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Re-introducing Politics in African Farmer-Led Irrigation Development: Introduction to a Special Issue

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ABSTRACT: This introduction is a reflexive piece on the notion of farmer-led irrigation development and its politics. It highlights the way the varied contributions to the Special Issue support a shared perspective on farmer-led irrigation development as a process whereby farmers drive the establishment, improvement, and/or expansion of irrigated agriculture, often in interaction with other actors. We analyse how the terminology is used and reproduced, and what it means for our understanding of irrigation policy and practices in sub-Saharan Africa. A central tenet of our argument is that farmer-led irrigation development is inherently political, as it questions the primacy of engineering and other expert knowledges regarding the development of agricultural water use practices in Africa as well as the privileging of formal state planning or technical solutions. We show how mainstream understanding of farmers' engagement focuses on (1) regulation and control, (2) profitability, and (3) technical efficiency. We demonstrate how these three perspectives have contributed to depoliticised readings of farmer-led irrigation (development), which has been essential to the ability of the terminology to travel and find global allies. Second, we explore the paradox of the invisibility of farmer-led irrigation development in national policies and practices. We discuss practical and political reasons underlying this silence and point out that there are important advantages for irrigators in not being visible. In conclusion we highlight what can be gained from adopting an explicitly political analysis of the processes through which farmers engage in irrigation on their own terms.

KEYWORDS: Irrigation, farmer-led irrigation development, sub-Saharan Africa, irrigation policies, state planning, expert knowledges

INTRODUCTION

African farmers driving the establishment, improvement, and/or expansion of irrigated agriculture is not a new phenomenon or an emerging process. In many parts of the continent there are documented cases of centuries-old irrigation developed by farmers (e.g. Fleuret, 1985; Grove, 1993; Potkanski and Adams, 1998). However, national irrigation plans and policies long disqualified such instances of irrigation development as being traditional, islands of intensification too limited in scope to provide continent-wide lessons, or small scale and inefficient. This tendency tends to shift in international development discourse, though, as we will show below, it does so under particular framings.

This introduction – and this Special Issue of *Water Alternatives* as a whole – interrogates such a shift in discourse and contrasts it with practices of farmer-led irrigation development in countries as diverse as Burkina Faso, Kenya, Mozambique, Tanzania, and Senegal, and through continent-wide reflections and viewpoints. Contributors engage with farmer-led irrigation development (sometimes shortened to 'FLID' though in this paper we eschew the acronym)¹ from diverse vantage points. This illustrates the interpretative flexibility attached to the notion, as we describe in the next section. But contributions also have in common a discussion of a *process* whereby farmers drive the establishment, improvement, and/or expansion of irrigated agriculture, often in interaction with other actors (government agencies, NGOs, etc). This is a significant shift away from many past and current analyses that discuss farmers' engagement in irrigation as a distinct *type* of irrigation. Rather, taken together, contributions clearly show that the process of farmer-led irrigation development cuts across existing irrigation typologies defined on the basis of scale, technologies, crops, modes of management, and so on.²

The value of thinking about this form of irrigation development in terms of processes is that it illuminates the role of farmers –what makes it *farmer-led* – and locates it in political relationships. It enables a critical assessment of the primacy of approaches and perspectives that privilege formal state planning and expert engineering-based knowledge as drivers of agricultural water use practices in Africa. More specifically, it shows how an emphasis on decontextualised engineering criteria can diminish farmers' agency in favour of 'external' agencies which are able to deploy engineering expertise to set the terms by which farmers' initiatives are adjudicated, valued, and regulated.

In high-level policy fora there has been a recent, rapid, and widespread growth in the recognition that farmers can play a leading role in irrigation in sub-Saharan Africa, but this has come with diverse and sometimes divergent framings. In particular, the term 'farmer-led irrigation' is now commonly used – omitting the word 'development' which is so crucial for emphasising farmers' role in the trajectories, purposes, and governance of change in development practice. The term also tends to create a homogenous category of 'farmers' – despite their wide diversity and their different ways of engaging in irrigation activities – which leads to socio-economic differentiation and raises equity issues (Gross and Jaubert, Hebinck et al., Lefore et al., Scoones et al., this Issue). In this introduction we explore how the phenomenon of African farmers' development of irrigation is studied and framed. We argue that depoliticised readings of farmer-led irrigation (development) – which are less threatening to state apparatuses – have been essential to the ability of the terminology to travel and find global allies, as was the case for farmer-managed irrigation systems (FMIS) in Asia in the 1980s (see Liebrand, this Issue). We also show that the mutation of farmer-led irrigation development into its apolitical cousin strengthens research and policy practices that continue to frame questions of agricultural change in terms that are amenable to 'solutions' from importation of standard (decontextualised) technical

