THE ARCHAEOLOGY OF MOXOMATSI, A 17TH CENTURY BOKONI CAPITAL, MPUMALANGA, SOUTH AFRICA

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A dissertation submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science.

Johannesburg, 2020

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the Degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

______ ________

(Signature of candidate)

______6th_______day of___August______2020__in__Crossberry Central___

ABSTRACT

Ruins of Bokoni stonewalled settlements cover an area of 10 000 km^2 in north-eastern South Africa. Most archaeological research conducted on Bokoni settlements thus far has focused on phase I sites in the south, and phase II and phase III sites in the north. The zone in between remains largely understudied and unexcavated. My research focuses on this understudied region, particularly Moxomatsi, in central Bokoni. Moxomatsi is the earliest Bokoni capital mentioned in recorded oral histories. The aims of this research are to understand the spatial configuration of the town, and to explore what roles gender played in the structuring processes of the town.

For my family

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CHAPTER 1: INTRODUCTION

Introduction

William Beinart (2010) proposed that research in Bokoni could help to generate a more complex model of gender relations in precolonial South Africa. Recognising gender relations and/or gender roles in past communities can be significant in understanding their ways of life (Nelson 2006). Gender theory can guide research questions. I draw on other studies on gender in southern African precolonial farming communities to infer possible gendered activities that might have occurred at Bokoni (Hanretta 1998; Kinsman 1983; Weir 2006; Henshall 2013). There is limited research on the relationship between daily labour and gendered space in traditional or pre-colonial southern Africa. Consequently, I model my approach to gender on Henrietta Moore's (1986) seminal study on gender and space of Marakwet farming communities in Kenya. My dissertation explores the possibility of this on a macro spatial scale at Moxomatsi in Bokoni, Mpumalanga.

The Bokoni occupation sequence has been divided into four chronological phases (Delius *et al.* 2012). Archaeological research in Bokoni has thus far focused on sixteenth century to seventeenth century (Birin 2017; Ramaoka 2018) Bokoni phase I sites in the Komati River Valley, and phase II and III sites near Mashishing (formerly Lydenburg). The zones between these two regions have remained understudied. In this dissertation, I focus on the Bokoni phase II occupation at Moxomatsi, which is located southeast of eNtokozweni (formerly Machadodorp). Based on relative sequencing, which used oral traditions and settlement layout, the Moxomatsi settlement has been attributed to the early second phase, which probably dates to the 17th century AD (Delius *et al*. 2012; Schoeman & Delius 2011).

Moxomatsi was the earliest Bokoni capital, and oral traditions indicate that it was abandoned due to increased conflicts in the area. Its location southeast of eNtokozweni was still known to seKoni speakers, some from eNtokozweni, who were interviewed by Prinsloo in the 1930s who places it on the farm Dalmanutha (Prinsloo 1936: 11; Figs 1.1,1.2). Archaeologists (e.g. Collett 1979; Delius *et al*. 2012; Widgren *et al.* 2016) have previously referred to Moxomatsi as Rietvlei and Rietfontein after the names of the farms on which Greater Moxomatsi is located. The core of the town is on Button farm (see Fig. 1.2). Greater Moxomatsi comprises stonewalled settlement clusters, and in the outlying areas isolated homesteads. The core of the town comprises densely clustered stonewalled homesteads. Each homestead has associated terraces. A complex road network intersects the site (Delius *et al*. 2012: 405-406).

The focus of my research is how space at Moxomatsi was structured, used and manipulated. I also explore the conceptual role gender played in the structuring processes of the settlement. Research at Moxomatsi helps to fill this lacuna. Research at Moxomatsi also deepens our understandings of spatial configuration patterns of early phase two sites.

