



Women in farmer-led irrigation development: the case of Infulene Valley, Maputo – Mozambique¹

As mulheres no desenvolvimento da irrigação liderada por produtores: o caso do Vale do Infulene, Maputo - Moçambique

Natalia Reyes Tejada²

Abstract

This article draws on my doctoral research and aims to identify the ways in which international development literature generates a particular narrative on the relationship between agriculture, irrigation and societal development. It explores the social, economic and nutritional meanings that small-scale holdings have for society, particularly in the case of horticultural production in Infulene Valley, Maputo. As part of Maputo's greenbelt, Infulene is protected by municipal laws, but at the same time is a recipient of the city's waste. Development literature tends to highlight the importance of family agriculture: in Mozambique, 99.98% of agricultural holdings are family held (*machambas*). These smallholders farm 99.7% of the nationally produced food. However, the same literature expresses concern over a decline in productivity per area unit in family holdings. This presents the challenge of reflecting on the reasons why family agriculture remains. This is the case of Infulene, where horticulture's permanence challenges declining water quality and the city's rapid urbanization process. Development literature has failed to comprehend the intrinsic value of the *machambas* and it has unsuccessfully portrayed the African family systems reflected on the on-farm social organization of labour. The following is a manuscript that aims to understand the *machamba* as a socio-spatial unit and the on-farm sexual division of labour from a feminist perspective. The objective is, thus, to develop a language and terminology that do justice to its value in more terms than just productivity per unit area.

Keywords: Family agriculture, households, *machamba*, gender, Infulene Valley.

Resumo

O presente artigo é parte da minha pesquisa de doutorado, cujo objetivo é identificar como a literatura proveniente do desenvolvimento internacional gera uma narrativa particular sobre a relação entre a agricultura, irrigação e o desenvolvimento social. Ele se pergunta sobre a produtividade e os significados sociais, econômicos e nutricionais das explorações de pequena escala para a sociedade. Particularmente, ele analisa o caso da horticultura no Vale do Infulene, Maputo. Como parte das zonas verdes de Maputo, Infulene está protegido pelas leis municipais, mas ao mesmo tempo é o destino dos resíduos da cidade. A literatura do desenvolvimento destaca a importância da agricultura familiar: no Moçambique, 99.98% das explorações agropecuárias (*machambas*) são geridas por famílias, nas quais os camponeses cultivam 99.7% dos vegetais consumidos localmente. Por outro lado, a mesma literatura expressa preocupação pelos baixos níveis de produtividade por unidade de área nas explorações familiares. Isso representa o desafio de refletir sobre os motivos pelos quais a agricultura familiar não

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² Institute for Water Education - IHE Delft, Países Bajos. Universidad Católica de Córdoba, Argentina.



desaparece. Este é o caso do Infulene onde a horticultura permanece e desafia o declínio na qualidade da água e o rápido processo de urbanização. A narrativa do desenvolvimento falhou em compreender o valor intrínseco das *machambas* e não teve sucesso ao retratar aos sistemas familiares africanos que são refletidos na organização social do trabalho na fazenda. O presente é um texto teórico que pretende compreender a *machamba* como uma unidade sócio-espacial e a divisão sexual no trabalho na exploração desde uma perspectiva feminista. O objetivo é, então, desenvolver uma linguagem e terminologia que façam justiça ao seu valor além de só a sua produtividade por unidade de área.

Palavras chave: Agricultura familiar, agregados familiares, *machamba*, gênero, Vale do Infulene.

“Rather than assuming the meaning and boundaries of ‘farms’, ‘households’ and ‘farmers’, and the terms and criteria for inclusion in agriculture, these concepts and definitions should themselves be made the object of inquiry. If these definitions and conceptual categories are themselves a way of defining and reconfirming ideas about gender—of distinguishing men from women, or of denoting distinctions between masculine from feminine behaviors—is it time to change the way we talk about agriculture?”

