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Farmers' Logics in Engaging With Projects Promoting Drip Irrigation Kits in Burkina Faso

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ABSTRACT

Development agencies enthusiastically promote micro-drip irrigation as an affordable water and labor-saving device, yet most farmers stop using it as soon as development projects end. This article analyzes why farmers engage in projects promoting drip irrigation kits, even though they appear not to be interested in their water and labor-saving attributes. We combine practice-based theories of innovation with insights from the anthropology of development to explain that in development project arenas, micro-drip kits have different meanings for farmers than for the actors promoting the technology. Accepting the technology is just one element of more encompassing strategic efforts by farmers to obtain benefits from development projects. Hence, in the arena of the development project and for farmers, micro-drip kits are defined by the side benefits that accompany their introduction, such as motorized pumps, free inputs, the promise of credit, or the prospect of acquiring social prestige and forging new alliances.

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Micro-drip irrigation was first introduced in Burkina Faso in 2002 by the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) through the Desert Margins Project, which aimed at promoting the production of date palms. Two years after, ICRISAT introduced this new form of drip irrigation through the African Market Garden (AMG) project (2004–2007). Funded by the U.S. Agency for International Development (USAID), this project aimed at combining water management with improved crop production practices (Pasternak et al. 2006; Woltering, Pasternak, and Ndjeunga 2011). The AMG promoters tested the so-called prepackaged Family Drip System (FDS) kits designed by NETAFIM, the main manufacturer of drip irrigation equipment worldwide. The FDS is one among many different micro-drip kits, which consist of a network of plastic pipes, water emitters (or drippers), and a set of valves and filters, and that have been designed to cater to areas ranging from 25 to 1000 m^2.

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By communicating that 2,000 micro-drip kits had been distributed in nine Sahelian countries, ICRISAT framed the AMG project as a "Sahelian success" (ICRISAT 2006). Its promoters argued this success was linked to the suitability of the micro-drip technology for the specific arid environment of the Sahel and its affordability for smallholder farmers (Pasternak et al. 2006; Woltering, Pasternak, and Ndjeunga 2011). In several other countries of Sub-Saharan Africa (Kenya, Zimbabwe, and South Africa), micro-drip kits were likewise said to have been successfully introduced for small-scale vegetable gardening (Kabutha, Blank, and van Koppen 2000; Karlberg et al. 2007).

This form of drip irrigation appealed to the Burkina Faso government and various development agencies as a technology holding the promises of efficient water and labor management, improved nutrition and food security, poverty alleviation, and women's empowerment (for a description of the rationale to promote micro-drip kits in Sub-Saharan Africa see Venot et al. 2014). This enthusiasm underpinned a multiplication of projects centered on the promotion of micro-drip kits, involving numerous development actors.

The traction this form of irrigation has among development practitioners is remarkable, given the little evidence of farmers actually using the technology beyond pilot projects. Wanvoeke et al. (2015), for example, highlight that only 1 out of the 245 micro-drip kits distributed by the AMG project in Burkina Faso was still in use in 2012, echoing findings from other studies done in Zimbabwe (Belder et al. 2007) and Kenya (Kulecho and Weatherhead 2005, 2006), where farmers discontinued using micro-drip kits once the projects promoting them ended. Many scholars have explained why this happens. They notably highlight as many deterrents to widespread adoption that costs of initial investments are still high (Dittoh et al. 2010); the technical problems (with emitters and filters clogging and deterioration of material) due to unreliable and low-quality water supply and harsh environmental conditions (Friedlander, Tal, and Lazarovitch 2013); the lack of spare parts, supply chains, and support mechanisms; the difficulties to access markets (Kulecho and Weatherhead 2005, 2006); a lack of capacity and knowledge on the part of smallholders; and maybe more fundamentally, a misfit between the technology and the cultural setting and agricultural practices of smallholders (Garb and Friedlander 2014). Even though all these studies have criticized micro-drip kits, their starting assumption is that using small-scale irrigation technologies is potentially beneficial for smallholders' farmers. The studies thus focus on how to make these technologies work (better) in farmers' fields (e.g., by teaching farmers about how to use them), or on how to best disseminate them (e.g., by improving support services).

Our study builds on these studies, but has a different starting point. Rather than implicitly identifying with designers and promoters in their appraisal of the technology as something potentially positive, we empathize with farmers in an attempt to understand the technology from their perspective. We do not aim to explain why farmers stop using micro-drip kits after projects that promote them have ended (a question already answered by many; see, e.g., Kulecho and Weatherhead 2005; Belder et al. 2007). Rather, anchored in practice-based theories of innovation and drawing on theoretical insights from the anthropology of development, the article consists of a systematic analysis of how and why farmers engage with development projects that promote micro-drip kits. The origins of our desire to explore this topic lie with the realization referred to in the preceding that most farmers accept micro-drip kits while projects are running, but appear little interested in the water and labor savings attributes that are put forth by their promoters.

