Future Agricultures

ODI

Summary Paper

Pathways for irrigation development in Africa – insights from Ethiopia, Morocco and Mozambique

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Summary Paper

June 2015

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Key Findings

1. Ethiopia, Morocco and Mozambique have followed unique political and developmental trajectories over the last five decades. However there are some striking similarities in irrigation policy and practice, in part a reflection of Africa-wide trends. Importantly, past legacies continue to shape the sector today.

2. Morocco has made the most progress in exploiting its irrigation potential, benefitting from early colonial investments followed by a strong, politically stable, centralised state with a commitment to further developing the irrigation sector. In contrast, Ethiopia and Mozambique have undergone several regime changes and social upheaval. Irrigation has not been a priority in agricultural policy until recently.

3. In the three case study countries irrigation policy has historically formed part of agricultural and/or water policy, in turn orientated towards a number of different social, economic and political goals. Contingent on the dynamics of the broader policy environment, objectives for irrigation have not always been coherent.

4. In Ethiopia, Morocco and Mozambique changes in policy have been driven to differing extents by political and ideological shifts; macro-economic conditions; donor agendas; political projects; and climate and environmental concerns.

5. The case studies have shown that changes in irrigation policy are mirrored in the histories of particular schemes, such as Chókwè Irrigation Scheme in Mozambique, and can result in the co-existence of multiple forms of irrigation, for example in the Awash Basin in Ethiopia or Souss Massa in Morocco. However, the causal relationships between irrigation policy and practice are difficult to determine due to feedback loops and confounding factors. Essentially the two have co-evolved in response to drivers at multiple levels.

6. The findings indicate that performance is often not evaluated objectively by scheme managers or other stakeholders. Instead, in the cases examined, management is primarily driven by narrow operational concerns with little opportunity for those engaged to draw strategic, system-wide lessons. This obscures understanding of potential trade-offs between different objectives, and how farmers attempt to maximise their returns and benefits.

7. Enduring challenges remain in managing irrigation to increase agricultural output and water productivity, ensure sustainability and contribute to poverty reduction and economic development. Many of these challenges pertain to wider issues in the agricultural sector or governance of land and water, rather than irrigation *per se*. Interventions in irrigation need to be based on a thorough understanding of activities in other water-using sectors and the implications of drivers of change, such as demographic pressures, for resource management.

8. Irrigation modernisation should be a process of continual adaptation to increase resource efficiency and improve services for users, in light of changing agricultural and socio-economic contexts. Ethiopia and Mozambique have ambitious plans for sector expansion. Tackling underlying constraints to performance will be essential to ensure returns on future investments.

9. Water scarcity is a key driver of irrigation policy in Morocco, and is likely to become an increasingly pertinent issue for Ethiopia and Mozambique in future. Beyond technological interventions, there is a need to account for water at multiple levels; improve monitoring and sector coordination; and manage trade-offs transparently. Legal safeguards would help to protect local communities and downstream water users.

10. Given the poor performance of state-managed irrigation, the private sector is often perceived as an attractive alternative. Nonetheless, the state has an important role to play in ensuring sustainable and equitable development of natural resources; an enabling environment for investment; and contributions from commercial agriculture to economic growth and poverty reduction.

Introduction

Irrigation has played an important role in agricultural modernisation around the world. In Africa, however, agricultural production has increased very slowly over the last 40-50 years, barely keeping pace with population growth (Hanjra et al. 2009; Molden et al. 2007). Outside of North Africa, irrigation is little practiced on the continent in comparison with other regions (Neumann et al. 2011). In 2006 African countries collectively irrigated just 5.4 percent (13.6m ha) of their cultivated land, compared with a global average of around 20 percent and almost 40 percent in Asia (FAO 2011).

Africa's unmet irrigation potential remains a subject of interest to the international community given global concerns over food security, increasing water scarcity and climate change. Projections indicate that the equipped area could increase to 17m ha by 2050 (FAO 2011). However, many of the earliest state-managed irrigation developments in the region proved environmentally and economically unsustainable and provided limited social benefits (Rahmato 1999). The subsequent shift towards farmer-managed systems has also yielded mixed results (Garces-Restrepo et al. 2007; Vermillion 1997). Positive examples do exist in the sector, but tend to be isolated and context-specific (Wiggins and Leturque 2010). Amid calls for increased investment in irrigation there is a need to learn from past experiences in order to chart plausible pathways for future development. Recent growth in the private sector also raises important questions around rights and regulation, the role of the state, and who benefits from development of land and water resources (Calow and Mason 2014).

