

## **Institutional Arrangements and Support Systems for Independent Smallholder Irrigators in the Msinga Local Municipality, South Africa**

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### **ABSTRACT**

*This article describes the present institutional arrangements for irrigators' resource access, agricultural support systems accessible to irrigators, and the various constraints irrigators experience. The survey acquired data from 101 snowballed respondents for the quantitative phase of the study. The qualitative phase gathered information from four purposively selected focus group discussions. According to the findings, irrigators commonly gained access to production land through traditional authority (81.2%). Gender was a barrier to land access, where male-headed families had larger land sizes than female-headed ones ( $t=4.993$ ,  $p=0.028$ ). Concerning irrigation water, irrigators abstract it wherever they find access, without any institutional arrangement or restriction. The main limitations to irrigators' water availability were competition and the drying out of the water source, particularly spring water. Government assistance was rare among independent irrigators. Smallholder support services tend to be distributed unevenly among South African smallholders, usually leaving independent irrigators unsupported. Lastly, irrigators experience constraints in their farming that government existing services have the potential to address. Therefore, this study proposes that the government recognize independent irrigators as possible drivers of poverty and food insecurities. The study recommends institutional inclusion and the extension of support systems to independent irrigators.*

**Keywords:** Independent irrigation, Agricultural extension, Irrigation development, Land access

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## 1. INTRODUCTION

Historically, investment in smallholder irrigation has been one of the national strategies to improve livelihoods by reducing poverty and food insecurity in South Africa, particularly in rural areas. Post-apartheid, part of these investments included transferring management of existing irrigation schemes to farmers, a process called Irrigation Management Transfer (IMT) (Van Averbeke & Mohamed, 2006; Van Averbeke, 2012). In addition to the IMT and revitalising of these schemes, additional irrigation schemes were built to improve livelihoods and quality of life for informal urban settlement dwellers and rural people (Van Averbeke, 2012). In these projects, smallholders were given access to a plot of land and irrigation water. In addition to such investments, the South African government extended agricultural extension and training services as institutional support systems for these smallholders. The support systems provide farmers with training, information, and links to input and output markets (Rivera, Qamar & Van Crowder, 2001; Ortmann & King, 2007).

Despite such support and a massive investment of public funds, these public irrigation schemes continue to perform poorly, failing to meet the goals for which they were designed (Tlou, Mosaka, Perret, Mullins, & Williams, 2006; Fanadzo, Chiduzza & Mnkeni, 2010). The inability of irrigation schemes to accomplish such goals necessitates the consideration of other irrigation pathways. In South Africa, there are four categories of smallholder irrigators, including irrigated home gardens, independent irrigators, plot holders on irrigation schemes and irrigated community garden plot holders (De Lange, 1994; Du Plessis, Van Averbeke & Van der Stoep 2002; Van Averbeke, Denison & Mnkeni, 2011). Independent irrigators are “smallholders who have direct access to a supply of irrigation water and employ privately owned equipment to collect, transport, and apply this water” (Dube, 2017). Worldwide, these independent smallholder irrigators lift millions of households out of poverty, reduce food insecurity and create jobs, notably in Asia and sub-Saharan Africa (Giordano, 2012; Giordano & De Fraiture, 2014, De Fraiture & Giordano, 2014). As a result, these regions recognise independent irrigation as an appropriate poverty reduction tool.

One thing that independent irrigators worldwide have in common is that they generally fund and develop the irrigation initiative independently, with no government assistance. Namara *et al.* (2010) pointed out that independent irrigators usually operate beyond the eyes of policymakers, donors, and the scientific community; hence they are excluded from most official irrigation data, governmental policy, or agricultural support systems. In turn, data on independent irrigators is limited (Van Averbeke, Denison & Mnkeni, 2011; Beekman, Veldwisch, & Bolding, 2014; De Fraiture & Giordano, 2014). Independent irrigators exist in South Africa as well. Still, the research community and government continue to overlook them (Van Averbeke *et al.*, 2011), as their focus remains on state irrigation schemes, despite their dismal performance. This study seeks to bridge this information gap by adding to the limited literature and creating awareness for policymakers.

