). The distribution of support does not match with the poverty profile of the region and benefits larger landholders. Given the reduction of funds in the current project phase, it is most likely that this distribution pattern is still enduring.

Secondly, the project does not address the issue of the privatization of equipment (1, 8). For example the location of reservoirs can prevent from communal access. In fact, the construction of a reservoir close to someone's kitchen where women work is problematic, as strangers to the family cannot go near women (1). It was advanced that people are less eager to share the equipment in times of drought and growing population (8). Therefore, a process of appropriation of communal structures is taking place.

Thirdly, regarding the allocation of runoff flow along the *wadi*, half of the population interviewed pointed to 'water rights' issues. This means conflicts between upstream and downstream users in low-peak rainfall. Some upstream users impinge water to flow downstream with dams. Adding to this, they revealed that there does not exist any conflict resolution institution, which thus depends on the upstream user.

“Some people reclaimed lands, made dykes and now water does not reach downstream. There is no system to tell the people to change the dykes. If there is not enough water for irrigation there would be no production.” (6).

Lastly, observation reveals a large social differentiation among the Bedouins in water access and exploitation sizes. Some families have more water harvesting equipment than needed while others purchase water from Nile water tanks for the end of year. This highlights the inequitable access to water within the community. Overall the community’s needs are estimated of 8 millions cubic meters per year, whilst the project activities have met only 5 millions cubic meters capacity (17).

These findings provide the basis to argue that allocation of water within the community has been compromised by elite capture (Corbridge & Kumar, 2002), either by the *mandoubeen* and the tribal hierarchies, by the process of privatization of structures or by the water rights conflicts. However the research resources and interviews do not allow deepening the third issue of socio-politics of *wadi* water rights conflicts due to the difficulty of extracting data on these very contentious issues. Nonetheless, the elite capture can be explained by the lack of stakeholders’ dynamic analysis in the participation framework (Mollinga, 2008). It demonstrates how the failure to see the community as a complex social and economic organization leads to inequitable allocation within the community (Agrawal & Gibson, 1999). This participatory approach is based on a mystification of the Bedouin tribes as solidary and egalitarian (Cleaver, 1999). This is problematic since the Bedouin society is socially stratified and subject to broad societal changes that affect its tribal traditions (Cole & Altorki, 1998c). Combined with the representatives’ allocative decision-making power, it has paved the way for strategic behaviour from the

community leaders (Saravanan & al., 2009). It thus provides evidence for the strategic behaviour theory of participation (Cass, 2006).

Likewise, the project apolitical decision of relying on community social control mechanisms fails to address the issue of water rights along the *wadis*. In fact, while focusing on technical operations, the project misses the conflicts between upstream and downstream users. This highlights the IWRM framework deficiency that considers stakeholders with adequate capacity to deal with conflicts. This is problematic since the “Bedouin system alone is not effective to resolve potential disputes over water harvesting” (Oweis et al., 2007, p. 10). Clear delimitations of users’ rights to water supply and conflict resolution institutions based on water balance are missing from the SDCMR’s approach (Frasier, 2005). This finding matches with the concept of water as the place for social conflicts and politics, where social hierarchies are reasserted (Mosse, 1997). Moreover it highlights the inequity engendered by the technical focus and lack of political consideration (Mollinga, 2008). Consequently, it is argued that the unrealistic assumptions of participatory approaches in IWRM reduce its potential for equitable access, social welfare and poverty reduction.

At the regional scale, the equitable allocation objective is not yet achieved. In fact, the scarcity of funds attributed to the region is problematic as rapid population growth and several years of drought accentuate the population’s inequitable access to water supply. Moreover, water scarcity leads farmers to buy most of their fodder outside the region (Alary & al., 2011). Additionally there exists a regional water inequality between touristic and dry lands areas. Besides, crucial issues such as land tenure and privatization are not addressed to match with the equity and social welfare requirements of IWRM. This shows that Egyptian bureaucracy’s politics of non-

interference with allocation issues in the Bedouin community are strong impediments to IWRM. This implies that this integrated water management project is undermined by the political economy of water allocation (Allan, 2003). This demonstrates that the failure to address allocation issues leads to inequitable outcomes, especially for the most marginalized (Saravanan & al., 2009). This underscores that the preeminent allocation issues IWRM are rarely tackled. This integrated management addresses only located issues of water access, whereas “economically invisible and politically silent” (Allan, 2005, p. 182) dynamics interplay with the water management in the area.