Bokoni research history

Late farming communities in north-eastern South Africa emerged between the 12th and 15th centuries AD (Marker & Evers 1976: 160; for a general overview see Delius & Hay 2009). The occurrence of Eiland pottery on later farming community sites (e.g. Collett 1979: 28, 31, 44, Schoeman 1997: 107, 150; also see Schoeman 2013), suggests that it is likely that there was interaction between them and earlier farmers. This interaction, however, is poorly understood. Whatever their relationship with earlier farming communities, late farming communities approached the landscape differently, and inhabited areas that are some distance away from rivers; preferring elevated areas above valleys, on hilltops, spurs and plateaus (Maggs 1995: 141). The sites, however, were still within easy walking distance of sites, and for example most Bokoni sites are within a 2 km distance of water sources such as streams and rivers (Collett 1979; Coetzee 2016). Preferences of these areas might have resulted from population expansion, disease, perceptions of lowland areas as unhealthy, as well as preference for location near or away from trade routes, rivers and other resources such as good quality soils (Beinart 2010; Coetzee 2008, 2016; Delius & Schoeman 2008: 163; Marker & Evers 1976: 160).

Christiaan Willem Prinsloo (1936) associated the stonewalled ruins and terraces between Ohrigstad and Carolina in Mpumalanga with ‘Bakoni’ history and heritage, and suggested that the terracing was the result of conflict in the area. This information was included in the historical background section of his masters dissertation on *seKoni*, which is a language that at the time was still spoken by several individuals in towns such as eNtokozweni, Mashishing, and Sabie in Mpumalanga. The people who spoke *seKoni* were members of what remained of Koni communities, also referred to as Bakoni. Prinsloo (1936: 9-10) states that old Koni men, who self-identified as Nguni (Swati and/or Zulu), stated that the Koni originated from Bokoni (a place of Koni people), as opposed to the Pedi who originated from an area known as Bokgatla in the west, and the Roka in the north. For purposes of my research, Bokoni is