The current study focuses on institutional arrangements since they significantly determine smallholders' access to resources, especially land and water. Institutional arrangements, organisational issues, and power dynamics influence resource access (Scoones, 1998). For example, policies and land tenure institutions mediate access to land in rural regions (Scoones, 1998), and the security of access rights, often known as tenure security, is a crucial aspect of access to land. Registration of these tenure rights provides security (Masiya & Van Averbeke, 2013). At the same time, land tenure uncertainty prevents farmers from making long-term decisions on land, including investments (Tenaw, Islam & Parviainen, 2009). Access to inputs, finance, agricultural extension, and training support for smallholder farmers is crucial to their success and contribution to addressing poverty, unemployment, and food insecurity. Access to support services, particularly extension advice and training, is a major determinant of agricultural production (Purcell & Anderson, 1997). At the same time, data on constraints is essential for policymakers in designing bottom-up intervention strategies to deal with the challenges faced by smallholders. Therefore, the study will address the following questions:

- What institutional arrangements exist for independent irrigators to access production land and irrigation water?
- Are agricultural support systems and mechanisms in place to support independent smallholder irrigators?
- What are the challenges and constraints faced by independent smallholder irrigators?

## **2. METHODOLOGY**

### **2.1. Description of the Study Area**

The study site was Msinga, a local municipality of KwaZulu-Natal province in South Africa. The municipality is in the South-Western part of the uMzinyathi district and covers 2500km<sup>2</sup> and has an estimated population of 184 494 (Statistics South Africa, 2017). The area experiences a subtropical climate in most parts, an annual rainfall of 350-740 mm and temperatures between 8 to 35°C (Zindove & Chimonyo, 2015). In the province, Msinga is one of the poorest municipalities, with high unemployment and poverty levels. Agriculture is crucial in the livelihoods of Msinga residents, but most are still subsistence farmers. Statistic South Africa (2017) found that 55% of the 38 372 households practised agriculture in 2016. However, agriculture in the area is subject to the limited capacity of the land due to low soil quality, climatic conditions, and overstocking (Msinga Local Municipality, 2020).

### **2.2. Sampling of Independent Irrigators**

Study participants included independent smallholder irrigators operating within the boundaries of Msinga's local municipality. The study participants were chosen using the snowball sampling technique. During the initial round of data collection, the researcher and field assistants were guided to other elements with similar characteristics by the independent irrigators they contacted. The process resulted in a responder trial with 101 respondents. Additionally, four focus groups were purposively selected from the survey sample.

### **2.3. Data Collection and Analysis**

Survey data were collected using a standardised questionnaire. The questionnaire collected information on institutional arrangements concerning agricultural land and irrigation water access. Data on access to agricultural advisory services, training, and finance was collected to represent support systems. At the same time, data on farming challenges indicated vulnerability and constraints. The interviews were conducted in IsiZulu face-to-face with the respondents and recorded on the interview schedule. The data collected through the survey was entered into Microsoft Excel after coding. After that, it was exported to the Statistical Package for Social Sciences for analysis. Descriptive statistics were then used to analyse this data. The qualitative

phase included data from interview transcripts and voice recordings collected through Focus Group Discussions (FGD). There were four FGD discussions, with nine to 12 participants per group. Homogeneous purposive sampling was adopted, and the method of extracting irrigation water from the source and the location of the irrigators were the criteria for grouping. For analysis, the qualitative data was re-organised into consumable themes and patterns.

### 3. RESULTS AND DISCUSSION

#### 3.1. Demographic Characteristics of the Independent Irrigators

The results from the analysis of the demographic characteristics of independent irrigators are presented in Table 1. Most of Msinga’s independent smallholder irrigators (61) were 51 years or older. On average, irrigators were 53 years old, the youngest irrigator was 18 years old, and the oldest was 87 years old. The youth (less than 31 years) was rare, constituting 4% of the sampled irrigators. The average age from these results aligns with other South African independent irrigator studies that suggested that irrigators are middle-aged or older than 50 (Oosthuizen *et al.*, 2005; Tapela, 2012; Denison *et al.*, 2016; Dube, 2017). Table 1 also shows that 63.4% of independent irrigators in Msinga were females, contradicting studies that reported that independent irrigation is male-dominated (Oosthuizen *et al.*, 2005; Tapela, 2012; Denison *et al.*, 2016; Dube, 2017).