B. DOES PARTICIPATION EMPOWER LOCAL PEOPLE TO INFLUENCE WATER GOVERNANCE?

The issues investigated here are local knowledge inclusion in decision-making and participation alleged changes to power relations within the community and with regards to the state. Firstly, the activities are based on the indigenous knowledge of using roman cisterns in order to rehabilitate them or build new ones. Also, the beneficiaries decide their location through the CAPs (16). Furthermore, in 2000: “65 % of [households] had attended LC meetings, and participated directly in planning and implementation in CAPs” (Salkini & al., 2000). It was confirmed (10) that most of the population is aware of the project activities and its recourses to the authorities for new funding. While the population’s claim-capacity has improved, others pointed out that it is culturally considered a ‘shame’ to demand to the government in the Bedouin society (1) and that they rely on the community social control mechanisms. A distrustful opinion of the government, local councils and the governor as “Mubarak’s people” also nurtures this attitude. In fact, while they fill request to project or officials,

“The governorate gives no reply to requests and forms and even when the governor visited it gave no reply”. (2).

Secondly, one caveat of the project is the women’s empowerment objective. Despite strong gender separatism, women lead most of the households’ activities (World Bank, 2004). Marginalized women are especially targeted by a mandatory 25 % of funds, and with the help of a SRSC female employee, by parallel meetings (10). However this weak arrangement shows that the empowerment gains have not reached them yet.

Drawing from this, it is argued that local people and the most marginalized are only partially empowered. Effectively, the local dynamics of power and politics are not considered in the local water governance process. In fact, community’s representatives are embedded in elites circles and do not challenge the existing political order. Furthermore, the project leans upon tribal lineages and hierarchies for decision-making such as the *aqla*, the *sheikhs*. Thus, despite its attempt to avoid conflicts with the LCs design (16), the project does not tackle tribal domination relations. This limits its transformative power for the most marginalized, since their interests can be bypassed to please the more powerful. Concerning women’s empowerment, the project’s limited capacity is not well equipped to deal with this contentious issue within the Bedouin community. Despite efforts, the project has not challenged the gender relations within the community, nor the households. It therefore shows that the poor and women’s empowerment is not a predictable outcome of participation (Cleaver, 2001). Consequently, power relations in the community go unchallenged. These conclusions coincide with the claim that empowerment is only rhetoric, met with very few evidence (Cleaver, 1999).

Notwithstanding that the participatory approach yields gains for the local people at the state-community relations level, these are not met with appropriate responses. Responding to the lack of responsiveness from the authorities, the GOE calls for an “end of the culture of subsidies and over demanding to the government” (15). Accordingly, Bedouins are not fully capable of leading their own development, because they refuse to take credits for cultural reasons. Paradoxically LCs do not have independent control over the funds despite the initial aim of the project, thus they are dependent on external funding (10). Furthermore according to Armanios (2010), this particular project follows the logic of assistencialism characterised by local development goals, external project practices and resistance to decentralization.

This derives from the shortcomings of the empowerment achievements, as communities do not have control over the funds and the most marginalized lack participatory spaces (Classen & al., 2008). Moreover, it demonstrates that the lack of responsiveness from the central government impedes the effectiveness of decentralized management (Ribot & Larson, 2004). Efficiency of targets and realisation takes precedence over empowerment (Cleaver, 2001). Hence, their political relationships with the government have not been altered by their participation. Despite that Bedouin people’s know-how to channel their demands to the authorities, the state keeps a non-interference stance on tribal affairs (15). The transfer of power over natural resource management is thus superficial. This is problematic since national decision-makers consider Bedouins too dependent on subsidies whereas the decentralization process of water management is not achieved. This stems from the dual logic of participatory natural resource management identified by Mosse (2001), one of participatory planning and one of operational reasoning from

central authorities. Drawing from these elements, it is shown how participation asks local community to be responsible, without enabling them to, thus perpetuating the political order.