¹ Following Billig (2013), we avoid the acronym. Billig has identified tendencies in social science writing which conceal human agency by various devices, one of them being the excessive use of acronyms. In our view, the diversity of farmers and the multiple strategies they use to develop their irrigation would be made invisible by the simple use of the letter 'F' in 'FLID'.

² In this paper 'development' always refers to the development (or performance) of something specific such as irrigation practices; it does not necessarily imply development in the political and economic sense.

packages (often with explicit or implicit requirements of changes in farmers' behaviour). We consider this to be a missed opportunity. The great advantage of 'farmer-led irrigation development' as a heuristic tool is that it can shed light on the social and political contexts and dynamics of irrigation practices and changes.

Though farmers developing irrigation seem to have found global allies, numerous authors note such activity is not widely recognised or supported by national governments (de Bont et al., El Ouaamari et al., this Issue). Our introduction therefore explores the paradox of the invisibility of farmer-led irrigation development in national policies and practices. We argue there are a number of reasons for this silence. These predominantly relate to the advantages for irrigators of not being visible (and thus not being regulated or taxed) by the state (Mdee and Harrison, this Issue), issues of state capacity and data collection (how does one know about and measure irrigation), but also to the nature of processes that question the role of governments (and their international partners) in setting the trajectory of change.

We conclude this introduction with a discussion highlighting what can be gained from the adoption of an explicitly political stance with regard to the analysis of farmers' engagement in the irrigation sector on their own terms. We invite readers interested in specific case studies, and in policy advice on how different actors can engage with farmers initiating irrigation in sub-Saharan Africa, to turn to the diverse contributions that follow. Contributions by Hebinck et al. and Scoones et al. are reminders that farmer-led irrigation development is a situated practice, and that different farmers engage with irrigation in different ways which reinforce differentiation. Gross and Jaubert emphasise that the inability to acknowledge such diversity could be the main reason for the failure of development projects to guide and support such changes. This echoes the word of caution – and related recommendations – on how to ensure equity in development, which readers will find in the viewpoint of Lefore et al. Highlighting its contingent nature, El Ouaamari et al. see farmer-led irrigation development, as an example of resistance to the dominant model of irrigation development in the Senegal Valley. This complements the paper by de Bont et al., who argue that farmer-led irrigation development questions the vision of modernity that has dominated the sector to date and continues to inform the viewpoint of many government agencies. The difficulty of bridging this gap between different understandings of irrigation is also evident in Liebrand's contribution, which draws parallels between farmer-managed irrigation systems in Asia in the 1980s and contemporary irrigation dynamics in sub-Saharan Africa. Van Koppen and Schreiner, then, invite us to view farmer practices through a water-rights perspective. This suggests the need for rethinking state engagement modalities, which Mdee and Harrison remind us have generally aimed at regulating practices in the name of water conservation.

THE PHENOMENON, ITS CONCEPTUALISATION, POLITICS, AND TRAVELS

Woodhouse et al. (2017) already signalled that there are other terms in use to name the phenomenon that we refer to as 'farmer-led irrigation development'. We argue that most of these terms reflect an apolitical framing of irrigation dynamics in sub-Saharan Africa, and that the diversity in terminology is not innocent. Various names and terms indeed have their histories, and reflect diverse ways of seeing irrigation practices and agrarian change that are themselves associated with different disciplines, and science or policy perspectives. Naming also asserts perspectives, reinforcing them by making certain elements and processes central to the investigation while marginalising others.