This paper summarises the findings of a rapid review to determine the policies and practices that have shaped irrigation performance over the last 50 years in three African countries: Ethiopia (Box 1), Morocco (Box 2) and Mozambique (Box 3). The research combined a review of national (sector) level trends with short case studies of specific irrigation schemes. Evidence was drawn from the literature, supplemented by in-country key informant interviews and brief site visits. The review considers changes in policy and their drivers; linkages between policy, practice and performance; factors determining scheme performance; and key issues for future policy-making. Full details can be found in the main working paper.

Box 1: Ethiopia

Agriculture is central to the Ethiopian economy, contributing 44 percent to gross domestic product and employing 85 percent of the workforce (Access Capital 2010). However, abundant water resources are unevenly distributed in space and time, and the country continues to grapple with unpredictable rainfall patterns and exposure to drought. Irrigation is perceived as a means to better harness the country's water resources for human development and mitigate the impacts of climate variability, contributing both to poverty reduction and economic growth (World Bank 2006). Historically, irrigation has tended to occupy a marginal place in Ethiopia's agricultural policy and the sector is relatively underdeveloped (Box 4), but ambitious new plans aim to accelerate expansion, particularly through private investment.

The Ethiopian case study centres on the Awash River Basin, which is considered to be the most heavily utilised river basin in Ethiopia, currently serving as home to 10.5m inhabitants, providing water to the growing capital city of Addis Ababa and containing a concentration of irrigation and industrial developments (Tiruneh 2013; Alemehayu et al. 2011). The Awash was the site of the first significant modern irrigation developments during the 1950s and 1960s (Rahmato 2008). It accounts for a significant percentage of Ethiopia's total irrigated area (Alemehayu et al. 2011) and is thought to have potential for further development (Tiruneh 2013). The case study looks at a range of irrigation schemes found in the upper-middle basin, of different scales, vintages and management types.

Water scarcity is a growing concern for water managers and users in the Awash Basin. Significant new investments in agriculture and industry, coupled with rapid urban expansion, are exacerbating existing tensions over water resources. Groundwater abstractions are also on the rise. In future urban water use is likely to take priority; therefore, the agricultural sector will come under increasing pressure to limit withdrawals and find ways to increase water productivity. Although water scarcity has been a driver of national agricultural policies in the past, these have largely been centred on supply-side interventions (e.g. expanding irrigation to achieve food security). Demand-side policies and regulations (e.g. rules for water allocation, user fees, pollution control), where they exist, are poorly enforced due to a lack of technical and institutional capacity and the limited political clout of implementing agencies. The absence of effective mechanisms to control water allocations and use within and between sectors means that adjustments are driven by resource capture rather than a clear set of rules. Investments are frequently uncoordinated, putting downstream users and local communities at risk.

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Genesis Farm, a small private enterprise in the upper-Awash Basin, is using ground-water based drip irrigation for vegetable production. This 40ha farm also produces flowers, dairy and poultry products, and has a small shop.

Box 2: Morocco

Morocco has a varied but predominantly semi-arid climate, with increasing water demand exacerbating water stress, and drought is a structural feature of the environment and economy. Rainfed agriculture and agro-pastoralism are traditionally the dominant livelihoods. However, agricultural modernisation, including irrigation development, has been a key policy objective since colonial times. With a national agricultural strategy aimed at maximising the benefits of commercial agriculture, Morocco is now a leading supplier of early season vegetable and fruit crops to Europe and North America (Van Cauwenbergh and Idllalene 2012). The irrigation sector is relatively well developed (Box 4) and approaching the limits of freshwater availability, with efficient technology and alternative water supplies (e.g. desalinisation) regarded as key to further expansion of coverage.

The case study focuses on three schemes in the Souss Massa Basin, in the south of Morocco. This is one of the most important agricultural areas in the country. Surface water has been mobilised for irrigation through the building of eight dams, in addition to abstractions from two highly stressed aquifers (Dolcine et al. 2010; Agence du Bassin Hydraulique du Souss Massa 2007). The first scheme is Issen Traditional, in which a traditional network of canals fed by springs and seasonal flooding have been rehabilitated and supplied with water from a dam for flood irrigation (ORMVA 2013). The second scheme is Issen Modern, a formerly rainfed area supplied with pressurised water initially for sprinkler and subsequently for drip irrigation (Chati 2012). Both Issen schemes were developed during the 1980s. The third scheme is Guerdane, a public-private partnership delivering pressurised supply for drip irrigation to large commercial citrus growers formerly wholly reliant on groundwater (Houdret 2012).