In the section that follows, we provide the analytical framework guiding this study. In the third section, we describe the methodology used. Through three case studies, we then further analyze the multiple logics farmers have to get involved in development projects that promote micro-drip kits (fourth section). A short conclusion comes back to our main finding, which is that farmers accept engaging with projects promoting this form of irrigation not for the technology per se (or because of its promises in terms of yields and water savings) but for the anticipated side benefits they can gain from it.

Research Framework

A wide variety of disciplines is concerned with the way innovations are created, and with understanding why and how they spread. Rogers's theory of the diffusion of innovation (Rogers 2003) is perhaps best known and most often used and referred to. Most attempts to explain the success or failure of micro-drip kits indeed make use (sometimes implicitly) of Rogers's classical approach, in identifying the factors facilitating or impeding adoption (see, e.g., Kulecho and Weatherhead 2005; Kulecho and Weatherhead 2006; Friedlander, Tal, and Lazarovitch 2013; Malik, de Fraiture, and Ray 2014; Namara et al. 2014).

Although popular and widely used, Rogers's approach has also been criticized for its overly simplistic positing of linear causal linkages between design (or dissemination) intentions and outcomes. This has the effect of attributing too much steering power to engineers and innovation planners, to the neglect of end users or other involved stakeholders. Moreover, Rogers's theory makes it seem as if innovation happens in relative isolation from wider societal processes and structures. Prominent among alternative ways to make theoretical sense of, and help improve, innovation processes are knowledge systems thinking (Röling 1992), which proposes a much less linear and predictable view of innovation and dissemination, and participatory approaches to technology development inspired by the seminal work of Chambers (Jiggins 1989; Chambers 1994).

The practice-based innovation theory of Akrich et al. (2002a; 2002b) shares with these latter approaches the idea that innovation is open-ended and contingent. Perhaps different from most other theories, which continue adhering to some kind of diffusion model, Akrich et al. do not ascribe the success or failure of a technology to its "intrinsic" properties. They instead look at technologies in context to suggest that innovations are only taken up if an ever-increasing number of actors get interested in them. This is the *model of interessement* that postulates that for actors to become interested in a technology, the latter needs to be translated to fit different contexts, interests, and discourses. In this light, while the discontinued use of micro-drip kits diagnosed by many may mark a "failure" in conventional diffusion terms, in our framework, the fact that farmers do accept the kits reveals that there is something to the technology that does appeal to them. The model of *interessement* directs the attention to why this is so, acknowledging that (the meaning of) an artifact may change depending on the actor-network of which it comes to form a part.

In this article, we are particularly interested in the influence of development projects in influencing the meaning(s) that micro-drip kits have for farmers. To do this, we make use of insights offered by scholars in the socioanthropology of development who propose conceptualizing development project contexts as *arenas,* that is, as bounded sites of interaction, contestation, and cooperation (Long 2001; Olivier de Sardan 2005). Within these arenas, actors (re)interpret and (re)negotiate things and ideas that come "from outside." Olivier

de Sardan (2005) proposed the term "logics" to avoid explaining "developees" behavior only from the normative interpretative frames of "developers" and their projects. When "developees" behave differently than "developers" expected, in other words, this is because their logics do not coincide. "Logics" is akin to strategy and refers to the reasons and motivations actors have for their behaviors. Speaking of "logics" also stems from recognition that while actors may display an infinite variety of actions and responses, the number of behavioral patterns is limited. This allows inductively explaining similarities in behavior (Olivier de Sardan 2005, 138). Where Long (2001) and Olivier de Sardan (2005) focused on the negotiated and contingent nature of interpretations and meanings of development interventions, we suggest (inspired by practice-based theories of innovation) that (the meanings of) technologies too are renegotiated and recontextualized.

We show through three case studies that, beyond their technical and material properties, and within development project arenas, micro-drip kits have different meanings to farmers than to other development actors. This "other reality" resulting from a process of *interessement* in specific actor-networks is what explains that the reasons for which farmers engage in projects promoting micro-drip kits are often different than the ones assumed and intended by the project and its promoters.

Methodology and Research Setting

We used a three-tier methodology. First, from June 2011 to December 2012, we interviewed 44 agents from international and national development agencies, government officials, and nongovernmental organizations (NGOs) involved in the promotion of micro-drip kits in Burkina Faso. This allowed developing a comprehensive inventory of all development projects and actors promoting this form of irrigation in Burkina Faso (Table 1) and yielded a list of 87 sites in which these had been introduced over the last 10 years (Figure 1).