As more generally argued by Mosse (2004), the strength of a given concept, name, or even interpretation of events then lies in its ability to garner support from an ever-extending network of social agents, what Sabatier and Jenkins-Smith (1983) refer to as an 'advocacy coalition'. The interpretative flexibility of the concept is in turn central to its function as a 'boundary object' (Star and Griesemer, 1989) around which such a coalition can structure itself. The following paragraphs show how African farmers' engagements in irrigation lend themselves to such interpretative flexibility and advocacy work, and stress the issues associated with it.

The term 'farmer-led irrigation development' was initially coined in 2014, in an article analysing the organisational modalities of irrigation systems diverting mountain streams in North Mozambique, initiated and managed by small-scale farmers (Nkoka et al., 2014). Several other publications further established the terminology (Beekman et al., 2014; Woodhouse et al., 2017) and gave it a positive connotation for the prospects it held for supporting agricultural change in sub-Saharan Africa. Preceding these publications, irrigation scholarship used a variety of terms to study instances of irrigation development initiated by farmers, and highlighted its potential but also the challenges it raised (see de Fraiture and Giordano, 2014 and, in the same vein, Lefore et al., this Issue). Farmer-led irrigation development was then discussed in relation to issues of (1) regulation and control, (2) profitability, and (3) technical efficiency. Below we demonstrate how these three perspectives continue to frame mainstream understanding of farmers' engagement in irrigation. This results in depoliticising a process that questions current policymaking and development trajectories.

A first dominant perspective on farmers' initiatives reveals that they are seen through the lens of 'the state'. Farmer-led irrigation development is then referred to as something 'informal' or 'unofficial', sometimes even 'illegal'. These terms reflect the perspective of central planners and government agents for whom public irrigation 'schemes' epitomise what irrigation is, or should be, in sub-Saharan Africa (see Harrison, 2018 for a critique). The terms not only emphasise that such irrigation development happens outside the purview of the state but also label them as inferior, and often indirectly call for an intervention to regulate it. Terms that have also been used to characterise this development without state involvement are 'unplanned irrigation' (de Fraiture et al., 2014), 'spontaneous irrigation development' (Veldwisch et al., 2013), and 'emergent irrigation systems' (Namara et al., 2011). Though these authors recognise the driving role of farmers in developing irrigation, the terminology used tends to obscure the fact that these developments are intentional, and require hard work, financial investment, and some degree of planning (though not from state agencies). As socio-economic development is increasingly being premised on private sector involvement (including in the African agricultural sector, see World Bank, 2017), there are, among the international development organisations that recently adopted the 'farmer-led' terminology, a number that welcome the idea that irrigation development is taking place largely outside the state's purview. Their calls for strong private sector involvement in driving and supporting agricultural value chains imply also limiting the role of the state to providing 'enabling policy environments' (World Bank, 2018c).

A second dominant perspective frames farmer-led irrigation development in economic terms, attempting to draw lessons from a myriad of experiences to elaborate a new (investment) model for irrigation in sub-Saharan Africa. This is, for instance, reflected in the work of the agricultural water management solutions project funded by a grant from the Bill & Melinda Gates Foundation and coordinated by the International Water Management Institute (IWMI). Both the main report and the special issue resulting from this project refer to "farmer-driven investments in agricultural water management" (Giordano et al., 2012), "small-scale private irrigation" (Wichelns, 2014; de Fraiture and Giordano, 2014), and to farmer-led irrigation development as being "small-scale, private, self-funded and guided by market transactions" (de Fraiture et al., 2014). There is an emphasis on the market orientation of the production practices of high-value crops (Gross and Jaubert, Hebinck et al., and Scoones et al. in this Issue), and the role that private sector actors are to play in order to support this 'revolution' (World Bank, 2018b). This perspective recently re-emerged at a 2018 policy forum held by the World Bank and the Daugherty Water for Food Institute, which several of the organisations involved in the AWM project contributed to framing (DWFI, 2018). In September of the same year, the World Bank, together with the African Development Bank and the Alliance for a Green Revolution in Africa (AGRA), launched the 'Farmer-led irrigation initiative' with a dedicated webpage, email address, and hashtag (World Bank, 2018b). The event at which this initiative was launched called on African national governments to "commit to supporting farmer-led irrigation, which is based on building inclusive

private sector supply chains, boosting technological innovations, and increasing use of pumps and water application" (World Bank, 2018a).³