**TABLE 1: Independent Irrigator’s Demographic Characteristics (n=101)**

Variable	Mean	Std. Deviation
Age of irrigator (years)	53.0	11.93
Gender (% female)	63.4	-
Formal education of irrigator (years)	2.3	3.78
Farming experience (years)	17.8	11.77
Irrigation experience (years)	17.8	11.77
Occupation (%)		
Full-time farmer	86.1	-
Temporary job	2.0	-
Self-employment	10.9	-

Student	1.0	-
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Sampled independent irrigators had low levels of formal education. On average, independent irrigators went to school for two years (Table 1). Their formal education years ranged from none (66%) to grade 12. None of the sampled irrigators in Msinga acquired tertiary education. Independent irrigators were experienced in irrigated agriculture, as indicated by the years they had practised irrigated farming. On average, irrigators had 17.8 years of experience in irrigated agriculture. About 84.1% had practised irrigated farming for more than five years. The current study’s findings align with Greater Tzaneen independent irrigators, who had an average of 17.9 years of irrigated farming experience (Denison *et al.*, 2016). Over four-fifths of the sample considered themselves full-time irrigators, while 10.9% were self-employed in other activities. Temporary job holders were rare, and there was only one student.

### 3.2. Institutional Arrangements

#### 3.2.1. Access to Land and Irrigation Water

Land and water are crucial resources in irrigated agriculture. Access to these two resources is essential for the success of the irrigation enterprise. Institutions, in this case, the government, have policies and laws in place to determine access and control to these resources by smallholder farmers. Regarding land, Msinga independent irrigators had four arrangements to access land for crop production. These arrangements included registered ownership, unconditional usufruct, sharecropping, and unregistered ownership. In registered ownership, the land was registered in the name of any household member. It was called unconditional usufruct when ownership lay with a person who was not a household member but had the right to use land without compensation. Sharecropping arrangement was when ownership lay with a person not part of the household, but a sharing agreement existed between the irrigator and the other person. Unregistered ownership refers to using the land without permission from the authorities or the owner if it belonged to a household. In the current study, registered ownership was the most common, found in 81.2% of the 101 households. This type of access was granted by traditional authorities and through inheritance. Accessing land through traditional authorities reported in this study was consistent with other independent irrigator studies in South Africa (Oosthuizen *et*

*al.*, 2005; Tapela, 2012; Denison *et al.*, 2016; Dube, 2017). Other land access arrangements, including unconditional usufruct (8.9%), sharecropping (6.9%), and unregistered ownership (3.0%), were rare.

The results show that the allocation of land in Msinga favours males. The study results show that irrigation land sizes for male-headed households (M=981, SD=2015.68) and female-headed households (M=455, SD=483.33) were different, where the male-headed households had larger plots than households headed by women. The results are confirmed by a t-test analysis, showing statistical significance ( $t=4.993$ ,  $p=0.028$ ) at a 95% confidence level. In line with the current study, Sinyolo, Sinyolo, Mudhara and Ndinda (2018) pointed out that land distribution in Msinga benefits men. Women in that region access land through inheritance, an internal female-only system in which unmarried women are assigned land within the family plot (Sinyolo *et al.*, 2018). The same study also pointed out how men within the irrigation scheme are more likely than women to own upper-end plots. In the upper-end plots, water reaches the top plots before the scheme's tail end, which women occupy. It is a limiting factor for smallholders in this irrigation scheme as the water reaches the upper plots before the scheme's tail end. Men occupying these upper-end plots meant that women in the irrigation scheme also faced limited access to irrigation water.