Therefore, the main aim of stabilizing the region given the Bedouin's ties with Libya and their revolutionary potential appears at the forefront of the project motives (Oweis & Hachum, 2009). Interestingly, it pursues the national motives of border security and stabilization like containing urban migration (16). This reveals its true nature of security imperatives enforcement, through a patronage network of tribe leaders. Water management is thus conceived as a security issue and drift into the "shadow state" away from public scrutiny (Mirumachi & Allan, 2010). In order to maintain the population stable, the state sustains its livelihood with little concerns for empowerment. Therefore, it is claimed that participation reinforces the social hierarchies by providing more visibility to the stakeholders but no actual decision-making influence (Mirumachi & VanWyk, 2010). The empowerment claims of the project are far from achieved given the tenuous efforts dedicated to unravelling power differentials.

C. DOES PARTICIPATION CONTRIBUTE TO INTEGRATED NATURAL RESOURCES MANAGEMENT?

The question explored in this section is the extent to which the participation engages with the integrated water management national framework. Various national government stakeholders implement activities in the region. MRWI, MALR and Ministry of Housing's NWC Development Agency, which builds cisterns and dykes. However they do not coordinate their policies (14). This results in fragmentation of funds for WH, with the SDCMR being under-funded while other organizations with more funds have thus a larger response capacity. The

cooperation between MALR and MWRI is considered weak (12, 16), especially when compared to the outset of the project. At this time, the Ministry of Agriculture, influential, pushed for national coordination of the project (15). Consequently, the lack of co-operation among national stakeholders results in project failures (Luzi, 2010). Nowadays, Matruh rainfed region presents less national strategic importance for the Ministries, which deal mainly with new reclaimed lands and irrigated areas. As a consequence national plans and investments are either inappropriate for the region (12) or without impact on the current activities (17). This demonstrates how the political economy directing GOE's action towards sustaining the Bedouin population's livelihood bypasses the region sustainability, integration challenges and IWRM objectives.

This pattern hampers local capacity for IWRM. Effectively, the culture of integration at the local government level is missing (12). Firstly, the governorate gives little support to the SDCMR's activities, except WH (16). Secondly, the isolated nature of the SDCMR presents a major obstacle to coordination. Created by the project, it was expected to reintegrate the governorate at the project completion but never did (World Bank, 2004). Therefore, whereas the SDCMR is supposed to communicate its research findings to the Agriculture Department, which transmits them to farmers and breeders, in practice communication and coordination are non-existent (12).

Moreover, the evidence of continuing desertification due to overgrazing and low rainfall highlights how the current practices of IWRM limits its potential for sustainable resource use (GEF, 2001) (4,5,7). The lack of political will for integration deprives the local government from adequate capacity and management instruments for co-ordinated water and land resources management. Water structures take priority; subsequently IWRM mandate to protect vital ecosystems is jeopardized. The project fails to monitor and evaluate environmental changes (11).

In fact, the environmental concerns have been side-lined by the developmental and social welfare goals of the GOE (World Bank, 2004). This approach is at stake with deep-rooted dynamics such as the purchase of fodder from outside. The lack of attention given to crops, soil and water salinity as well as livestock production for income-generating activities was pointed to as a strong weakness of the project (12, 14). However, interviewees confirmed the lower land productivity (4,5), loss of plant species on the rangelands (7).

Subsequently, barriers to coordination and communication impact the integrated land and water management at the watershed level. The two concepts of rangeland management and *wadi* development are in opposition since improving rangelands reduces downstream runoff (Frasier, 2005). However, the current practices do not address this compromise. In fact introducing WH techniques along the *wadi* makes upstream areas: “users for water rather than a water catchment” (ibid, p.5). Additionally, new cultivation introduced in the coastal strip such as fig and olives trees is not always adapted to the soil quality of the region. These consequences were summed up as the lack of integrated valley development model such as in Egypt’s irrigated areas (15). Therefore, the project is badly conceived to be adequately integrated and to ensure sustainable development. It fails to look beyond the watershed to address the political economy underlying the current unsustainable water governance (Shiferw & al., 2009). This matches with Allan’s call (2005) for IWRM to integrate the society, economy as well as the environment interests. Building on this, it is demonstrated that the politics of water allocation and the lack of consideration of environmental issues deprive IWRM from its potential for sustainable use.