The above quote also echoes a broader professional culture in the field of irrigation and our third dominant perspective through which farmers' engagement in irrigation has been discussed, namely that of engineering. Engineering perspectives typically highlight technologies and production techniques as the key elements in understanding irrigation dynamics. The terminology associated with this third perspective includes "small-scale agricultural water management technologies" (Giordano et al., 2012), characterised as low-cost and affordable, often mobile, and individually owned; and 'distributed irrigation', which is defined as irrigation systems where the water source and irrigated fields are near to each other, and thus there are minimal distribution requirements (Burney et al., 2013). This perspective is reflected in development projects that promote technologies like low-cost drip irrigation, treadle and motor pumps and, more recently, solar-powered pumps (see Wanvoeke, 2015, and Venot, 2016 for a critical investigation of why drip irrigation continues to be promoted despite the lack of evidence that it is used as intended by irrigation engineers). This is reiterated by Gross and Jaubert (this Issue), who highlight that development projects generally foreground the technological object (or package) as a universal solution that deserves widespread marketing, and overlook the variability among farmers and the fact that irrigation is one among many strategies that households resort to. Approaches which primarily monitor the spread of 'adoption' of technological artefacts on the basis of a linear technology diffusion model, inspired by Rogers (1962), are an extension of this perspective. They largely ignore the technology-appropriation processes by which farmers embed objects (like petrol pumps) within specific contexts by contesting, allocating, and reappraising their meanings and values (Hebinck et al., this Issue). Instead, insistence on the primacy of engineering expertise tends to abstract decision-making about technology from the specific contexts in which it is to be applied. The dominant engineering perspective – that 'modern technologies' are essential and that these need to be provided to farmers – has not abated with the embracing of the farmer-led terminology. In April 2018, the vice-president of the International Commission on Irrigation and Drainage (ICID) wrote a two-page article on the Water for Food International Forum 2018, referring to 'farmer-led irrigation solutions' and 'private sector solutions', while equating farmer-led irrigation to 'small scale projects', and projecting a prominent role for drip irrigation technologies (Wahlin, 2018). A World Bank blog post that summarised the event at which the 'Farmer-led irrigation' initiative was launched reports that the Tanzanian agriculture minister "highlighted the critical importance of supporting inclusive and affordable technologies to catalyse *adoption of farmer-led irrigation* for sustainable land and water use. Technology is a key driver to reducing costs and [increasing] quality of solar panels, submersible pumps, and low-cost *sprinkler and drip irrigation systems* – enabling farmers to purchase or lease-to-own *solar pump equipment* at a reasonable price and to irrigate larger areas in much shorter timeframes" (World Bank, 2018a; emphasis added). As a final example, the World Bank/AGRA farmer-led irrigation team uses a logo that highlights sprinkler irrigation and pumping on the basis of solar energy (Figure 1). These technologies are indeed used by African farmers to irrigate, but they remain highly exceptional and result in farmers becoming heavily dependent on technology developers – an issue also flagged by Lefore et al. (this Issue). Though some contributions to this Special Issue document the appropriation dynamics of technologies, they do not share this fascination for technology. They rather highlight the 'failure' of projects focusing on promoting technical packages (Gross and Jaubert, this Issue), or argue that what is at play is the shaping of a 'mutant modernity' that questions the high modernism that has dominated the sub-Saharan irrigation policy landscape to date (de Bont et al., Hebinck et al., this Issue).

³ The African Union also developed its draft continental irrigation development framework in 2018, giving a prominent role to farmer-led processes and presenting it as one of four main agricultural water development pathways.

Figure 1. A techie dream? Contrasting the World Bank/AGRA 'Farmer-led irrigation' initiative logo with one among many forms of farmers' approaches to 'technology'.