In contrast, there were no limitations by gender regarding water access by independent irrigators. Independent irrigators extracted irrigation water wherever they could find access as long as there was a piece of land nearby to cultivate. Independent irrigators also did not pay for the water but only for the extraction in the case of the pumping irrigators. In South Africa, irrigated agriculture is one of the water users described by the National Water Act 36 of 1998. Consequently, the users need to obtain legal authorisation to use water from the Department of Water and Sanitation. These irrigators did not know laws and regulations concerning legal water use rights.

On the contrary, some of the irrigation scheme farmers knew about the laws to the extent of having water use licenses. For example, in Limpopo province, Van Averbek (2012) reported that 27 of the 48 irrigation schemes in the Vhembe district had water use licenses they had obtained from the Water and Sanitation Department (formerly known as the Department of

Water Affairs). However, the Department of Agriculture officials usually assist smallholders with those legal requirements. The situation is different for independent irrigators, as they operate outside the view of such institutions or departments.

### **3.3. Support Services**

#### *3.3.1. Agriculture Extension and Training Support*

Institutions not only determine access to resources but also support smallholders to improve production. Support may be advice, training, input support, infrastructure, or output market support. In South Africa, the Department of Agriculture assigns agricultural advisors to smallholder farmers for such purposes. The agricultural advisors assist smallholder farmers with farming advice on their varied farming practices, production inputs, and training. In the case of Msinga independent smallholder irrigators, access to these services was limited. Agricultural support services tend to focus on public irrigation schemes or projects. In the current study, only 20.8% of the sampled independent irrigators indicated that they had received agricultural advice from the department's agricultural advisors. Only eight stated that they had received training in production. Advice on other aspects such as irrigation, marketing, business, and finance was rare to non-existent. Also, none of the sampled irrigators had received equipment and production loans or grants. Independent irrigators typically used their households' savings and income from other sources to finance their independently irrigated plots. These results are consistent with other independent irrigator studies in South Africa, indicating that South African irrigators rarely received assistance from the government or other institutions. Evidence in Limpopo province for Thulamela (Dube, 2017) and Greater Tzaneen independent irrigators (Denison *et al.*, 2016) indicated that 38.8% and 27.6% of irrigators in these regions had received some production advice, respectively. At the same time, only 28.6% and 24.1% claimed that they had received irrigation assistance.

In contrast, irrigators on South African irrigation schemes including, but not limited to, Dzindi (Van Averbek, Letsoalo, Mohamed, & Khosa 2004; Denison *et al.*, 2016), Tugela Ferry (Sinyolo, Mudhara & Wale 2014; Zegeye & Chipfupa, 2018) and Bululwane (Wale & Chipfupa, 2018) have had high-level access to these services. This evidence supports the study's conclusions that agricultural support services tend to focus on public irrigation schemes or



projects. The uneven distribution of support and focus of the government on projects resulting in support benefiting a few individuals were also indicated by Sinyolo *et al.* (2018). The government built the irrigation schemes, which could explain the disparity in access to agricultural support services between independent and scheme irrigators, or it could be motivated by the state's investments in these projects.

Apart from uneven distribution, government departments duplicate support to similar groups instead of identifying new beneficiaries. For example, the Agri-park initiative by the Department of Rural Development and Land Reform (Now known as the Department of Agriculture, Land Reform, and Rural Development) provides projects or cooperatives with agricultural support. The programme offers smallholders the support of agricultural extension, production inputs, infrastructure, and output markets. Each district has a Farmer Production Support Unit (FPSU) or two as part of this initiative. The FPSU is a one-stop location where all produce storage, packaging, farmer training, and other services are delivered. Surprisingly, some of the irrigation schemes (e.g., Nsuze irrigation scheme, Tugela Ferry, Shinga irrigation scheme) are identified as FPSUs. Irrigators on those schemes benefit from the current Department of Agriculture support programmes and the new FPSU initiative by Rural Development. In contrast, this initiative could benefit many goal-driven individual farmers, especially the youth who may be interested but facing resource limitations.

### **3.4. Irrigators Constraints**

Irrigators face various challenges and constraints in their farming; the ability to recover lies in the strength of the capital endowment, household strategies employed, and available support systems. On the four responses Likert scale, independent irrigators were asked to rate their experience with constraints they face in their farming. Table 2 shows the relative distribution (%) of constraints faced by respondents.