(Zwarteveen, 2018, pp. s/p)

Introduction

This literature review draws on my doctoral proposal which explores the social, economic and nutritional meanings that small-scale holdings have for society, particularly in the case of horticultural production in Infulene Valley. Infulene, as part of Maputo’s green belt, has historically played a key role as a fresh food provider for Maputo. In Maputo’s urban planning it appears as part of the city’s perimeter and is categorized as a space for agricultural activities or as a farming area within the municipal limits (MOZNET, 2008). It is a 500 m wide strip of land cut across by Infulene River, which stretches for 15 km and borders with the adjacent city of Matola. Infulene is currently going through a series of socio-environmental changes. Concerns about the effects of these changes on the lives and livelihoods of Infulene’s farmers, particularly on female farmers, form the direct motivation for this research. In other words, through the case of Infulene Valley, I study smallholder horticultural production and a particular instance of the relation between the gendered social organization of farming and the materiality of water for farmer-led irrigation. In Maputo’s greenbelt, as in the rest of Mozambique, small groups of people who are usually related by family ties carry out smallholder horticultural production (SHP).

SHP happens on *machambas*, which are described by the United Nations Food and Agriculture Organization (FAO) as production units relying on a household workforce for fulfilling a family’s food consumption needs under the category of family agriculture (Bicchieri & Ayala, 2017). It refers to a small (less than 5 hectares) plot used for agriculture.

In that context, this literature review seeks to conceptualize the relationship between gender, household, family, on-farm social relationships of labour and the materiality of water. As a first step a comprehensive research on literature about water – society relations was carried out. The goal being to identifying how a diversity of authors had conceptualized the materiality and agency of water in relation to social inequities in small-scale farming. As the number of texts studied reduced according to the categories considered relevant, I chose gender and labour as the axis around which water shapes and is shaped by society in turn. Feminist literature on irrigation helped me position my research in the current debates around peasantry and family agriculture and I draw my concepts from it to be able to start a dialogue with official statistics and agrarian economics.

Research from the Non-Governmental Organization (NGO) Observatorio do Meio Rural (OMR), as well as from international development organizations (like FAO and the



World Bank), affirm the importance of family farming for the country's food security and national economy. In Mozambique, 99.98% of agricultural holdings are family held and these family smallholders farm 99.7% of the locally produced food (Camarada, 2014; Siteo, 2005; Uaiene, 2014). However, these same studies also describe family agriculture as in perpetual decline. This conclusion is based on reported decrease in plot size, soil quality and limited usage of production inputs and access to markets, which leads to a decline in productivity per area unit (Uaiene, 2014). This literature – unintendedly or not - justifies the narrative that illustrates SHP as a form of farming that is doomed, something that will have to make place for more modern and productive forms of agriculture. At the same time, this narrative sits uneasily with the continued permanence of SHP within Maputo's city limits. This permanence not just suggests that the doom story is inaccurate; but it also reveals the meaning and value of SHP for those engaged in these forms of irrigated farming is not well captured in conventional measures of productivity per unit area.

A feminist study of SHP in Infulene raises questions on what makes these people smallholder farmers, particularly on who are the female farmers working on the *machamba*, and why do they chose to keep on farming in Infulene. In this framework, gender is, at the same time, an organizing principle of social life as it creates hierarchical relationships among people and a process of giving meaning and obtaining legitimation of the own gender identity. Having the *machamba* as a methodological entry point, I will carry out an on-farm gender analysis as a first step to talk back to official development narratives on SHP. Such an analysis tries to identify the institutions, social codes and taboos that mediate and modify biological differences and inscribe them in masculine or feminine gender identities (Ahmed & Zwarteveen, 2012). The second step is to define farmer-led irrigation in a way that it challenges, first, dominant definitions of irrigation and irrigation systems, and second, the current stereotypes of smallholder agricultural production in Sub-Saharan Africa as “stagnant” and destined to decline. These critical studies call for its

exploration ‘from below’ (Woodhouse et al., 2016).