Finally, a striking characteristic in most of the terminology that has emerged over the last decade and is currently being mainstreamed is the fact that the word 'development' is being dropped and reference made to 'farmer-led irrigation'. We argue that this is not merely a semantic change that would be of interest only to academics. It has very practical and far-reaching implications for how we collectively understand the dynamics at play and hence define the ways in which different actors can engage with it (as shown by Liebrand, this Issue, on the case of farmer-managed irrigation systems in Asia in the 1980s). Though some recent definitions are process oriented – the World Bank (2018b), for instance, talks of a 'revolution' in the making – the dominant discourse tends to frame farmers' engagement in irrigation as a 'category' alongside other types of irrigation that are already existing and well known by policymakers (see next section for a more detailed discussion of the 'categories of irrigation'). As a category or type of irrigation, it then becomes possible to discuss farmer initiatives in relation to issues of regulation and control, profitability, and efficiency. While we analytically separated these three dominant perspectives in the above discussion, they operate in conjunction. Together they lead to two related convictions: (1) that farmer initiatives constitute irrelevant, insignificant, or even harmful development, and (2) that intervention and assistance are required.

Thus, the idea that farmers can play a key role in the development of irrigation in sub-Saharan Africa has indeed been embraced widely, and has put smallholder agricultural water use high on the policy agenda, at least discursively. At the same time, the terminology has been co-opted by development organisations in ways that disarm its potential political dimensions, not least in terms of the relationships between state agencies and the mass of small-scale agricultural producers (which we turn towards in the next section). It is likely that the depoliticisation of farmer-led irrigation (development) has been key for the concept "to continue recruiting support and so impose ... [its] growing coherence on those who argue about or oppose [it]", a condition Mosse (2004: 646) reminds us is necessary for policies to become 'successful' in the sense that they stay around and keep getting reproduced.

The proven flexibility of the 'farmer-led irrigation (development)' terminology and its capacity to absorb the diverse meanings assigned to it, makes it particularly well set to become a successful policy model. Indeed 'farmer-led irrigation' works as a 'boundary object' (Star and Griesemer, 1989). It allows sufficient room for diverse interests and even contradictory objectives to express themselves in an ever-extending 'interpretative community' that brings together heterogeneous actors (academics, international organisations, NGOs, national governments, 'lead farmers'). The flexibility of the farmer-led terminology is certainly helpful in concealing ideological differences and facilitating the building and maintaining of a broad support network. It also allows engaging with processes that would otherwise

remain impossible to address due to their politically sensitive nature. But this process of depoliticisation also brings a risk: that of undermining the agency of different groups of farmers vis-à-vis other actors.

THE INVISIBILITY OF FARMER-LED IRRIGATION DEVELOPMENT

The pivotal role that farmers play in the development of irrigation in sub-Saharan Africa has re-emerged in the international development sphere – very much as happened in the 1980s when researchers, development agents, and policymakers 'discovered' that farmers indeed played a key role in shaping the realities of irrigation schemes and agriculture in Asia (see, for instance, Chambers et al., 1989). However, farmer-led irrigation development has not yet become a 'policy object' in most African countries – or only under one specific lens: that of the need to regulate it on the grounds of its presumed low efficiency and low productivity, two tenets that several contributions to this Special Issue openly question (de Bont et al., El Ouaamari et al., Hebinck et al., Scoones et al., this Issue).

We argue that for most policymakers in sub-Saharan Africa, farmer-led irrigation development (as we understand it) remains invisible both literally and/or in the sense that it has not yet acquired any legitimacy. They therefore do not really engage with it in a forward-looking way. There are three main reasons for this state of affairs: (1) the farmers themselves and their (in)visibility strategies, (2) the multiple facets of a process that does not lend itself easily to categorisation and challenges current practices of generating irrigation statistics and capabilities of government agencies; and (3) the political nature of a process that questions the role of the state in driving modernisation and development. We address each of these points in the following paragraphs.

The invisibility of farmer-led irrigation development is evident when countrywide irrigation statistics are compared with emerging evidence based on case studies. There is growing evidence that official narratives underestimate, or fail to recognise, the irrigated areas developed by farmers as 'irrigation', or that government agencies do not know it is occurring (Beekman et al., 2014; Woodhouse et al., 2017; see also Lefore et al.; Scoones et al., this Issue). At first sight this is strange. As African governments have pledged to increase state budget allocations to the agricultural sector and have displayed ambitious plans to increase irrigated areas (see, for instance, at a continental level, NEPAD, 2003), farmer-led irrigation development could assist governments to reach diverse development and economic targets. Further, and as highlighted by several authors (de Fraiture and Giordano, 2014; de Fraiture et al., 2014; Woodhouse et al., 2017; see also Lefore et al., this Issue), farmer-led irrigation development can have important implications for watershed and river basin management, for wildlife and power needs, as well as for changes to commercial agriculture and food imports and exports. It is the sort of thing that governments are likely to notice. Why might they fail – or refuse – to do so?