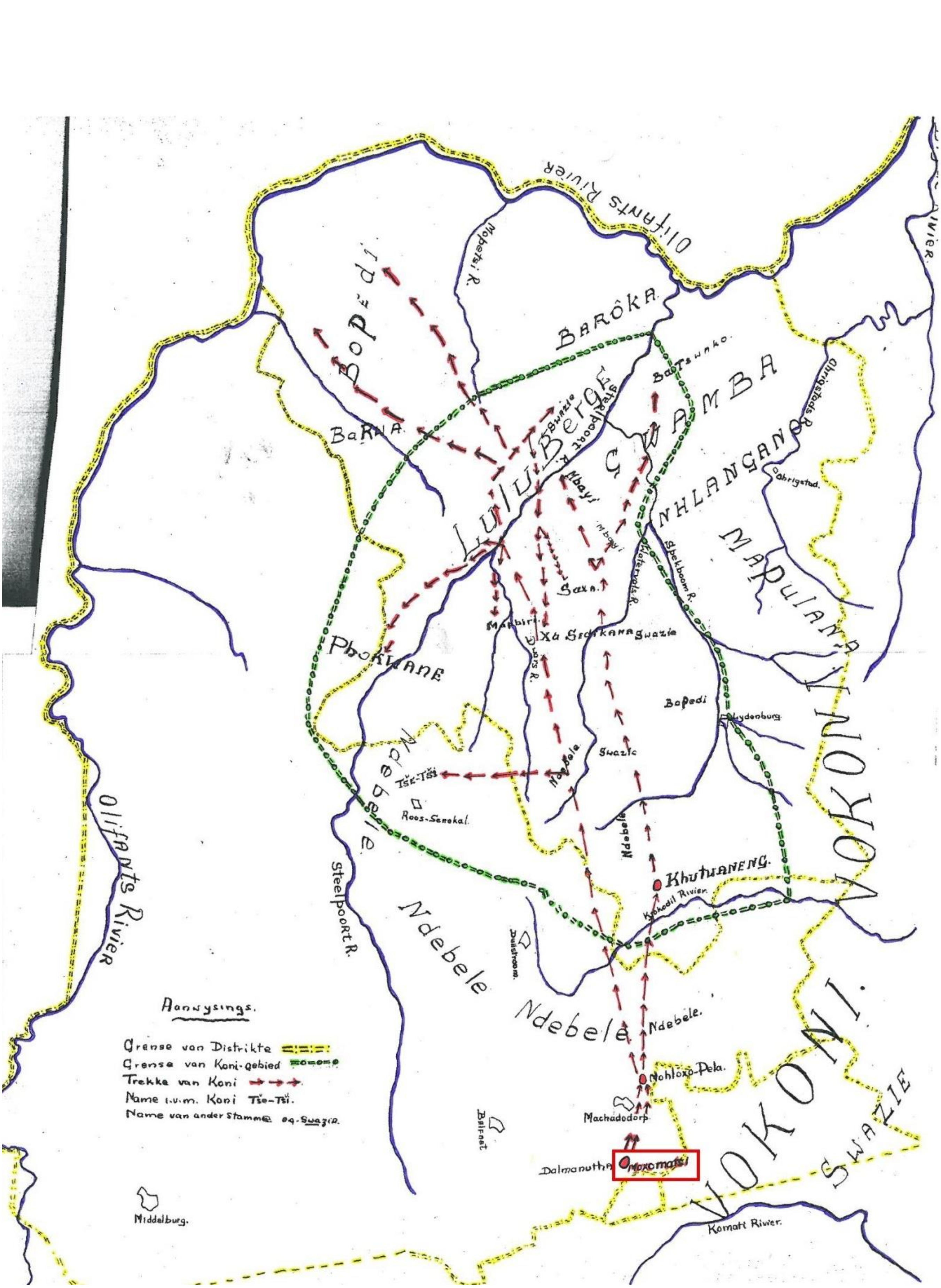

Figure 1.1: Map of Bokoni sites adapted from C.W. Prinsloo (1936), Moxomatsi is indicated in the red box.

used as a regional identity of the stonewalled ruins in north-eastern South Africa, rather than implying a region with a fixed cultural identity or the people.

Prinsloo (1936) used the stories that the old men told him to map Bokoni, and plot specific sites mentioned in the traditions, regional boundaries, neighbouring polities, and routes that people of Bokoni used when relocating in response to the troubles in the south (Fig. 1.1). Pivotal for my research, is the identification of the site Moxomatsi as one of the main towns of Bokoni. Prinsloo's reading of the traditions placed Moxomatsi on the farm Dalmanutha, south of modern-day eNtokozweni (Prinsloo 1936: 11; Figs 1.1, 1.2).

The stories recorded by Prinsloo (1936) narrated that the people at Moxomatsi suffered from numerous attacks by the 'Mapono' (possibly Nguni communities) while under the leadership of Tapiše Semokgwane. This resulted in relocation of the capital further north to Mohloxo-Pela east of the modern-day town eNtokozweni (Prinsloo 1936: 11). According to Prinsloo (1936: 12), Mohloxo-Pela became the main town after the abandonment of Moxomatsi. At this time another new town, named Khutwaneng, was founded in the Badfontein valley, which is located south of the modern-day town of Mashishing. Mike Evers (1973, 1975) and later David Collett (1979, 1982) conducted most of their research in and around Khutwaneng.

While there were earlier forays by archaeologists and historians into Bokoni, archaeological excavations only started in the 1970s. Mike Evers' (1973, 1975) research on the stonewalled settlements of Mpumalanga expanded on the aerial photograph surveys conducted by Revil Mason (1962, 1968). Evers (1973, 1975) primarily focused on the area between eNtokozweni and Mashishing, where he identified 166 sites, equating to 5 000 collective settlements. Evers (1975) studied the settlement components, layouts, and the positioning of stonewalled structures, and argued that the cattle kraals are surrounded by houses/huts, and both are encircled by a ring-wall, and adjacent to the ring-wall are terraces.

A collaboration between M.E. Marker and Mike Evers (1976) focussed on the link between settlement patterns, terracing and erosion in the Mashishing valley. They identified three types of settlement configurations in the Mashishing valley. The first type was found in small isolated homesteads, and comprised simple enclosures with two concentric circles. The second type consisted of complex and/or elaborate enclosures composed of a large central enclosure with two opposite entrances and numerous smaller enclosures attached to the main large enclosure. The third type formed through the agglomeration of multiple smaller circular enclosures, which do not follow the first and second structural layout settlement pattern

Figure 1.2: Map showing farm boundaries and Moxomatsi in areas of eNtokozweni

(Marker & Evers 1976: 160-161). Marker and Evers (1976: 164) concluded that the relationship between soil erosion and precolonial farming communities' settlements resulted from land-use, and an increase in population numbers, with environmental traits regulating the spread of erosion.