In Morocco increasing agricultural water use, alongside increasing demand from other sectors, has resulted in severe water stress. Few sources for mobilisation remain, and the Souss Massa Basin's deficit has led to substantial declines in aquifers. The government has responded by promoting technologies such as sprinkler and drip irrigation to increase water productivity and restore balance at the basin level. However, it is not clear that these technologies have contributed greatly to water conservation. There are also concerns that beneficial allocations of irrigation water have disproportionately accrued to a minority of wealthy and politically connected landowners, and that some communities have been dispossessed of usufruct rights as water resources have been mobilised. The experience of Morocco is striking in that it encapsulates the challenges of balancing agricultural modernisation and commercialisation with pro-poor rural development in a water scarce environment. Although challenges remain, irrigation has been deployed to good effect. Moreover, the government has had some success in controlling allocations between sectors, for example during drought (Box 5). Morocco therefore offers a useful reference from which the future development of other semi-arid African countries may benefit.

Box 3: Mozambique

Despite recent successes in maintaining high economic growth rates, Mozambique remains one of the poorest countries in the world (World Bank 2013). Around 70 percent of the population is dependent on subsistence agriculture, predominantly rainfed farming, for their livelihoods (World Bank 2007). Although the country has relatively plentiful land and water resources and high agricultural potential, climate variability results in frequent and recurrent droughts and floods, which can impact significantly on production. Performance of the agricultural sector over the longer term depends greatly on the extent to which water resources can be managed effectively (World Bank 2007). Investments were made in modern irrigation under the colonial administration, but ensuing political changes and civil war have hampered subsequent development and coverage is low (Box 4).

The Chókwè Irrigation Scheme (CIS) in Chókwè District, Gaza Province, falls within the lower part of the Limpopo River Basin. It was developed by Portuguese colonists in the 1950s and extended in the 1970s, delivering gravity fed flood irrigation currently utilised for rice and vegetable production (Brito et al. 2009). In principle 23,000ha in the scheme is irrigable, but due to the impacts of floods, salinisation, and lack of rehabilitation and maintenance, the actual irrigation area is just 7,000ha (HICEP 2011). The scheme is managed by the para-statal *Hidraulica do Chókwè, Empresa Pública* (HICEP), responsible for maintaining primary infrastructure; allocating water among private farms and Water User Associations within the scheme; and collecting fees.

The history of the CIS is intertwined with that of Mozambique, and the scheme therefore serves as a useful illustration of how irrigation policies have evolved and been implemented over the last fifty years, and the outcomes of these processes. In theory the CIS represents an opportunity for high-yield farming, close to an urban market (Maputo), in a semi-arid area. Yet the viability of this scheme is undermined by factors such as limited engineering capacity, high operation costs set against the limited commercial value of crops (e.g. due to competition from imports), and the unpredictable yet significant costs of flood damage. Moreover, the interests or agendas of powerful actors, including donors and foreign investors, have frequently been prioritised over practical considerations such as technical or economic feasibility or institutional capacity. Expert opinions regarding the future of the CIS remain divided between those who see huge potential in large-scale irrigation, provided the job is done properly (i.e. using state-of-the-art technology and assuming good management); and those who claim that, until capacity is developed, intermediate techniques, technologies or management options are the best that can be achieved.

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Women working in the fields in Chókwè, Mozambique. In the Chókwè irrigation scheme 70 percent of farmers are smallholders with plots of less than 4ha. Women, who are the majority of small farmers, tend to own smaller plots of less than 2ha and cultivate rice and vegetables (Pellizzoli 2010).

The evolution of irrigation policy

A historical perspective reveals changing discourses relating to the use of (and rights to) land and water resources; the expected contribution of agriculture to national development; and the respective role of the irrigation sector. Interestingly, whilst Ethiopia, Morocco and Mozambique have followed unique political and developmental trajectories over the last few decades, there are some striking similarities in relation to irrigation policy, in part a reflection of Africa-wide trends. Importantly, past legacies continue to shape the sector today.