Second, we made exploratory visits to 28 sites to gain a better understanding of the interface between farmers and projects and to observe micro-drip kits in use, in a diversity

Table 1. Overview of drip irrigation projects in Burkina Faso (2004–2014).

Dates	Project name	Funding agencies	Main implementers
2004–2007	African Market Garden (AMG)	USAID/Africa Care/Swiss Agency for Development and Cooperation	ICRISAT, INERA
2007–2010	Approche Intégrée pour le Développement de la Maraîcherieculture (AIDEM)	Swiss Development Cooperation (SDC), Burkina Faso Office (BuCo)	Optima Conseils Services (OCS), GEDES
2008–2012	Drip irrigation promotion	IFAD Grant (820 and 1174)	IFDC
2008–2014	Projet d'Irrigation et de Gestion de l'Eau à Petite Echelle (PIGEPE)	IFAD, OPEC/OFID, and Government of Burkina Faso	Ministry of Agriculture (MAHRH)
2009–2012	Enhanced Homestead Food Production	USAID	Helen Keller International (HKI)
2010–2014	Programme de Développement du Maraichage par l'Irrigation Goutte à goutte (PDMIG)	BuCo/SDC	GEDES, OCS, CSRS, Kali Service
2012–2013	Water use and sustainability in market gardening in Burkina Faso	Self Help Africa (SHA)	SHA, ADECCOL NGO, and iDE
2011–2015	Scaling Up Micro Irrigation (SUMIT)	SDC	iDE

Source: This study.

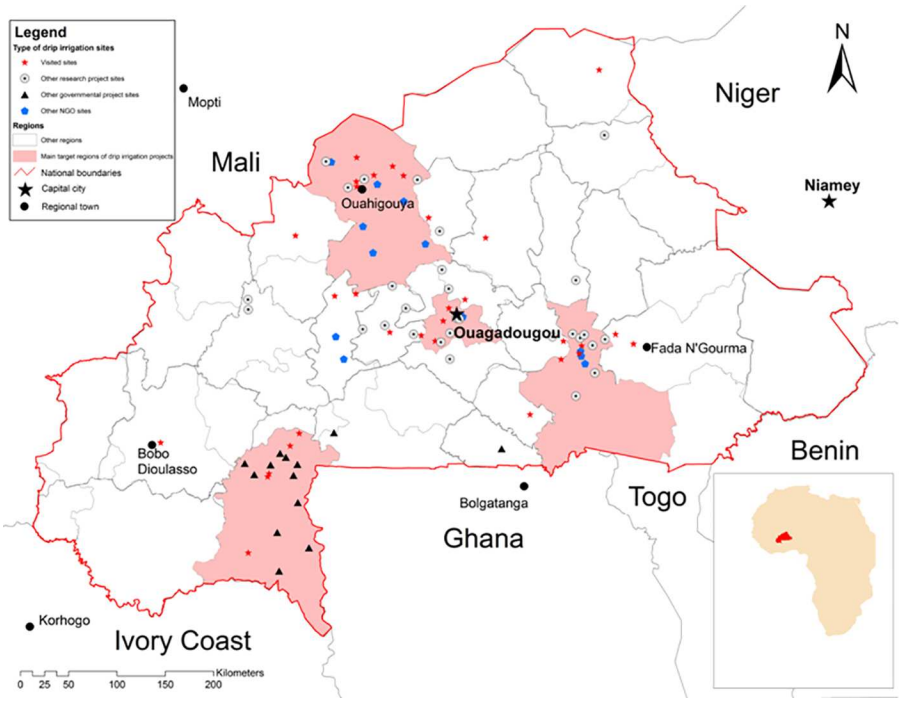

Figure 1. Geographical distribution of the drip irrigation sites identified in Burkina Faso.
Note: Target villages of the Enhanced Homestead Food Production and Scaling Up Micro Irrigation projects have not been identified. They are not represented on the map.

of sites targeted by the different projects that were active at the time of this field work (November 2012 to November 2013). The majority of the 28 sites we visited were considered by promoters and development workers as experimental or demonstration fields, with some of them being referred to as farmers' field schools (*Champs École Paysans* in French). Depending on the project and sites, micro-drip kits were either used by individual farmers or farmers' groups. In each site, we interviewed one individual farmer using drip irrigation (either in his or her own name or in the name of a group)[1]; we also conducted seven focus-group discussions in five of the sites where groups of farmers collectively used the micro-drip kits that had been provided to them. The interviews focused on (1) farmers' experiences and expectations in using micro-drip kits and (2) farmers' motivations to be involved in development projects promoting this irrigation equipment. The interviews were supplemented by direct observation of farmers' using the micro-drip kits in their fields.