David Collett (1979, 1982) conducted regional surveys, including of the farms Rietfontein and Rietvlei (Fig 1.2), where greater Moxomatsi is located. His excavations, however, focussed specifically on the stonewalled ruins of the Badfontein valley, south of Mashishing, where Evers (1975) had excavated a Bokoni site. Collett's (1979, 1982) masters research concentrated on the simple and complex stonewalled enclosures previously defined by Marker and Evers (1976). Collett (1979, 1982) agreed with Evers (1975) and Marker and Evers (1976) about the functions of these stonewalled structures, noting that the small enclosures were to keep cattle, the paths were roads to guide the cattle off the settlement and terraces.

Collett (1979, 1982) also excavated remnants of houses between complex enclosures. Importantly, Collett (1979: 18, 1982: 35) uncovered sorghum seeds on one of the house floors. The discovery of sorghum seeds was vital in showing the types of domestic plants these communities cultivated on the terraces. Also relevant to my data, the deposit in all the homesteads he excavated in the town of Khutwaneng was shallow, being less than 20 cm deep, and there were no middens in the town.

Bokoni occupation sequence

Recent research in Bokoni distinguished four chronological phases of occupation. The first phase is associated with settlement sites situated in the southernmost areas of Bokoni, in the vicinity of Carolina and the Komati River Valley (Delius & Schoeman 2008; Schoeman & Delius 2011; Delius *et al*. 2012; Fig. 1.3). Settlements found in these regions are characteristically open-air sites that occur on gentle sloping landscapes (Delius *et al*. 2012). Historical sources on events relating to this phase of occupation remain insubstantial, thus, knowledge regarding these communities is also limited. The start of the Komati Gorge Village 1 occupation dates to the early sixteenth century (Birin 2017; Ramaoka 2018).

The second phase of occupation is akin to the first phase, as it also involves open-air sites along hilly and gentle slopes. Its core is the Crocodile and Elands River catchments (Fig. 1.3). Pedi royal oral tradition records that Bakoni were already in the region when the Pedi royal core moved through the area around 1650 (Delius *et al*. 2012; Schoeman & Delius 2011). According to Prinsloo (1936: 11-12) these sites are named Moxomatsi and Mohloxo-Pela.

Notably, Prinsloo (1936) identified Moxomatsi as the first Bokoni capital, however, archaeological research found evidence that indicate earlier sites in the south such as in the Komati Valley (Fig. 1.3) (Delius *et al*. 2012; Schoeman & Delius 2011). A variety of settlement types have been identified at these phase two sites.