D. DISCUSSION

While acknowledging the limitations of a small sample qualitative study and the focus on a unique geographical region, this research allows eliciting several findings. The Matruh case has shown that stakeholders' involvement does not necessarily lead to a more sustainable use of natural resources. Under cover of participation, strategic aims of the "shadow state" are pursued with more legitimacy (Mirumachi & Allan, 2010). Firstly, it is claimed that participatory methodologies are instrumental for maintaining a broad political economy based on patronage, dealing with conflicts and funds. Thus, the critical issues of equitable allocation at the national, regional and local scales are not tackled and uneven benefits persist. Despite the adoption of IWRM and stakeholders' participation, a strong coalition of interests perpetuates the status quo in water management (Zeitoun & al, 2011).

Secondly, although stakeholders gain visibility, the analysis shows that participation is conceived in isolation from broader national dynamics and thus marginalizes further the less powerful. The unrealistic vision of the tribal community does not challenge the most powerful's ascendancy within the community and the local population lacks adequate capacity to render the state accountable. Thirdly, the conceptual underpinnings of participation in IWRM need to go beyond the watershed. The focus on WH is too narrow to address critical sustainability issues. Therefore, the political dynamics of inclusion and exclusion, power reassertion and empowerment in water management allow participation little contribution for sustainable development. In fact, participation in IWRM can result from a political manoeuvre to gain political support and social peace.

Consequently, its contributions to sustainability and equity are thin. The politics of water as space for social conflicts and power relations restrain the allocation and environmental imperatives of a

comprehensive IWRM (Allan, 2005). This paper argues that participation is subject to strategic and political exercises, which restrain equity and sustainability, and as long as the power differentials go unchallenged, its input for sustainable resource use will be limited.

V. CONCLUSION

The purpose of this paper has been to investigate the contribution of stakeholders' involvement in natural resource management. To this end, key issues of the IWRM (Allan, 2003; Mollinga, 2008) and participation (Cooke & Kothari, 2001; Mosse, 2008) literatures were addressed in order to unveil the political processes underpinning water governance. The main challenges for achieving IWRM through participation were scrutinized to establish an analysis basis framed by allocation, power differentials and sustainability issues.

Building on qualitative data analysis from the rainfed desert region of Matruh in Egypt, the paper has set out some interesting deficiencies emerging from participatory technologies for the pursuit of IWRM and sustainable development. The following conclusion can be drawn that IWRM and participation engage with political processes embedded in a political economy of water allocation and coalition of interests. Under cover of stakeholders' participation, the political order is maintained, thus undermining the equitable, empowerment and sustainability aims of IWRM. Subsequently, it has confirmed the adequacy of the political sociology approach to water governance.

The relevance of understanding the politics underlined in IWRM is to provide explanations for the failure of IWRM to release its objectives (Gyawali & al., 2006) and the little evidence base of successful implementations (Matthews, 2011). The tendency of water governance to be captured by vested interests elevates the importance to recognise and challenge power differentials among stakeholders. By analysing the power relations at the local level and interactions at the national scale, this paper adds to the literature on IWRM. As a result, it exemplifies that participatory

spaces that challenge power differentials for the most marginalized in water governance have to be enforced for stakeholders' participation to contribute to sustainable use of natural resources. The findings suggest further research to investigate how power relations between upstream and downstream users impact water management on the *wadi*.