Finally, we selected 3 out of these 28 sites in which farmers were using micro-drip kits, so as to also gain a deeper understanding of their logic. National and international development agents directed us to these sites, which they considered as "exemplary" of drip irrigation promotional efforts. Our sites were selected in contrasting regions of Burkina Faso (Figure 1) and funded by different organizations to illustrate different modalities of interaction between farmers and development projects.

Farmers' Logics to Get Involved in Projects Promoting Micro-Drip Kits

An Overview

Before elaborating on how and why farmers engage with projects promoting micro-drip kits, it is important to give some background information about agriculture and rural livelihoods in Burkina Faso. In Burkina Faso, most agriculture is rain-fed and takes place during the 3- to 4-months-long rainy season (June–September). This rain-fed agriculture is exclusively devoted to the production of cereals, mostly for self consumption. Vegetable gardening, the type of cultivation that micro-drip kit projects are targeting, is normally done on relatively small plots (less than 1 ha) and mostly is a supplementary activity. Whether farm households decide to engage in vegetable farming depends on the availability of water and labor; they only choose to do it to supplement their food and incomes if it does not compete with other agricultural chores. Not all farm households therefore grow vegetables. Development agencies have nevertheless long promoted vegetable gardens as a way to improve diets and combat poverty, often especially targeting women.

Our exploratory visits to 28 sites allowed getting a first idea of the diversity of reasons why farmers engaged with projects promoting micro-drip kits. These are summarized and categorized in Table 2. About 50% of our respondents said they were interested in micro-drip kits because they believed it could improve their health through better nutrition and food security (five answers) and enhance their income through the production of off-season vegetables (eight answers). These answers clearly reflect what is said about drip irrigation among development practitioners. Two farmers explained that they agreed to try the micro-drip kits because they hoped it would allow them to save water and labor when growing vegetables, while another five farmers said they wanted to "experiment" with a new cultivation technique without articulating any clear expectation. One-fourth of all farmers (eight answers) hoped micro-drip kits would come with other benefits such as fertilizers, seeds, or microcredits or expected that accepting the technology would help them to reinforce their social network through the partnership with a development project. Finally, one-fifth of all respondents answered they "accepted" micro-drip kits because this is what development agents had on offer at the time; they wanted to benefit from the project (and would have accepted any other technology way), reflecting a supply-driven intervention approach.

Case 1: The Wenden Kondo Farmers Group

The Development Project

Self Help Africa (SHA), a United Kingdom-based charity organization promoting agricultural development and active in the Sahel region for a long time, initiated a project entitled

Table 2. Motivations to use drip irrigation as expressed by farmers ($N = 30$).

Main motivations	"Experiment"	Gateway to other benefits (inputs/ prestige	pumps/credit), and network	Health, nutrition, food security	Increase income (food production)	Water and labor saving	Being part of a project
Number of answers	5	8		5	8	2	6

Note. The total number of answers is higher than the total number of interviews, as some respondents expressed that they had multiple reasons to use drip irrigation systems. *Source:* This study.

"Water Use and Sustainability in Market Gardening" in 2012. SHA funded this project for two main reasons. First, the SHA staff was aware of the literature praising the technical performance of micro-drip kits and their potential to increase smallholders' incomes while reducing the water and labor demands of market gardening (SHA 2012). Second, international Development Enterprises (iDE, an NGO promoting micro-drip irrigation) convinced them of the appropriateness and affordability of its micro-drip kits, based on stories of success obtained in Asia (SHA West Africa Head of Program, personal communication, July 2012).

SHA saw the project as a development research project, intended to measure the effectiveness of micro-drip kits as compared to traditional irrigation methods such as watering cans. iDE would contribute to the project by providing its expertise in disseminating micro-drip kits. SHA wanted to implement this new initiative in seven villages of the Kouritenga Province in the eastern region of Burkina Faso, a province in which it had already supported vegetable growers who had been organized in groups for this purpose. The idea was for farmers to witness and experiment, firsthand, the differences between drip and traditional irrigation methods. First, seven market garden sites (one per village) whose size varied between 0.75 and 1 ha were identified. Second, four micro-drip kits were to be installed in each village (one of 100 m^2 and three of 500 m^2) and four demonstration plots (one of 100 m^2 and three of 500 m^2; meant to be irrigated by watering cans) were delineated in each of the villages. In each village, SHA provided one motorized pump with accessories (fuel, toolkit, and support) to help fill the four reservoirs that would supply water to the micro-drip kits. Third, in each village, four farmers were selected. Each of them was entrusted with the management of two demonstration plots (one with drip irrigation, the other without) and responsible to select (pilot) farmers who would conduct cultivation. Finally, there were transversal activities such as training and capacity building (in relation to installing the kits and using them) and data collection and monitoring.