The first reason is the farmers themselves. It can make good sense not to be noticed by governments in contexts where state oversight is associated with unwelcome taxation, regulation of land and water use, large-scale land allocation that pays little attention to prior uses or customary rights, various restrictions including on inputs, coercion, and control (see Spear, 1997 in the case of Tanzania, as well as van Koppen and Schreiner, this Issue). Government engagement may not be empowering or advance irrigators' plans and prosperity. Irrigators, hence, deal strategically with their visibility, and often practice intermittent invisibility strategies as shown by Boelens (2008) in the Andean context; this can also be seen as a form of daily resistance to mainstream development pathways and actors (see El Ouaamari et al., this Issue). Farmer-led irrigation development may be hard to spot if farmers do not want to be spotted. They actually often seek support, however, making themselves visible to (at least some local) authorities. This can, for instance, entail seeking local government support for work on irrigation machinery. Farmers may also solicit protection by some branches of government (agriculture) from the activities of other wings of government (such as wildlife or power interests) that are trying to shut down their water use. The contributions by El Ouaamari et al., Hebinck et al., and Scoones et al., in this Issue, illustrate how farmers are embedded in far-reaching

networks that include government agencies. The work by Boelens (2008) on the visibility politics of women and other marginalised water users in the Andes urges us to critically reflect on how we, as researchers and other outsiders, relate to these intermittent 'visibilisation' projects of African farmers developing irrigation partly outside the view of the state and other powerful actors (see also Mdee and Harrison, this Issue). Do our attempts to advance what we see as their claims and ambitions really empower them, or would they indeed prefer to themselves choose how and when to become visible, according to how it serves their purposes and depending on the broader political economy in which they are embedded? There appears to be a risk that shedding light on farmers multiple engagements with irrigation lays the ground for farmer-led irrigation development to emerge as a new category with which the state will engage on its own terms rather than on the farmers' terms. Until now this has mostly occurred through two vantage points, that of the assumed 'inefficiency' and the 'low productivity' of farmer-led irrigation development, which this Special Issue challenges. Exposing the mechanisms through which smallholders' projects and rights can be undermined is much safer for those wanting to do research that is helpful to them; it is also important not to essentialise farmers and, as several contributors highlight, to recognise the political economy dimensions of (in)equity and differentiation that characterise farmer-led irrigation development.

The politics of (in)visibility highlighted above are linked to more structural questions on 'how irrigation gets to be known'. This in turn relates to both an issue of state capability and to infrastructure and practices of data (statistics) generation. Despite being known to (local) authorities, the invisibility of farmer-led irrigation development rather stems from a capability trap (see for instance Mdee and Harrison, this Issue) in which most government agencies are embedded. These agencies often simply do not have the tools to engage or make sense of irrigation practices that take multiple forms, are malleable, and do not fit within recognised categories for which standard answers can be prescribed. As far as tools are concerned, it can indeed be difficult for governments to map and monitor irrigation development that is based on small pumps, quiet diversions of streams, and temporary infrastructure, and that may only take place in the wetter years (in wetlands for instance). Government surveillance machinery is often underfunded, surveys infrequent, and field staff relatively few. The devices and budgets to capture dynamic farmer practices are often simply absent (van Koppen and Schreiner, this Issue, clearly highlight the challenges to implementing water use permit systems). Central to the problem of (measuring) tools and capacities is the question of the way irrigation is conceptualised, and how this lays the groundwork for national and international databases. The machinery that produces official statistics on irrigation does not make it easier to present good data on change to irrigation practices. Current FAO data, which is generally the gold standard for most international commentary on irrigation in sub-Saharan Africa, attempts to be accurate for activities in 2005 even though there is increasing evidence that irrigation development has witnessed a boom over the last 10 years. Further, echoing the fact that the idea of 'scheme' is pervasive in defining irrigation in Africa (Harrison, 2018), the idea of 'equipment for water control' structures the FAO database which was initially elaborated by digitising the limits of known schemes and cross-checking with available reports and statistics.⁴ Although the database also includes a category called 'total agricultural water managed area', meant to cover a broader array of irrigation and drainage practices, under-reporting in this category is evident.⁵