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VII. APPENDIX

A. INTERVIEWS TABLE

Interview no.	Interviewee	Date and Location
1-3	Bedouin breeders	23/07/11 Neguila Centre, Matruh Governorate.
4-8	Bedouin breeders	24/07/11 Neguila and Marsa Matruh Centres, Matruh Governorate
9	Sheikh, Tribe Hawita	25/07/11, Marsa Matruh city
10	CAP director, SDCMR Project	26/07/11, Marsa Matruh city
11	Monitoring and Evaluation, SDCMR Project	26/07/11 Marsa Matruh city
12	Soil and Water direction, Agriculture Department, Matruh Governorate	26/07/11 Marsa Matruh city
13	Neguila Centre director, Social Affairs Department, Matruh Governorate	26/07/11 Marsa Matruh city
14	Desert direction, North West Coast Development Agency, Ministry of Housing	26/07/11 Marsa Matruh city
15	Dr. Adel Aboul-Nagga, Supervisor ARC/APRI	31/07/11 Cairo
16	Dr. Sobhi El-Naggar, former Deputy Director MRMP	19/07/11 Cairo
17	Dr. Naeem Moselhy, Head of SDCMR	25/07/11 Marsa Matruh city

B. INTERVIEWS GUIDE

1. Bedouins farmers interviews

1. Introduction:

- What are your name, your age and your tribe?
- What are your activities?

2. Water management

- What is your use of water
- What management techniques do you use?
- What is your opinion about this system?
- What water rights issues do you face?
- What are the solutions?
- How does it cost you to built water harvesting equipment?

3. Government policies

- What is your opinion regarding the government activities in the region?
- What are your relations with the governorate?
- What is your opinion of the SDCMR?
- What do you think of the *mandoubeen* system?
- What changes have you noticed since the previous MRMP?
- Who do you discuss with regards to government activities?

4. Environmental issues

- Do notice any environmental changes?

5. General trends

- What differences do you see between your past and today?

- What do you expect from the future?

2. Governorate and SDCMR agents

1. Introduction

- What is the role of your department?
- What are your activities?

2. Government strategy

- How do your activities relate with the national strategies?
- What are your relations with the SDCMR and/or other governorate departments?
- What are your relations with the Bedouin farmers?
- What is your opinion of the SDCMR's project?

3. Sustainable development

- What are the main challenges for sustainable development in the region?
- How can they be resolved?

3. Elite interviews

- Discussion about the SDCMR's activities, its achievements, its shortcomings, its future in the Matruh region.
- Discussion about the challenges of participatory approaches
- Discussion about the integration of SDCMR's activities in national strategies
- Discussion about the interactions at the ministerial level for water and land management
- Discussion about the challenges for sustainable water and land management in the region
- Discussion about the challenges for sustainable development in the region