A local NGO (Action pour le Développement des Communes et des Collectivités Locales, ADECCOL) was put in charge of implementing the activities of the project, thus acting as an extension service provider (provision of agricultural inputs, link to microfinance institutions, capacity building). iDE provided the micro-drip kits and related technical support for their installation; it also had the responsibility for monitoring drip irrigation in use and was made responsible for collecting the data that would allow comparing micro-drip kits with traditional irrigation methods. When we talked to SHA staff members, they expressed their disappointment about iDE in this regard, because this research activity had not taken place.

The Wenden Kondo Farmers' Group

Wenden Kondo is the name given to the vegetable growers group of the Dassui village. Meaning "God will provide," the name of the group gives an indication of the way its member perceive development projects, that is, as an assistance provided by God. The group had received various types of support from SHA in the past. At the time of our field work (August 2012), it was the only group among the seven targeted groups initially planned by the project to have received the four micro-drip kits.

Created in 2009 by ADECCOL with the objective of producing and marketing vegetables on 1 ha of land, the group counted 42 members (21 women and 21 men). Since its creation, it had received regular training courses regarding horticultural production and

group management and also benefited from diverse farming equipments and tools. In addition, in 2010, ADECCOL organized a field visit for the group to another village so that the Dassui farmers could learn about different water lifting (treadle, motorized pumps) and application (watering cans, micro-drip kit) devices. In 2012, the group visited the iDE experimental field located in Yamtenga, province of Kadiogo.

Following these visits and on the insistence of ADECCOL, the group accepted to experiment with micro-drip kits in its garden. The four micro-drip kits were installed on the collective plot of the group, together with a new diesel pump and four water reservoirs. The group was also provided with fuel and maintenance tools. The executive committee of the group together with the members identified four persons who were to manage the micro-drip kits. These became the de facto "representatives" of the project in the village. A work plan was established by the executive committee of the group to enable all members to contribute to cultivation, which they did under the supervision of the four designated "representatives." As expressed by the president of the group, "It was our first experience with drip irrigation; we decided to work together on the collective plots to avoid that failures would be attributed to just one person. We decided to share the harvest or sell it and put the money in the group's bank account."

Drip Irrigation as Part of a Development Assistance Package

In Dassui, we organized two focus-group discussions: one with the women members of the group, and the other with the men members of the group. During the discussions, it was clear that farmers were skeptical about the (potential) benefits of the micro-drip kits, which they derogatorily called "plastic agriculture." Yet, they did want to benefit from SHA activities in the village. We asked every individual independently to identify the main reasons why he or she participated in the drip experiment conducted by SHA. Results are summarized in Table 3.

Farmers appeared to be mostly interested in the prospect of being provided with diesel pumps (and related equipment: fuel, a maintenance toolbox), as these allow for significant time and labor savings compared to drawing water from wells by hand. The readiness of farmers to accept (and potentially use) micro-drip kits largely hinged on the fact that these kits were supplied together with other goods, such as pumps. Women farmers also mentioned that their interest in experimenting with the kits was linked to the fact that it facilitated access to microcredit. Instead of using the pumps to supply the micro-drip kits, farmers used them to fill up the collective water reservoirs and used these to fill up their watering cans to irrigate their individual fields. Farmers indicated some hesitation in using the micro-drip kits as this would necessitate a change in cultivation methods: from direct seeding to transplantation of young carrot seedlings (the preferred crops of farmers), which they were not aware at the start of the project and which led them to discontinue using the kits quickly after they were installed.

Table 3. Interests to participate in the SHA-funded drip project (farmers in the Wenden Kondo group).

Responses (number)	Free motorized pumps	Free drip kit + pump	Free inputs	No articulated interest	Free drip kits	Total ($N = 35$)
Women (16)	5	5	3	2	1	16
Men (19)	7	6	2	2	2	19
Total (35)	12	11	5	4	3	35

Source: This study.

Case 2: The Yelkpieripouo Farmers' Group

The Development Project

The Small-Scale Irrigation and Water Management Project (Projet d'Irrigation et de Gestion de l'Eau à Petite Echelle, PIGEPE) is a project funded by the International Fund for Agricultural Development (IFAD) and the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development (OFID). With a total budget of $19 million over 6 years (2008–2014), the project was implemented by the Ministry of Agriculture, Hydraulic and Fisheries (MAHRH), through a project management unit (PMU) specifically set up for this purpose, operating from Gaoua, the regional capital of the southwestern region of Burkina Faso. The project targeted six provinces, located in three regions of Burkina Faso (South West, Central West, Central South), and aimed "at improving the living conditions of 19,500 rural families by increasing their agricultural productivity through better access and control over water resources" (IFAD 2007).