Broadly speaking, the 1950s and 1960s were characterised in all three countries by a drive for infrastructure development and agricultural modernisation. An initial focus on the development of large centralised irrigation schemes was then followed by a shift towards integrated rural development in the 1970s and preference for smaller farmer-managed (and financed) schemes. A decade later, economic crisis led to structural adjustment programmes imposed by the World Bank and IMF. Morocco was the first of these three countries to agree to a structural adjustment programme, including the adoption of neoliberal economic policies, in 1983. This led to significant declines in state and donor funding for agriculture, and reduced capacities for delivering extension services. Meanwhile, trade liberalisation and removal of constraints on the private sector encouraged private sector participation in irrigation. Favourable policies and access to affordable technologies, among other factors, has led to expansion of irrigation by smallholder farmers, local enterprises, and (to an extent) international investors.

Mozambique and Ethiopia share a number of features. First, state farms and producers' cooperatives were the main management models for irrigation schemes during their historical socialist periods (do Rosario 2012; Rahmato 2008). Producers' cooperatives were subsequently disbanded, with Water User Associations becoming the favoured model for community management, while most state farms have been privatised, although some irrigation schemes are still run by para-statal organisations. Second, over the last decade or so development policy has focused on poverty reduction strategies. These initially stressed boosting smallholder production for food security, in which small scale irrigation played a minor role, but were later oriented to agricultural commercialisation with renewed interest in irrigation expansion (Mosca 2011; GoM 2010; Teshome 2006). Finally, the emergence of climate change on the development agenda has led both countries to produce strategies for green economic development. These include promoting certain forms of irrigation to mitigate greenhouse gas emissions and increase resilience to climatic variability.

Box 4: Comparing irrigation coverage in Ethiopia, Morocco and Mozambique

Morocco has the lowest irrigation potential of the three countries – around 1.7m ha (FAO 2014), compared to more than 3m ha in Ethiopia (Awulachew 2010) and Mozambique (FAO 2014). Yet Morocco has made the most progress in expanding and modernising its irrigation sector. Low average rainfall and periodic droughts perhaps heighten the need to mobilise available water resources for agricultural production and reduce reliance on rainfed cultivation. The relatively early growth of the sector experienced under French and Spanish protectorates also gave the country a head start. By 1954 Morocco had an estimated 355,800ha of agricultural land under irrigation (Houston 1954), whereas in Ethiopia the very first modern schemes were only just being built and the total area was still only 100,000ha in the mid-1980s (GoE 1984; this figure may not account for traditional schemes). Morocco has since benefitted from stable government, continued strong commitment to the irrigation sector and relatively high human capacity. By 2011 the area equipped for irrigation had reached nearly 1.5m ha (FAO 2014), more than double that of Ethiopia which was irrigating 640,000ha the previous year (Awulachew 2010). Meanwhile, Mozambique's irrigation sector grew under Portuguese rule, reaching 100,000ha of land for rice and sugarcane production in 1973 (Mosca 2011) but with little subsequent progress. By 2005 a mere 118,000ha was equipped whilst only 40,000ha was actually being irrigated (FAO 2014).

Drivers of policy change

In Ethiopia, Morocco and Mozambique irrigation policy has historically served agricultural and/or water policy. These in turn serve a number of different social, economic and political goals, including food security, economic growth and rural poverty reduction. Whilst these fundamental goals remain relatively unchanged, approaches to achieving them have differed through time. Policies for irrigation are contingent on the dynamics of this broader policy environment and shaped by multiple objectives, not always towards coherent positions.

National and sectoral policies have been driven by factors such as:

- **Political and ideological change:** Changes in government and associated ideological shifts can have a strong, at times disrupting, influence on agricultural policy and hence the irrigation sector. This has been an important factor in Ethiopia and Mozambique. Although

Morocco has seen significant policy shifts since independence in 1956 it has been politically stable in comparison.

- **Macro-economic conditions:** As noted above, structural adjustment measures in the 1980s and 1990s had profound implications for key sectors of the economy and repercussions for irrigation policy and sector development in all three countries.

- **Donor agendas:** Donors and international finance institutions have shaped irrigation policy and practice throughout Africa, and of the three countries have played a particularly decisive role in Mozambique, although sources of finance have shifted. Interestingly, in Ethiopia donor influence is thought to have caused less distortion to the economy than in many other African countries (Brown and Teshome 2007).

- **Political projects:** Technical and economic considerations are at times overridden by political agendas. In Ethiopia and Mozambique there has been a notable bias towards high-profile public investments, such as the Chókwè Irrigation Scheme which has symbolic value but is costly to manage. The Morocco case illustrates that policies often serve the interests of powerful groups. In Souss Massa Basin, potential benefits to elites have played a significant role in determining some irrigation investments.