Taking this call to heart, my research investigates the continued existence of SHP in Infulene Valley and documents irrigation practices *from below*, in an attempt to understand how labour, land and water are combined and organized, and how benefits and incomes are distributed. The particular way in which Infulene, as a case of SHP, is gendered and watered expresses the *machamba's* intrinsic value for the people who work on it. Specifically, I aim to understand how particular meanings given to the social relations within the private domain are reflected on the *machamba*, and how they co-constitute the on-farm organization of labour in horticulture, and what this means for practices of irrigation. I will try to make sense of African women farmers, not by taking for granted the “nuclear household” or the individual as units of study, but by providing an empirical understanding of everyday gender relations in farming (Zwarteveen, 2006).

The case: Horticulture in Infulene Valley

In Mozambique, 99.98% of agricultural holdings are family held. The average farm plot size is less than 10 ha (Mosca, 2014) and family agriculture produces 99.7% of the locally consumed food (Camarada, 2014; Siteo, 2005; Uaiene, 2014). Studies diagnose production and productivity per family exploitation as limited, something that is among other factors attributed to uncertainty of land tenure, and the ever decreasing size of the plots - together with declining soil qualities, low schooling levels, the use of rudimentary tools, limited access to extension services and markets, and limited use of improved inputs (Uaiene, 2014). The documented increasing role of women in SHP is seen as a consequence of these limitations: especially young men are said to quit agriculture in search of more profitable employment, leaving farming to left-behind wives and mothers. In 2012, 72% of family farms in Mozambique were male held, but a growth in the number of female-lead *machambas* was registered from 25 to 28% since 2005. In the particular case of the



province of Maputo, this percentage even reached 34% (Uaiene, 2014).

During Mozambique's civil war (1977 – 1992) millions of people fled to urban areas and neighbouring countries. As a response to urban unemployment and the disruption of food supply lines, the government organized cooperatives around farm areas within the cities, which were called green zones. During the 80's, Maputo city's council dictated a law to protect the green zones. FAO (2012) estimated there were approximately 13,000 smallholder farmers growing vegetables on 2,300 hectares in the Infulene and adjacent Mahotas Valley. The average size of *machamba* is 0.3 ha and a variety of vegetables, including cabbages, lettuce, tomatoes, onions, eggplants, beans and pumpkins is produced (FAO, 2012). Infulene Valley is located in an area that was described to be high quality agricultural land with access to water from Infulene River that made the catchment particularly suitable for intensive vegetable production (FAO, 2012). However, currently, the Valley is going through a series of socio-environmental changes.

Producers irrigate their plots from a variety of water sources, with the choice of water depending on the *machamba's* location and proximity to the different sources. These include: a tributary of the Infulene River, called the Malausa Ditch by the users; natural springs the water of which is harvested through shallow wells and conducted through ditches; untreated domestic and industrial wastewater discharge; and drinking water from the piped network. An additional source of water for irrigation is the discharge of the Wastewater Treatment Plant (WWTP), which receives 3% of the city's domestic effluents as well as privately transported sludge from the slums, the rest is discharged directly into rivers that flow into Maputo Bay (Spaliviero, 2008). Even though hydrologically connected in the sense that activities by one farmer have consequences for others, practices of irrigation and drainage are largely individual, and seem relatively uncoordinated.

After being used to irrigate crops in the *machambas*, the remaining water eventually ends up – through discharges, overflows from ditches, or percolation through the soil – in the

Infulene River. As the valley is periodically flooded, the possibility to farm not just depends on one's access to water for irrigation, but also on whether excess water can be effectively drained to prevent one's fields and crops from flooding. Equally, its role as a floodplain partly explains why the area has remained untouched by housing initiatives, but this does not mean that the area has not undergone important socio-environmental changes since the 1980's. The WWTP was built in the lowest part south of the valley and started operations in 1990 (DHV 1984). Since 2011, some areas north of Infulene (Zimpeto – Vila Olimpica) have been allocated to housing complexes and factories.