According to project documents, PIGEPE's approach was demand driven, whereby, after an awareness campaign on the scope and objectives of the project, potential "beneficiaries" were to express and submit their demands (in the form of microprojects) to the project team, following a template designed by the PMU. By 2013, the project had financed 150 microprojects. Agricultural and water management in the form of the promotion of small-scale irrigation technologies was central to the project. The choice to provide smallholders with micro-drip kits was based on the belief that this responded to farmers' needs to save water while boosting yields, thus offering the scope to address the rampant rural poverty in the region. The project envisioned the dissemination of 15,000 kits over 600 sites during the lifetime of the project (IFAD 2007). By 2012, PIGEPE declared having installed 488 kits (PIGEPE 2012). The PIGEPE project subsidized micro-drip kits and related accessories up to 85%, with the beneficiaries of the kits paying the remaining 15%. In 2013, and following difficulties in ensuring a steady supply of good-quality micro-drip kits from local entrepreneurs, PIGEPE entered into an agreement with iDE for the supply of 2700 micro-drip kits. At the time of writing this article (December 2014), iDE had supplied the kits to the PMU of PIGEPE, but we did not know whether they had been installed or were used by farmers.

PIGEPE specifically targeted women, as it considered them to be the most vulnerable farmers. Based on the diagnosis that women lacked investment capacity, that they had difficulties accessing land, and that very profitable ventures risk being appropriated by men, smaller kits of 20 and 30 m^2 were thought to be best suited to women, while men were expected to use 100 or 500 m^2 kits

The Yelpieripouo Group

The Yelpieripouo ("move out of misery") group is a mixed group of 25 farmers (11 women and 14 men) in Bapla Birifor in the Bougouriba province in the southwestern region of Burkina Faso. Like many other groups, it was specifically created in 2011 to partner with the PIGEPE project and benefit from its activities. With the help of the extension agent of the decentralized office of the MAHRH, the Yelpieripouo group elaborated and submitted a microproject for the creation and development of a market garden of 1 ha, which was accepted by the PMU. One hectare of community land was thus identified to be used as a gardening site. The land was given to the group by the chief of the village; it had only been used for the production of rain-fed cereals until then. Though owned by the group,

the site was divided in individual plots of land. PIGEPE built two wells to enable farmers to access water, provided four treadle pumps to draw water from the wells, and fenced the garden to protect it from domestic animals and predators. In addition, the group received tomato and pepper seeds from the decentralized office of the MAHRH.

Two types of irrigation methods were practiced within the garden site: manual irrigation with watering cans and calabashes, and drip irrigation. Farmers who wished to use micro-drip kits had to submit an individual request to the project. However, it is important to highlight that the development of the gardening site (wells, treadle pumps, fence) had been made conditional to women agreeing to test micro-drip kits. Consequently, all women (11) of the group and three men agreed to test the kits; men were supplied with 100 m^2 kits and women with 20 m^2 kits (as agreed, both contributed 15% of the drip kit cost, i.e., about $23 and $4, respectively). PIGEPE trained farmers in the use and maintenance of the kits through on-farm training and demonstrations while project staff visited the site weekly for monitoring purposes.

During training courses, PIGEPE staff and agricultural extension officers pointed out that women's plots equipped with micro-drip kits needed to be watered three times a day due to the high temperature, the aridity of the soil, and the small size of the water reservoir that had been provided. Having to irrigate thrice daily clashed with the usual practice whereby women irrigate their garden once in the morning and once in the evening, devoting the rest of the day to all kinds of domestic chores (cooking food, washing clothes, collecting wood in the forest, brewing the traditional alcohol, and baking cakes for sale). Further, the long distance between the garden site and their homesteads made it cumbersome for women to use the micro-drip kits, which, according to them, did not result in significant time savings or increases in yields. Interestingly, even though they seldom used the micro-drip kits, women left them apparent in the field to ensure the goodwill of extension agents and project staff. Only a few men were interested in the kits, with only three out of 14 asking for one. The men were mostly interested in the wells, pumps, and fence: a feeling that was reinforced by the early experiences of women.