**TABLE 2: Relative Frequency Distribution (%) of Constraints Faced by Irrigators (n=101)**

	Never	Rarely	Sometimes	Most of the times	Always
Lack of capital	3	1	23	54	20
Insufficient land	38	21	23	19	0
Lack of access to inputs	8	14	41	36	2
High increase in input prices	4	6	19	67	4
Production below normal	4	4	53	39	1
Declining market prices for outputs	8	26	55	11	0
Land tenure not secure	92	6	2	0	0
Local and political conflict	89	10	1	0	0
Lack of support services	8	3	6	47	37
High pump and maintenance cost	81	1	5	13	0
Water availability	8	7	54	25	6

The table shows that independent irrigators perceive lack of capital (74%), access to inputs due to high price (71%), and support services (84%) as major significant constraints they experience most or all the time. All these factors are very important for an irrigated enterprise's success. The low levels of opportunities for economic activity in the municipality and high social grants dependency (96%) among irrigator households exacerbate households' lack of financial resources. Furthermore, water access is very crucial for the success of an irrigation enterprise. Springwater was the most prevalent source of irrigation water in Msinga (69%). Another significant source was direct extraction from the river, found in one-third (31%) of the sampled irrigators. Water issues were prevalent among all four FGDs but differed in several aspects. The first two FGDs in Mashunka village voiced concern over the drying out of the water source. As a result, the competition for water was high, and one had to get up early to access irrigation water. Fortunately, no confrontations have resulted from this, simply intense competitiveness. Regrettably, irrigators could not utilise two seasons of the year due to water drying. Irrigators

who extract irrigation water by pumping were the third FGD in the same village. The pumper group had no problems accessing water because they extracted it from the river, but they complained about the high price of petrol, which limited them to irrigating once a week. The last group in Paraffin village extracted water from the Tugela River; the source was not an issue but transporting the water from the river to their plots was a more significant constraint. The irrigators in this area were mostly older women. Finally, through FGD, it was learnt that fencing of the plots was a significant constraint. Irrigators utilise tree branches to keep livestock from entering their plots. These efforts were often ineffective since they lost their crops to cattle anyway.

#### **4. CONCLUSION AND RECOMMENDATIONS**

This paper aimed to describe institutional arrangements, support systems, and challenges faced by independent smallholder irrigators in Msinga's local municipality. The study results suggest that independent irrigators usually operate outside the government's view. Independent irrigators are not registered for authorised water use, so they fall outside the water management department. However, it is not because independent irrigators are unwilling to acquire legal authorisation to use water but because they lack access to such information. The absence of interaction between irrigators and the department's extension services could be one of the reasons for this. Their unofficial water abstraction did not hinder or affect their irrigation enterprises. Still, the means of extracting water from the source exacerbated by limited resources, including financial resources to procure physical capital, poses a limitation.

The drying of their irrigation water sources, particularly the spring, hinders full utilisation throughout the year. Many independent irrigators are females, and current land access practices limit women irrigators' to smaller plots than male irrigators. Existing land access arrangements for all genders should be prioritised on the policy agenda. It is proposed that the existing land tenure and administration systems be improved. Another significant finding from this study is that support systems are limited to a few independent irrigators. However, the lack of support is not a matter of lacking resources or capabilities by the South African government but rather a matter of identifying and extending support services to other beneficiaries. Independent irrigators' existence should be made known among the different support services since, with the

proper resources, they might significantly contribute to agricultural productivity and address poverty and food insecurity. Providing extension and training support should be prioritised. Independent irrigators' access to physical resources, such as pumping technology for manual lifters, should be prioritised.

The findings of this study make a significant contribution to the literature on “South African independent smallholder irrigators,” as there is limited literature. However, further broad research needs to be done to shed more light on the issues faced by independent irrigators. This study provides groundwork about what could be used to develop targeted interventions for independent irrigators. Lastly, systematic research on who these irrigators are and how they make a living is necessary to understand their impact on rural development and thus justify the investment.

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