The wastewater of these houses and industries is discharged into the river. Although there is no documentation and monitoring of the quality of the water, district authorities recognize the detrimental effect of these wastewater discharges on the quality of the water in the river. They therefore discourage using Infulene River's water for irrigation. The idea that the vegetables produced in Infulene are "dirty" or unsafe is, consequently, well established among Maputo's middle class. This makes it more difficult for farmers to sell their produce. This discourse is also used to legitimize water interventions and – for instance in the World Bank investment plan for the expansion of WWTPs – the projected displacement of several hundred smallholder farmers from Infulene (Bank 2017). No further information on the relocation of these people was found, but the impacts of these interventions on SHP practices and strategies is undeniable. My assumption is that any interventions or changes in the quality of water used in SHP will have an effect in the power structures embedded in on-farm labour impacting women particularly.

In other words, I will look at SHP through water and for that I chose 4 peasants associations around the WWTP, each with access to a particular source of water or water infrastructure. 25 de Setembro uses spring water and counts on a well and tubed irrigation system provided by the Ministry of Agriculture and Food Security in 2017. Primeiro de Maio uses a wells system built by the Portuguese during the colony and some *machambas* use water directly from the WWTP's oxidation



ponds. Sombra das Enxadas is right next to the WWTP and uses discharges from the adjacent beer factory (Mac and Mahon – 2M) and spring water. Finally, Augusto Chirute is next to the WWTP's gates, relies on rain as a water source and is regularly affected by flooding in rain season. 10 *machambas* distributed throughout the territory covered by the 4 associations have been chosen to carry out ethnographic research exploring the concepts described in the following literature review.

Smallholder Horticultural Production and irrigation

To understand the particular relationship between women farmers and access and control over land and water resources, I will study the social organization of labour having the *machamba* as a methodological entry point. It is the space where social relations of production take place and I will understand them as the socio-spatial units where household dynamics are reflected in irrigated farming. Moreover, *machambas* will constitute an interface between changes in water's quality and changes in the social organization of SHP. The assumption is that the gradual decline in the quality of the surface water flowing through Infulene is bound to affect irrigated farming in the catchment. In Infulene, irrigation and drainage are not contained, managed, arranged or controlled through a larger infrastructural system that links waters, plots and people.

In this sense, irrigation in Infulene does not fit dominant engineering definitions (Woodhouse et al., 2016). Here, irrigation happens through watering cans – with water taken directly from the source or from ditches, and manually carried to the plot. This form of irrigation fits Woodhouse's (2016) more encompassing definition of irrigation as the "wide array of water control techniques practiced in agriculture" (pp. 2016). This definition challenges the definition of irrigation systems promoted by irrigation development projects based on the Asian development experience, where physical irrigation infrastructure allows for "total water control" in terms of water use, stored water, equipped irrigated area and percentage of area actually irrigated

(Woodhouse et al., 2016). Accordingly, Zwarteveen (2006) asks whether productive irrigation development is compatible with existing (traditional) ways of farming and organizing life, and more particularly irrigation, in Africa.

These authors study farmer-led irrigation in Mozambique, Zimbabwe, Malawi and Kenya and they contest dominant definitions of irrigation and irrigation systems promoted by the international development world. They argue that "this agenda ignores farmers' initiatives in developing irrigation already widespread throughout Sub-Saharan Africa" (Woodhouse et al., 2016, pp. 214). These studies specifically investigate why and how smallholder farmers invest – financially and in workforce - in land and irrigation systems. Accordingly, they show how "official narratives and statistics on African irrigation often underestimate the extent" (Woodhouse et al., 2016, pp. 213) of SHP and document how peri-urban smallholder farming using wastewater is expanding, despite land tenure insecurity and increased pressure on land from non-agricultural activities.