Drip Irrigation as Part of a Development Assistance Package

Farmers' experiences with micro-drip kits in Bapla Birifor were not very positive. However, the president of the group continued using one. This was not so much motivated by the results obtained in the field, but by the need to maintain the good reputation of the group in the eyes of the project staff and extension officers to ensure potential future support, notably in the form of diesel pumps to replace the treadle pumps that had been supplied until then. Similar to the first case study, our interviews revealed that farmers "went along" with the micro-drip kit because it helped them access other things, as illustrated in the following quotes:

> We joined the project because one of the project officers told us we would get treadle pumps and wells in addition to the drip kits. We were happy at the prospect of getting wells. In the past, we carried water from a distance to irrigate, but now we have the wells close to the plots. (field interview, male farmer, December 2012)

> We were told that in addition to the drip kits we would get seeds to grow tomatoes and chilli pepper and also credit and that our field would be fenced against animals. That is why we use it. But we are still waiting for the credit. (field interview, women farmer, December 2012)

Case 3: The Example of an "Innovative" Farmer

The Story of an Innovator

When asked to discuss how he came to use drip irrigation kits, El Hadj Lassané Sawadogo started retracing his own history. Born in 1952, he presented himself as an agricultural entrepreneur dividing his life between agriculture and Islam. He also proudly declared himself to be among the first farmers to test drip irrigation in Burkina Faso. Well known by fellow villagers and development agencies as an agricultural risk taker in the Yatenga province, he traced his involvement in the agricultural sector back to his childhood. He recounted that his first encounter with drip irrigation dated from 1998, through an Israeli documentary broadcasted over an international TV channel in Ivory Coast. Driven by the idea of making more money with less effort, he started exploring whether drip irrigation could be used in Burkina Faso. He recalled how, in 2000, he created the Professional Association of Market Gardeners of Yatenga (ASPMY, *Association Professionnelle des Maraichers du Yatenga*) together with another agricultural entrepreneur. Meanwhile, he was informed by the Institute for the Environment and Agricultural Research (INERA, *Institut de l'Environnement et Recherches Agricoles*) that a project called the African Market Garden (AMG) was active in Niger and had provided drip irrigation kits to a private advisory services agency promoting small-scale irrigation in Burkina Faso, APIPAC.[2] He approached APIPAC to seek assistance and obtained a 500 m^2 drip kit, which he tested without any training or support. APIPAC also contributed to the construction of a cement water reservoir on his field.

With the start of the AMG project in Burkina Faso in 2004 (Wanvoeke et al. 2015), Lassané Sawadogo further engaged with drip irrigation. He was identified by the AMG project as one of its pilot farmers and participated in several courses on drip irrigation, seed cultivation, and nursery planting techniques. The AMG project also supported the construction of a second cement water reservoir and supplied him with two new drip kits of 500 m^2. Finally, he was also trained in building cement reservoirs and started selling his services.

In 2011, the Générale des Services (GEDES), a Burkinabè NGO, started promoting micro-drip kits as part of a project funded by the Swiss Agency for Development and Cooperation (see Table 1). Lassané Sawadogo benefited, again, from two drips kits of 500 m^2 and further training regarding their use. Being a large landowner and wealthy farmer, owning three cemented water wells and four motorized pumps, in combination with his entrepreneurial spirit and experience, made him an ideal anchor point for development agencies that wanted to experiment with and communicate about the potential benefits of micro-drip kits. Lassané Sawadogo, for example, partnered with INERA in a trial to test onion cultivation with drip irrigation. In return for making his plots available for these trials, INERA built another cement water reservoir and provided him with additional drip kits.

Lassané Sawadogo might be the only Burkinabè farmer to have continuously used micro-drip kits since 2004, thanks to his ability to network and maintain good relationships with projects, NGOs, and research institutions. The latest association of Lassané Sawadogo with initiatives promoting micro-drip kits in Burkina Faso is with iDE, which set up another 500 m^2 drip irrigation kit on his land and supplied him with a polytank reservoir. In 2013, there were different brands of micro-drip kits and four water reservoirs on Lassané Sawadogo's fields. He was very enthusiastic about it.

Drip Irrigation as Part of a Development Assistance Package

Lassané Sawadogo did not conceal what he derived from his sustained use of micro-drip kits over the last 10 years. This had established him as a reference farmer in the region vis-à-vis fellow farmers and development agencies, and thus helped him to acquire significant social prestige, as illustrated in the following quote:

> Everybody knows I use drip. If you want to see drip, they [extension services or NGO] will bring you to my field. The extension workers visit me periodically and many big cars and white people come to visit me in the field. Anytime you see a car coming in the village, be sure it is for me, because of drip. (field interview, June 2013)

Such social prestige was not only acquired through the visits of "outsiders" to Lassané's fields but also through Lassané's participation in meetings, conferences, and seminars organized by these outsiders and during which he is asked to bear witness of the benefits of drip irrigation:

> I am often invited to attend meetings concerning drip irrigation out of the village and in the capital. They [NGOs] often finance my travels so that I talk about drip irrigation in other villages or during workshops, shows or any events. (field interview, June 2013)

Finally, the story would not be complete without stressing the fact that a given steady water supply (through wells, storage, and pumps), using micro-drip kits to cultivate vegetables over several thousands of square meters actually is a very profitable avenue. Lassané Sawadogo is also in a position to sell services for which he has acquired experience through these multiple engagement with development projects—notably regarding the building of cement reservoirs.