⁴ The glossary defines water control structures as "[a]nthropogenic modifications or controls set in place in order to control water movement" (see www.fao.org/nr/water/aquastat/data/query/index.html) and the database identifies four main categories: (1) equipped for full-control irrigation, (2) equipped for partial control irrigation, (3) water harvesting, and (4) non-equipped cultivation in flood recession areas and in wetlands.

⁵ The area cultivated using water harvesting techniques is not captured in the database. Further, although flood recession agriculture and non-equipped cultivated wetland areas and valley bottoms are included, only a few countries report cultivated areas in these categories. In the period 2008-2017, out of 49 countries in sub-Saharan Africa only four reported on flood recession and only six reported on non-equipped cultivated wetlands, even though these are widespread practices.

The AQUASTAT database formally provides space for documenting areas under farmer-led irrigation development, but in practice it reflects national statistics that tend to ignore these activities and focus on donor- or government-funded initiatives that often take the form of 'schemes'. The wealth of freely available satellite images, and the fact that remote sensing techniques have become relatively easy to use, has allowed some breakthroughs in identifying areas of intensive irrigated production (Beekman et al., 2014; Cai et al., 2017; Vogels et al., 2019). Even with such techniques, however, irrigation activity is hard to spot. Where irrigation happens in the wet season, cloud cover hampers remote sensing analysis that is based on the use of visible-spectrum images (e.g. Landsat). Where irrigated crops are mixed with non-irrigated crops, or where irrigation is small scale (as is often the case), remote sensing products may not have the spatial precision to detect irrigated activity on the ground. They may also not have the temporal frequency to spot, for example, vegetation growth despite low rainfall, which could indicate irrigation activity. Despite their better accuracy, and beyond the technical problems faced, the key issue related to using remote sensing techniques is that of categorisation according to a binary that contrasts 'irrigation' and 'rainfed'. Making farmer-led irrigation development visible to national decision makers is likely to only happen if such practices emerge as a distinct 'known category'. We have shown above that this raises ethical questions (do farmers want to be visible and, if so, according to whose terms?); the categorisation it presupposes also entails the risk of 'rendering technical' (Li, 2007), and of doing away with one of the key element of the process – its complexity (see El Ouaamari et al., and Liebrand, this Issue).

Let us now turn to the third reason why farmer-led irrigation development may remain invisible despite being 'known' by a wide array of actors, including policy makers. If irrigation is hard to map and measure for its social, political, and hydrological properties, it may also be sensitive politically from the point of view of governments who might otherwise want to measure it. Particularly at higher levels, officials far removed from changes on the ground have large national-level targets to meet for (government-led) irrigation development. These targets are based on the government's own understanding of what practices are already taking place, what water is available, and so on. Were their targets be revealed to be out of date and out of touch, then this would be embarrassing for the civil servants involved. Indeed, figures that highlight the large extent of potential areas for irrigation are powerful tools to attract foreign direct investment in agriculture (see, for instance, Venot and Hirvonen, 2013). The scale of proposed amendments to official data that some of the new measurement techniques suggest is considerable: they indicate increases in actual irrigation activity by a factor of one or even two orders of magnitude. That sort of revolutionary change to official data and narratives can be unwelcome, especially as it would openly question the role of the state (and its development partners, be they from public or private sectors) as the primary engine of modernisation as well as the form this modernity should take (for a discussion, see de Bont et al., this Issue). Hence, it is possible that governments, through their machinery, are aware of the farmer-led irrigation developments but turn a blind eye in order to keep their options open for future state-led investment, or to keep control over trajectories of change that they consider to be more desirable (in that instance, promises of sweeping changes brought by a massive influx of private capital into the specific areas that are seen as having the most potential, often called 'growth poles' or 'growth corridors' (de Bont et al., this Issue).