As stated, this line of research challenges the stereotype of smallholder agricultural production in Sub-Saharan Africa as "stagnant" and destined to decline and call for its exploration from below (Woodhouse et al., 2016). They too raise the question of the permanence of SHP faced to insecurity in land tenure, which is an unlikely formula for sustainable investment and growth of irrigated agriculture according to the development narrative. The authors state that this narrative fails to recognize farmers as agents of irrigation, by considering them beneficiaries of the irrigation projects. These authors also criticize development literature on irrigation that tends to postulate a dichotomy between rain-fed versus irrigated agriculture. By doing so they ignore all in-between forms of irrigated farming and fail to understand the diversity of irrigation practices used by farmers in SHP (Woodhouse et al., 2016). One more time, we are reminded of the need to understand the particular relation of water and SHP in Infulene by grounding the concepts of irrigation and the division of labour around it on the ground.



Gendered organization of Smallholder Horticultural Production

Family farming, more particularly the role of families as the workforce behind small-scale food production has found its way back into the public agenda since 2014, declared the international year of family agriculture by FAO. In that context, the role of women in farming occupies a crucial spot in the academic debate. According to official statistics, there is an increase in female heads of farms and in female workers in farming; this increase seems to be a trend in the developing world (Bank, Organization, & Development, 2009). Scholars from agrarian economics have shown how in the last decade women are said to have broadened and deepened their participation in agricultural production (Lastarria-Cornhiel, 2006). I argue that these current debates should be enriched with the feminist considerations on female farming that took place mainly in the 1980s and 1990s (Brandth, 2002; Zwartveen, 2006).

With a variety of approaches and conceptualizations, feminist scholars have tried to expose gender relations and the sexual division of family labour when studying smallholder farming. However, there is not just one feminist understanding of gender in farming and irrigation. For example, some scholars look at gender rather from a recognition or accommodation approach that aims to shed light into women's roles in irrigation development from the practitioners' point of view, while other authors are more radical and aim to transform the role of women in irrigation from below (Deere, 2005; Zwartveen, 2006). However, to a greater or lesser extent, feminist understandings try to deconstruct stereotypes in their gender analysis of farming and mostly agree on the risk of perpetuating them by using concepts like family and household, more particularly by using the Euro-U.S. American nuclear concept of family when studying African realities (Oyewumi, 2000).

Within this concept of the nuclear family, gender is the fundamental organizing principle of the family, and the distinctions of gender are

the primary source of hierarchy and oppression (Oyewumi, 2004). Brandth (2002) describes the stereotyping of gender identities in European family farming. Women are said to have weak access to property and occupational resources, thus the gendered allocation of tasks is based in a 'natural' distribution of work. Brandth (2002) differentiated the farm as a business within the public sphere, from the household and the family as the private domain. The farm is a male domain where the masculine is an "occupational identity": a man is a man because he is a farmer and a farmer is a farmer because he is a man. According to this stereotype, women access land and water through marital contract and construct their identity as the farmers' wives.

This stereotype is based on gendered dichotomies that establish clear-cut spatial and ideological borders between 'the farm' as the work place and 'the home' (Zwartveen, 2006, 2018). Under this perspective, farming is seen as a business, where the family assists in the production, irrigation and other economic activities, and the man, as the head of household is the one on charge. On the other end is the home, where reproductive activities such as child bearing, nurturing and cooking are carried out. Those activities are women's responsibilities. Seeing the farm as a business, justifies the assumption of agricultural production intended for market being dominated by men. This kind of production, i.e. cash crops like sugar cane, is the one generating income in contrast to crops oriented for consumption, such as horticulture. Therefore, subsistence agriculture is a feminine realm under this dichotomy. Consequently, men are positioned as the breadwinners and irrigated agriculture is seen as the 'world of men'.

Agriculture becomes part of the public domain in contraposition of the private relegated to the home and domestic activities. The cut is also clear among those who can be called a farmer, irrigator, engineer, etc., and those who are carers, cleaners, mothers, and so on. This is how a man becomes a farmer and a woman becomes the wife of the farmer (Oyewumi, 2000). It is the occupation that shapes the gender identity as the tasks and abilities regarded as masculine tend to be considered



the defining features of that activity (Alda-Vidal, Rusca, Zwartveen, Schwartz, & Pouw, 2017). The cultural beliefs around what it means to be a farmer, lead to an under-recognition of women's work in SHP.