Conclusion

In Burkina Faso, drip irrigation has raised the enthusiasm of the government and of various funding and development agencies and nongovernmental organizations. To date, the number of farmers using drip irrigation kits has remained quite small, yet many (roughly 1,000–2,000) have willingly engaged in projects promoting this technology over the last decade.

In this article, we explored why farmers engage in projects promoting micro-drip irrigation kits, even though it is clear they are not interested in using them as was intended by their promoters: as small-scale irrigation technologies that allow growing vegetables with less water and labor than traditional irrigation methods.

Different from most studies that look at how and why farmers use micro-drip kits, and that tend to look for explanations in farm economics, farming systems, and livelihood strategies, our investigation was not based on an a priori identification with engineers and disseminators (and an associated belief in the intrinsic "goodness" of the technology); nor did we aim to identify ways to improve dissemination and adoption. Rather, we set out to understand how farmers perceive and define micro-drip kits from their logics, in the specific arenas defined by the actor-networks of development projects. To do so, we used the theoretical model of *interessement,* engaging in particular with its insight that (the meaning of) a technology changes according to the actor-network it is or becomes part of or mobilizes.

Using our theoretical model to make sense of the cases presented in this article, we conclude that one important reason why farmers nevertheless engage in projects promoting micro-drip kits is because, in development arenas, the latter acquire other meanings for

them than for those promoting the technology. Or, the technologies become and do something else for farmers than saving water or labor. Our analysis thus extends that of Olivier de Sardan (2005), in showing that it is not only the meanings of development but also the involved technologies that are renegotiated in the arena of the development project. Where promoters focus on the field-level promises of improved agricultural productivity and water and labor savings, for many farmers micro-drip kits are just one element in a larger development package. Micro-drip kits thus come together with other benefits and services that can be acquired within the sphere of the project. Micro-drip kits may also serve as a tool to acquire prestige or forge new alliances. Here, our analysis is similar to that of Olivier de Sardan (1988; 2005), who concluded that farmers' logics when engaging in development projects are often different from the logics of development agencies.

Development agencies depend on success stories to stay in business and to safeguard their reputation. These often make use of a single indicator (such as the number of beneficiaries) or of anecdotal life histories and pictures of some prototypical farmers. In Sub-Saharan Africa, farmers understand this perfectly well and do not mind providing these agencies with such success stories by accepting a technology and pretending to use it, even if it does not really fit their needs. They might agree to this because they are attracted by what development agents say about the ways the technology may enhance their system of production but also, as shown in the three case studies we documented, if there is chance that the technology under the spotlight comes with other (less advertised) benefits and services, such as a facilitated access to agricultural inputs (seeds, fertilizer, pesticides), water lifting devices (motorized pumps), microcredit, and infrastructures (wells, fences, doors), or a connection to an interesting network (of funders and service providers), or again an increase in prestige.

Better understanding of these negotiations and games, and a better appreciation and recognition of how both developers and developees (to use Olivier de Sardan's terms) strategically manipulate and negotiate meanings and technologies in different arenas, as well as construct or perform successful outcomes, are important. For one, this sheds a revealing light on the performativity of any measurement of development project success. At the most basic level, it suggests that mere acceptance by farmers is not a very good indicator of use and adoption, let alone of achieved outcomes. Also, our analysis suggests that poor adoption rates are not necessarily caused by a lack of awareness, knowledge, capacity, or support services—as most analyses have it—but may be the result of a lack of fit with farmers' logics. Rather than interpreting this as a failure of projects, we suggest that insights in how and why farmers choose to deal with new technologies and the development projects promoting them provide revealing entry points for further dialogues and experiments, in a process of joint discovery and learning that is beneficial for both developers and developees.

Notes

1. Most development agencies and NGOs consider the existence of farmers' groups as a prerequisite for successful development interventions. They see such groups as a guarantee for the sustainability and equity of the intervention, while also hoping that channelling development assistance through groups will increase the number of ultimate beneficiaries. In several of the sites we visited where micro-drip systems were meant for groups, they were actually used by an individual farmer. In two sites we interviewed two persons, bringing up the number of interviews to 30.
2. APIPAC: Association des Professionnels de l'Irrigation Privée et des Activités Connexes was set up in the framework of a World Bank Project.

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