- **Climate and environmental concerns:** Climate change, environmental degradation and water scarcity are global concerns. In Morocco and Ethiopia, countries which suffer from periodic droughts, the desire to better manage variable water resources and address food insecurity has had a strong influence on national policy. Mozambique also experiences climatic variability and flooding is high on the disaster risk management agenda, although it does not directly shape irrigation policy.

- **Other trends:** Growth in domestic markets (Ethiopia), new opportunities afforded by global trade (Morocco) and increasing interest from the private sector (Mozambique) have also driven changes in irrigation policy and practice.

From policy to practice

The case studies have shown that changes in irrigation policy are mirrored in the histories of particular schemes, such as Chókwè in Mozambique, and can result in the co-existence of multiple forms of irrigation, for example in the Awash Basin in Ethiopia or Souss Massa in Morocco. However, these cases also demonstrate that irrigation practice is determined by multiple factors and not government policy alone. Moreover, determining the causal relationship between irrigation policy and practice is extremely difficult due to feedback effects and confounding factors. It is evident that drivers of policy change at the national level have more directly shaped the development of irrigation schemes and their performance. Policies are also informed by practice and performance outcomes, for example availability of new technologies or lessons learned regarding different forms of management.

Policy and practice have essentially co-evolved in response to contingent factors and events. For example, during the 1980s drought exacerbated Morocco's macro-economic problems that eventually led to structural adjustment. Around the same time cheap imported technologies became more accessible to local farmers; improved infrastructure provided better access to markets; and new neoliberal policies facilitated global trade (Faysse et al. 2012; Doukkali 2005). It was the convergence of these factors and events that drove changes in the irrigation sector.

The performance of irrigation schemes

In the case studies investigated little evidence was found that irrigation performance was being evaluated objectively in terms of progress towards (or contribution to) a set of stated objectives. Instead the management of irrigation schemes was primarily driven by narrow operational concerns and with little opportunity for those engaged in management or policy to draw strategic, system-wide lessons. This obscures understanding of potential trade-offs between different objectives, and how farmers attempt to maximise their returns and benefits. Individual actors have different goals which determine both their actions (practices) and their interpretation of outcomes.

In the absence of clear objectives, it is useful to assess and compare the performance of schemes against broader policy goals for the irrigation sector:

Increasing agricultural output: While there are aspects of irrigation systems and their management that contribute to unmet potential, irrigation itself is just one dimension to achieving and sustaining higher, or more stable, agricultural productivity. The case studies revealed numerous other factors affecting performance, including the availability of agricultural inputs; technical knowledge; appropriate and functioning institutions; land fragmentation; access to markets; and environmental factors such as soil degradation and the impacts of droughts or floods. Many of these relate to broader issues of land and water governance,

Box 5: Irrigation under climate variability and change

In Ethiopia, Morocco and Mozambique irrigation is promoted as a means to stabilise production in the context of a variable and unpredictable climate, yet production may still be vulnerable to climatic extremes. In Chókwè, flooding has repeatedly damaged infrastructure, significantly reducing the irrigated area. Better data sharing between riparian states would help reduce this vulnerability, but systems to translate early warnings into effective responses and mitigation measures are also required. In Morocco, irrigation has been promoted as a means of building resilience to drought. However, agriculture remains vulnerable to multi-year droughts, when stored water is prioritised for urban drinking supply rather than irrigation, and water-intensive crop production has depleted groundwater reserves. Similarly, in Ethiopia rainfall variability is often not adequately factored into scheme design and management resulting in fluctuating yields. In the Awash Basin demographic pressures are also resulting in increasing water scarcity, yet plans for irrigation expansion are poorly coordinated and take little account of demand for water in other sectors.

institutional capacities and incentives or deficiencies of the wider agricultural system, rather than irrigation *per se*. To illustrate, yields in Chókwè were initially high, yet productivity has declined significantly since the 1970s (Kajisa and Payongayong 2011). Whilst poor management and lack of infrastructural investments are partly to blame, external factors such as the import of cheap produce, socio-political upheavals, policy reforms and political biases have also had a strong influence on irrigation practice and performance.