From this dichotomy, we learn that it is problematic to locate SHP in any of the poles, because it is a family undertaking. The farm is not separated from the home, since it comprised by the members of the household working on it. The *machamba* does not really fit into a business model and in the case of Maputo 34% of holdings are headed by women. The vegetables produced on the *machamba* are both for family consumption and for selling on the city's markets. These facts raise the question on who is a farmer in Infulene, and is farming really a masculine occupation in this case? What is clear is that in this study we cannot implement a nuclear family household model where the private sphere is separated from irrigation realities, in SHP home and work are interconnected in a way that it is yet to be explored in my fieldwork.

In the case of Mozambique, the question is if this is the case or if women are farmers by their own right. It has been documented that the role of women in smallholder farming has always been crucial in the country. This research reflects on how the patterns of labour dynamics, gender interaction and power relations in agriculture are not apprehended through the official statistics by the application of the concepts of family and household (Agarwal, 1997; Ekejuiba, 1995; O'Laughlin, 1995; Oyewumi, 2000; Woodhouse et al., 2016).

Understanding the particularities of the conjugal contract in African farms will be key to this investigation (Jackson, 2012; Oyewumi, 2000). These identities are created through meanings and practices that are shaped by cultural beliefs and institutions that rule what it means to be a good woman and what is a good man, while at the same time shaping the expectations on an appropriate femininity and masculinity (Agarwal, 1997; Vera Delgado & Zwartveen, 2007). I will question how people experience their own gender identity, while reflecting on how research - by describing what women and men do, the power relations and

the bargaining processes - creates gender identities within the household, as well as in farming and irrigation. The identities created within the household reflect and are reflected in the public domain of participation, for example in peasants' association (Vera Delgado & Zwartveen, 2007), and in the *machamba* as a production and consumption unit.

The concept of household has been used in agrarian studies as a unit for data collection and analysis for establishing a social unit's basic income, nutritional and other needs and the means for covering them. Ekejuiba (1995) analyses how gender stratification in Africa has been characterized by differential access to production resources (education, technology, credit, land, capital, income). Therefore, she states that the concept of household hides gender interactions and power relations and it perpetuates women's invisibility (Ekejuiba, 1995). The goal of investigating intra-household and family relations is to understand how gendered power relations are reflected on the *machamba*. Quoting Zwartveen, "what a household is and how it functions is a question that needs to occupy a prominent place in feminist irrigation thinking. (...) the household is one important domain where [labour] motivations are shaped and negotiated, and also that this is a highly gendered domain" (Zwartveen, 2006, pp. 164). A feminist understanding of the role of the *machamba* as a socio-spatial unit recognizes that family ties are crucial at defining gender identities and how they shape production and irrigation practices and (re)produce dynamics of control over labour in farming.

In that line, Whitehead (1999) states that farming systems are actually based on complex interrelation of male and female labour. The motor of SHP is human labour where there is relative land abundance and virtual non-existence of capital. This is the case in so much of Sub-Saharan Africa, where labour has tended to be the limiting factor of production (Fahy Bryceson, 1995). The author believes that gender and age, rather than class, predominate in the delineation of work allocation in SHP and that control over labour of others is the key to male power and authority. In other words, control over labour is central to understanding



the position of women in smallholders' farming (Fahy Bryceson, 1995).

Agriculture is a socio-political arena, where conflicts can arise and the legitimacy of formal and informal institutions is constantly negotiated (Korbéogo, 2017). In that sense, the *machamba* is a domain of cooperative conflict where the distribution of tasks and labour takes place. It is a domain that goes beyond categorizations of public and private. It is not a business in the traditional sense of a cash crop oriented to produce for the market, but it is also not just a consumption unit. For instance, it contrasts with the literature reviewed by Brandth, since reproductive and productive labour are most likely juxtaposed in the *machamba*. Faced with this paradox, the concept of "hearth-hold" introduced by Ekejuiba (1995) will help me understand the back and forth between the household and the *machamba*. This concept includes the group of people for whose food security a woman is responsible for. In other words, it encompasses the reproductive responsibilities of a woman - child bearing, nurturing, cooking, and cleaning - and the productive activities - irrigating, weeding, harvesting and selling -, all of them happening simultaneously at home and on the *machamba*.