TOWARDS A POLITICAL UNDERSTANDING OF FARMER-LED IRRIGATION DEVELOPMENT

We have earlier stated that farmer-led irrigation development is an observed phenomenon in many parts of sub-Saharan Africa. It is characterised by farmers' agency in developing or expanding the management of water in agricultural production, primarily to generate income from sales of agricultural produce (see Gross and Jaubert, Scoones et al., de Bont et al., this Issue). While it seems likely that this has improved agricultural incomes for at least some of those irrigating, it also seems inevitable that this phenomenon sets in motion socio-economic changes that include a growing differentiation in income

and wealth between those best able to take advantage of the new opportunities and those less able to do so (see de Bont et al., 2019; Lefore et al., and Scoones et al., this Issue).

We have also noted that the notion of 'farmer-led irrigation' – where the word 'development' is increasingly omitted – signifies a selective appropriation of the terminology. It frames the notion as an object/category of advocacy rather than as a process. As such, it becomes a long-awaited answer in the quest for transforming the chronic low productivity of sub-Saharan Africa's agriculture. As part of this selective appropriation, we have discerned efforts to create a technical package (exemplified, though not exclusively so, by solar pumping, and drip and sprinkler apparatus) capable of mobilising capital investment from both public and private agencies. Together with a pervasive narrative that calls for private sector involvement and entrepreneurial development (Harrison and Mdee, 2018) this, in effect, creates an abstracted entity whose social origins and constitution are not known to the people using it. Or, to put it differently, it creates a 'commodity' and has at least three consequences.

First, the commodification of 'farmer-led irrigation' is – to use the words of Tania Murray Li, and to echo the contribution of El Ouaamari et al. (this Issue) – a process of 'rendering technical' (Li, 2007). It abstracts an object of technical change from the complex political and local social contexts which give it meaning. For instance, it obscures the fact that expanding irrigation creates local winners and losers. Instead, the Special Issue addresses essential questions of political economy: Who owns what? Who does what? Who gets what? What do farmers do with the benefits they glean from irrigation? These insights are not new, but it is extremely important to reiterate them at a time when development agencies are actively engaged in engineering a 'development/intervention model' that (1) will necessarily (through their involvement) modify dynamics in which they had until now played an ancillary part, and (2) overlook that any change leads to redistribution of resources and power.

Second is the 'rights' and 'justice' dimension of farmer-led irrigation development that notably coalesces around the ecological consequences of irrigation and issues of water allocation and prioritisation (see contributions by van Koppen and Schreiner, and by Mdee and Harrison, this Issue). These are challenging topics as farmer-led irrigation development is often found in areas where there is a dearth of good hydrological and environmental data. Farmers are able to develop irrigation in part because of the absence of oversight, regulation, and state initiatives. Yet this happens in contexts with often intense disputes over how farmers' activities affect downstream water users' needs in, for example, the power, wildlife, or tourism sectors. Better understanding the consequences of farmer-led irrigation development for water availability more generally is essential in order to understand the environmental justice dimension of new irrigation development.

Third, though framing 'farmer-led irrigation' as a change programme pursued by development agencies (and national governments to a certain extent) puts long-overlooked trends on the global agenda – at least discursively – it falls short of tackling issues that relate to the balance of power to be exercised between different groups of 'farmers' (who have heterogeneous lived experience of irrigation development) and technical experts of development agencies. To that end, this Special Issue also attempts to answer questions relating to politics and power dynamics at play: who decides the trajectory of agricultural change to be followed? On what basis? Who notably determines what is a productive or damaging use of land and water, and according to what criteria? What institutional and political processes govern such judgements? By what institutions are the costs and benefits of irrigation allocated? The nature and extent of farmer-led irrigation development as described by several contributions to this Special Issue, demonstrates the existence across sub-Saharan Africa of a dynamic and inventive multifaceted small-scale farming sector that is consistently achieving far more than is generally expected of it. Not only does this challenge the primacy of engineering and other expert knowledges, but it also raises questions about political relationships of governance and control, and in particular the power balance between state officials and policymakers on the one hand, and a diverse group of agrarian actors on the other, some innovative and entrepreneurial, others much less so.

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