C. WATER HARVESTING EQUIPMENT



Cisterns



Reservoirs



Wadi

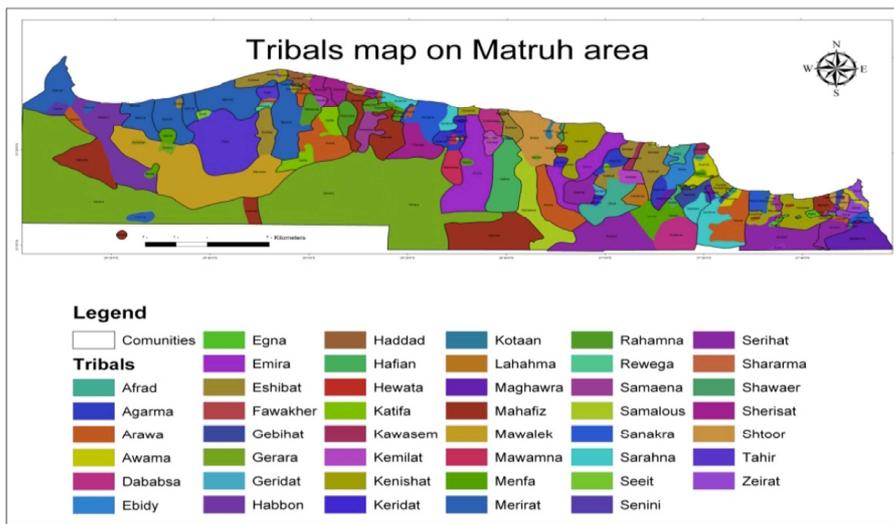


Dykes

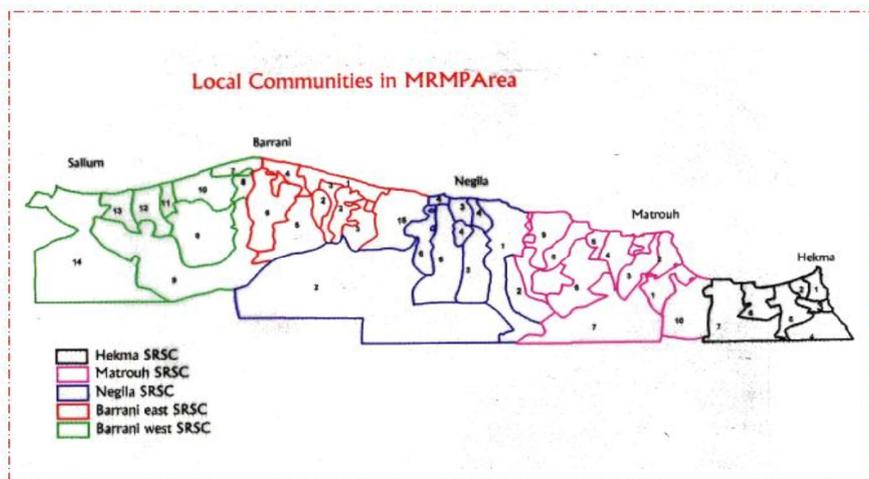
D. MAPS

Source: (Moselhy, 2010)

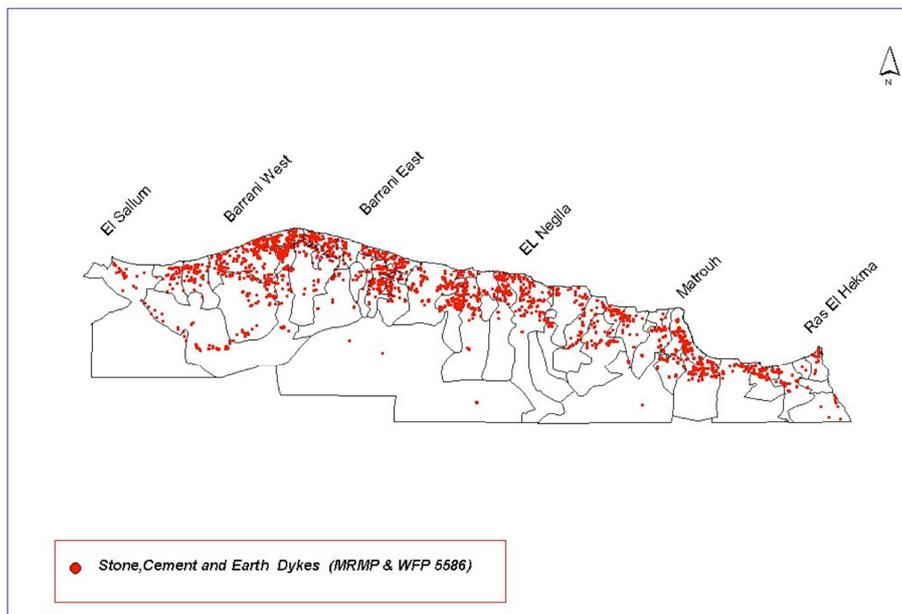
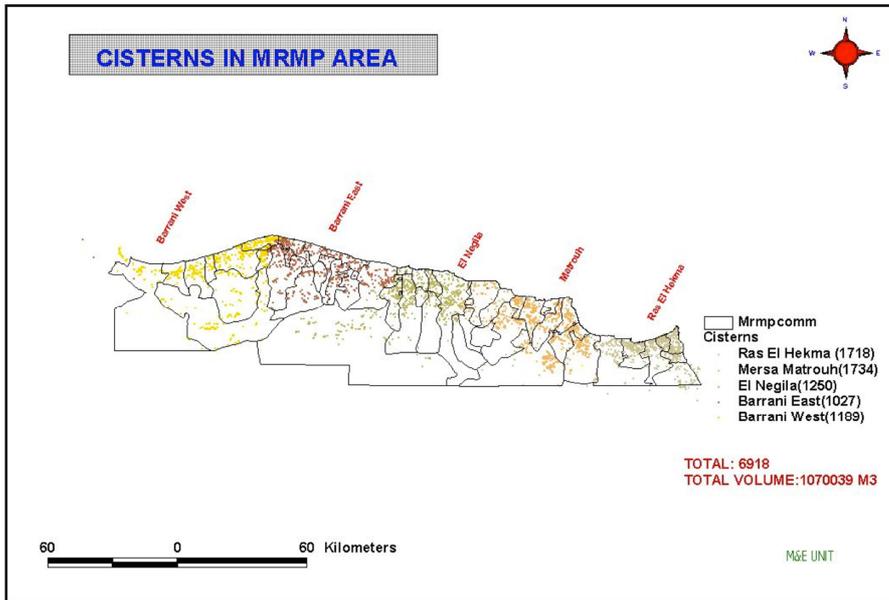
Map 1. Tribes' distribution in the region