The concept of heart-hold raises two empirical questions: first, how do people acquire membership of the *machamba* as a socio-spatial unit, what makes them farmers, and second, how are resources, tasks and incomes distributed among the members. This requires a gender analysis of the *machamba* investigating how women experience access and control to land and water. In the cases of Cameroon, Kenya, Sri Lanka and Gambia studied by Zwartveen (2006), gender proved to be an important axis around which changes in land and water tenure occur. Changes in land use bring changes in land tenure and labour relations, and these changes are related to how women experience their control over land and water resources. For instance they affected their interest in investing their labour and capital in irrigation (Zwartveen, 2006).

Agarwal (1997) sees the household as an arena of consumption, production and investment, within which both labour and resource

allocation and decisions are made. In comparison to the stereotype described by Brandth, African women have considerable autonomy when it comes to the time and resources they invest in agriculture and the allocation of their labour force happens within the context of conjugal negotiations and bargaining processes (Agarwal, 1997). Therefore, on-farm allocation of work can range from a situation of control of others' labour to one of cooperation, since wealth depends on access to labour and access to labour depends on conjugal relations (O'Laughlin, 1995). In that context, the cultural construction of appropriate female behaviour affects women's ability to bargain within the social group and social norms and perceptions are those that define the value of a woman's economic contribution and how its benefits are distributed among the members (Agarwal, 1997). The challenge to define the *machamba* as a separate sphere from the private bargaining domain or not remains. All of these questions need to be grounded on the field and will serve to understand how water is socially produced in my case's SHP.

Gender and irrigation

When researching irrigation, most narratives have de-valored women's contributions to irrigated agriculture. These interpretations give greater value to on-farm activities related to men, which further encourages the neglect of women by irrigation professionals. In response, feminist scholars claim women have been misrepresented as direct actors in irrigation and call to better understand what women do in irrigated farming (Zwartveen, 2006). The present research responds to that call by attempting to challenge the conceptions and definitions of irrigation that make it a 'masculinity' domain. A feminist study of Infulene's SHP needs to question what it means to be a man or a woman on the *machamba*. The following section asks who are the women represented in irrigation discourse by recognizing that women's gender identity in irrigation is constructed in otherness to masculinity.



When thinking irrigation, gender is not only an important axis for the division of control over access to land and water rights, but also for the division and control of labour, decision-making and distribution of benefits resulting from one's work (Zwarteveen, 2006). This sexual division of control needs to be examined under the light of the particular context where farming is happening, and it has to be put into dialogue with the intra-household organization of productive and reproductive activities since gendered divisions in responsibilities and rights are related to culturally embedded ways of defining and performing gender identities (Zwarteveen, 2006). Once again, while recognizing that control over labour is central in SHP, investigating bargaining and power distribution within the household crucial to understand that sharing and distribution is hardly ever 'equal' or 'fair' among its members.

Irrigation development has intrigued feminist thinkers for decades because of the evidence there is of how those projects affect women negatively (Vijfhuizen, 2002; Zwarteveen, 2006). One explanation for this outcome is that rights to water and irrigated land have historically been vested in men by these projects. In these cases, female irrigators have fewer possibilities to own land and water. It is often the case that they still contribute their labour to irrigated agriculture, but they do not directly control the fruits of their work (income) or are less rewarded for their efforts than men (Zwarteveen, 2006). Even though, currently, most irrigation development projects include gender components, irrigation remains a masculine realm. The question is, then, why has irrigation development been accompanied by a decline in gender equality?