Using water productively: Surface irrigation systems predominate in Africa and yet are often viewed as wasteful and undesirable. Morocco has made the most progress in adopting modern technologies, namely sprinkler or drip irrigation systems. These investments are expected to result in increased water productivity (crop per drop) and to 'free up' water for other, higher-value uses. However, many smallholders don't have enough land to recoup investments in equipment, and there are barriers to accessing subsidies offered by the state. Further, investments in drip irrigation have often been followed by adoption of water intensive crops and expansion of irrigated area, whilst poorly maintained equipment negates potential benefits. Hence policies to promote specific technologies are clearly not sufficient to manage agricultural water demand.

Ensuring the long-term sustainability of investments: A lack of resources (human and financial) for operation and maintenance were found to contribute to poor performance in most of the public or communal schemes examined. Private schemes generally appeared to perform better. For example, in Morocco the public-private scheme Guerdane has extremely high operation and maintenance standards, high levels of cost recovery and negligible interruptions to supply. This is because the private company is able to generate sufficient finances to invest in infrastructure and recruit trained staff. When farmers experience a disruption in service the company has to pay compensation, hence profit is a strong motivation. This incentive is often absent in public schemes.

For public investments, the difficulties in recouping capital and running costs can partly be attributed to broader sector issues – the pursuance of relatively high-cost approaches, frequent underestimation of technical challenges, overestimation of management capacities and/or lack of attention to market conditions. The lack of consideration given to 'software' elements in project design can also result in poor alignment with local institutions and, indeed, farmers' needs. This was particularly evident in Ethiopia and Mozambique. Irrigation users have little voice in the planning process. Greater attention is needed to local institutions, farmer priorities and successful low-cost innovations.

Contributing to poverty reduction and socio-economic development: The outcomes of public investments in irrigation have been mixed and there are often trade-offs involved. For example, in Morocco investments in drip or sprinkler systems are promoted to increase water productivity but can also reduce labour requirements. This can benefit the farmer or owner but have negative impacts on the income of agricultural labourers.

The contribution of the private sector to societal goals also requires greater scrutiny. Commercial enterprises can offer direct benefits to local communities such as employment or training, but profit remains the primary objective. Private irrigation developments can also undermine local livelihoods where regulation is weak. For example, in the Awash Basin conversion of pastoral grazing areas to irrigated cotton or sugar plantations has been a longstanding source of conflict, serving to exclude communities from land and water resources over which they hold customary rights (Behnke and Kerven 2013; Tiruneh 2013). Meanwhile, in all three countries governments have implemented policies to incentivise private investment in irrigation such as tax breaks, cheap land leases or subsidies for new technologies, which could potentially serve to negate the indirect economic benefits of such developments if not carefully managed.

Emerging issues for future policy

To conclude, policymakers have difficult decisions to make regarding prioritisation of investments, governance of scarce resources and regulation of the private sector.

Investments in irrigation modernisation: Many African countries face significant financial and human

resource constraints, so effective allocation of public investments is important. The objective of system-level investments should be to ensure that irrigation services are (more) resource-efficient, responsive to farmers' needs and equitable. In Ethiopia and Mozambique the current drive is predominantly infrastructural expansion, yet tackling poor performance in the sector should be paramount. Underlying governance issues are equally likely to undermine new investments. Morocco is a step ahead – reform is high on the agenda and significant progress has been made in modernising the sector, although challenges remain in managing agricultural water demand and coordinating across sectors. Irrigation modernisation is best understood as a continuous process of adapting to changing agricultural and socio-economic contexts.

Governing scarce resources: Water scarcity is a key driver of irrigation policy in Morocco, and likely to become an increasingly pertinent issue for Ethiopia and Mozambique in future. As the Morocco case illustrates, technological interventions have their limits. There is a need to account for water at multiple levels – farm level, scheme level and basin level. Ultimately there will be trade-offs between competing users. How these are managed and who benefits are political questions and decision-making processes are often opaque. Legal safeguards are needed to protect local communities and downstream water users. Increased capacity to monitor abstractions, better coordination and integrated sector planning could also help ensure that decision-making is equitable.

Regulating and facilitating private sector development: Given the poor performance of public investments, one might conclude that irrigation development and management should be left to the private sector. However, it is argued that the state still has an important role to play in governing the irrigation sector: 1) to ensure the sustainable and equitable development of land and water resources; 2) to ensure that commercial agriculture contributes (directly or indirectly) to economic development and poverty reduction; and 3) to provide an enabling environment for investments and address market failures.

End Note

Cover photo: Farmers discuss the local news as they irrigate their maize fields at Gumsalasa, a smallholder irrigation scheme in the semi-arid Tigray region, northern Ethiopia. Photo by Eva Ludi, ODI.

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