Map 2. Local Communities distribution in the region



Map 3. Cisterns distribution



Map 4. Dykes distribution

E. ELVULMED PROJECT

Funding: Centre National de la Recherche Scientifique (CNRS) – Institut National de la Recherche Agronomique (INRA) - Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD).

Outline:

The Mediterranean basin has faced important changes of its environment: (i) urbanization and demographic pressure on natural resources, mainly land and water; (ii) the food habits and cultural changes, and (iii) the climatic change. Due to its strong historical and cultural links with the natural and social environment, livestock activities, and particularly small ruminant ones, occupy a structural role in the social and spatial organization and in the household economy, notably thanks to their adaptive capacities to harsh conditions. In the South Mediterranean, one process of adaptation has been the development of livestock activities in the overcrowded zones (household systems) to face to the demographic pressure. In the North, the main adaptive strategy has consisted in increasing the abilities of livestock activities in valorising marginal resources (crop by-products or uncultivated land in the inlands). Nevertheless if livestock activities have well adapted to recent changes in the short term, the mid and long term adaptation to ongoing changes remains uncertain in terms of sustainable development.

The exploratory project ELVULMED aims at analysing the role of livestock activities in reducing the vulnerability at the farm/family land territorial level face to global change and at identifying the key-determinants of adaptive processes according to two contrasted zones in the North and South Mediterranean. The adaptation of livestock systems and their role in reducing vulnerability implies to understand, characterize and quantify the interactions between livestock activities, the private and collective use of natural resources and the market access and overall adaptation to global change. How to integrate the multiple functions of livestock farming activities and their direct and indirect impacts on environment, on society and economics? How to integrate the multiple spatial and time scales in a pertinent research approach? The main challenges will be to identify the key parameters to model the interactions between (1) the human activities (associated with livestock and resources management), (2) the territorial development

(in terms of social inequities, spatial segregation, migration and movements, food security, soil and water use, and landscape) and (3) the global change.

We propose an exploratory project that aims to integrate the different approaches and scales of vulnerability to develop a conceptual model on the adaptive processes face to global changes in the livestock territories of Mediterranean. This project is based on two tasks: T1) understanding the role of livestock in reducing vulnerability at the farm/household and territorial levels; T2) analyse the adaptability of livestock systems to global change using retrospective analysis of factors that have affected the use of resources (land and water) and livestock management and analysis of representations and perceptions of future challenges. This research will be based on an important data collection on present and past trends by using archived information, and carrying out retrospective, sociological and anthropologist surveys on the perceptions and representations of changes by the populations. The project is built on two contrasted zones in the circum-Mediterranean (Egypt, France) in order to identify and analyse the diversity of adaptive processes according to the historical, cultural and socioeconomic context and the magnitude of environmental changes. From these contrasted situations, we will design a conceptual framework that could be extended to a larger panel of situations in the circum-Mediterranean zone.