To answer it, the first step is to recognize gender as an important axis around which changes in access and control of land and water resources happen. Irrigation development projects often export western ideals and stereotypes through some conceptual biases of planners and engineers. One of these biases is the concept of household, which as exposed above, obscures inequalities on the field. This concept inevitably reinforces the identity of women as housewives who help their husbands on the farm, while male farmers are seen as managers. In

development projects, men are given institutional and economic tools to become farmers while women are not given the same learning opportunity, thus they not only lose control over land and water, but also of the fruits of their own work. This is how their position in the farm changes and how irrigation development shapes the possibilities of different people to control water and irrigated land and the benefits resulting of irrigated farming.

In sum, a feminist understanding of irrigation has to conceive irrigation realities not presuming or naturalizing gender identities or structures, and in that sense, it has to remember that gender is a social construct and that social relations cannot be explained by sexual differences, but by the meanings attributed to them (Agarwal, 1997; Zwarteveen, 2006). Irrigation studies need to understand, first, the particular context of reality they are examining, and second, the intra-household organization of productive and reproductive activities. Irrigated farming is organized at a household level and this private domain is where the gendered division of responsibilities and rights is shaped. This division is related to culturally embedded ways of defining and performing gendered identities as explained above and that is why it is so important to better and more explicitly recognize intra-household dynamics when studying irrigation.

Further steps

The present literature review concludes that a feminist understanding of the *machamba* should question the narratives promoted by development projects, engineering solutions and economic literature on SHP and farmer-led irrigation. Equally, it should be careful not to impose western or white categories in the making sense of African female farmers.

This is a feminist study for two reasons. First, it is feminist because I draw on concepts from a feminist epistemology and I want to contribute to a feminist academic debate on SHP. The second reason is the fact that the research is openly political. It departs from the assumption that there is a situation of inequality based on gender, that intersects with other social



dimensions such as age, class, race, ethnolinguistic lineage and religion (Loforte, 2000), resulting in the marginalization of social groups in the city of Maputo. By shedding light into this marginalization of peri-urban farmers, I hope to contribute somehow to the visualization and improvement of their situation.

Accordingly, I believe that economists and development research's output has an impact on people's life since they inform urban planning, land use and water policies. This kind of research treats Infulene's SHPs as marginal and declining, which has been used to justify development interventions to respond to the decline in water quality in the valley. This narrative of decline and decreasing productivities justifies the promotion of a more entrepreneurial and intensive mode of farming in Mozambique's official policy. In that context, my assumption is that any interventions or changes in the quality of water in SHP will have an impact in the power structures embedded in on-farm labour. This means that changes in water quality could lead to deepening inequalities among members of the *machamba* and among *machambas*.

To understand the particular relationship between women farmers and access and control or land and water resources, I will study the social organization of labour having the *machamba* as a methodological entry point. The *machamba* as a socio-spatial unit around which deeply gendered social relations of production and reproduction are organized, will be the basis for me to develop a language and terminology for making justice to its value in different terms than just productivity per unit area. Making sense of the *machamba* means, then, investigating how farmers

experience and deal with the socio-environmental changes and water interventions – especially the changes in water quality - happening in Infulene. In that sense, a feminist understanding of the *machamba*, will allow me to contribute to an informed discussion of the meaning and value of the SHP for the people involved in irrigating and farming by talking back to the official narrative of productivity decline. My assumption is that any interventions or changes in the quality of water used in SHP will have an impact in the power structures embedded in on-farm labour. This means that changes in water quality could lead to deepening inequalities among members of the *machamba* and among *machambas*.

During the research's on-going fieldwork, I will ground many of the concepts I am using in my broader analytical question empirically on the field. I will use diverse qualitative methodologies for data collection and content analysis for their analysis and I will have the on-farm production and irrigation practices as an entry point. I hope that this case study will allow me to identify the interfaces between the social and the materiality of water in Infulene and to make sense of them from the perspective of the farmers. I will carry out in-depth interviews with some farmers to try to understand how their family or household dynamics are reflected in their horticultural production. I aim to open up the household to investigate the construction of a female/male identity within the private domain. My objective is to come up with definitions that make justice to the actual productivity and the social, economic and nutritional meanings of small-scale holdings for society, more particularly of horticultural production lead by women in Infulene Valley.

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Natalia Reyes Tejada



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