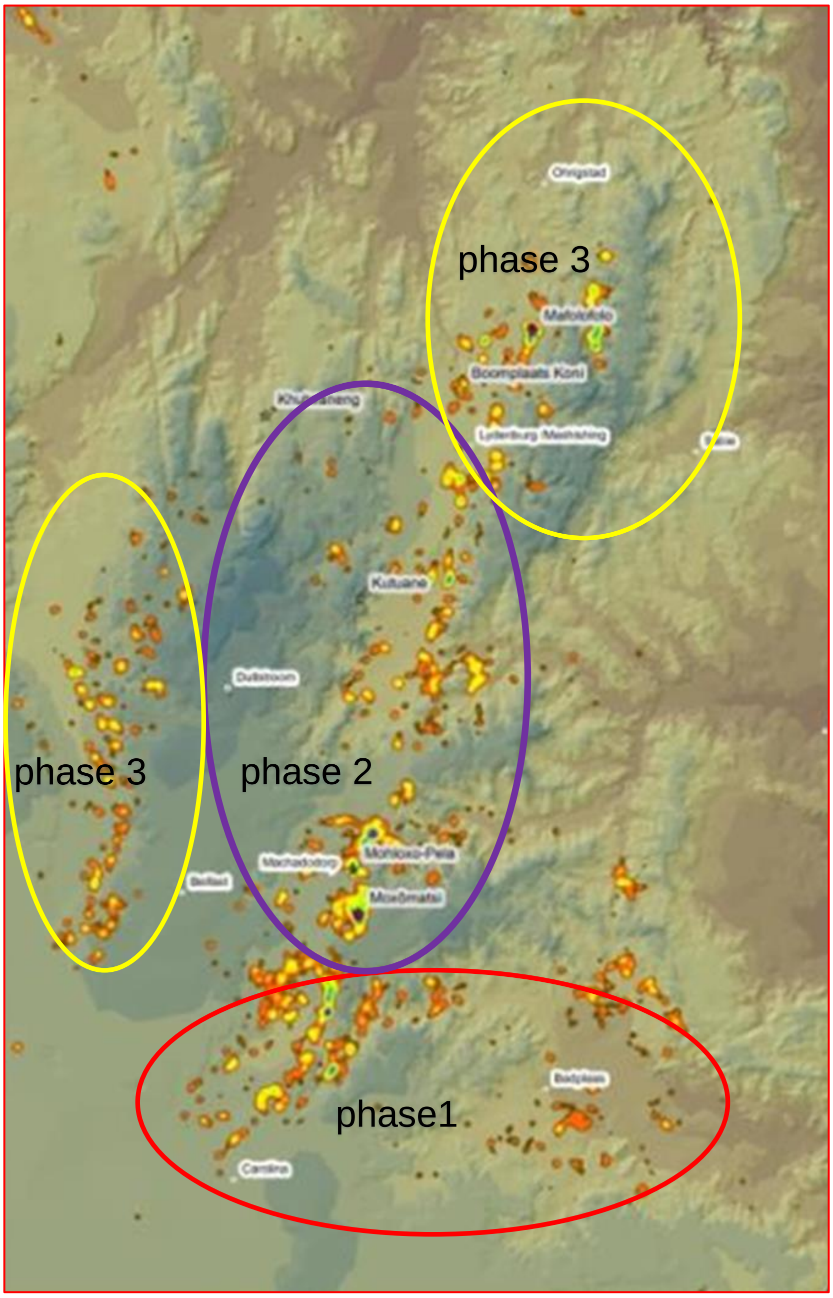

Figure 1.3: Map illustrating Bokoni settlement sequence adapted from Coetzee (2016)

Settlements found at phase two sites include simple and complex homestead enclosures. Simple enclosures comprise two concentric circles located in small isolated homestead, while complex structures consist of large central enclosures with smaller enclosures attached to the outside of their central enclosure (Delius *et al*. 2012; *cf.* Collet 1979, 1982; Marker & Evers 1976). Delius *et al*. (2012) argue that the various settlements found at phase two sites illustrate varied stages of development of the homesteads, thus, newly developed homesteads would be small as they housed fewer individuals, who also owned small herds of livestock. Rock art engravings found in these areas are said to depict settlement configuration patterns (Delius *et al*. 2012; Maggs 1995).

Settlement sizes varied from individual homesteads to elaborate settlement clusters that extend to five kilometres and more in length. Regardless of the type of settlement, homesteads incorporate open, or terraced gardens alongside them. In the clustered settlements, or towns, new homesteads are constructed at the peripheries, or in uninhabited areas (Delius *et al*. 2012).

Phase III in Bokoni can be separated into two stages (Fig. 1.3). The initial stage when people probably used kloofs as refuges while continuing to live in open valley occupations, and then the later stage when conflict intensified causing the total abandonment of open valley settlements (Delius *et al*. 2012). Conflict emanated from the Pedi polity led by Maroteng royals, generalised regional conflict and the emigration of people fleeing from aggressive states from southern areas (Delius & Schoeman 2008).

Some of the conflict related to processes in the Pedi polity, such as succession disputes. Initial Maroteng succession battles included Thulare and his brother Dikotope, who sought refuge at Maepa near Ohrigstad. Later Makopole, Thulare’s son, built a threatening stronghold near Mashishing, which his brother ambushed (Delius & Schoeman 2008). When the Maroteng succession conflict faded, more disruptive attacks occurred in the area due to attacks from Ndwandwe, Ndebele, Sobhuza, Soshangane, Zwangendaba, and Nxaba communities (Delius & Schoeman 2008).

Delius *et al*. (2012) state that Bokoni communities sought refuge during intensified periods of conflict in kloofs where they built stonewalled settlements with terraces. However, kloof site occupations were not sustainable in the long term, and this resulted in the scattering of the communities and abandonment of the stonewalled sites. Bokoni communities that took refuge in other communities across the Mpumalanga landscape left limited oral traditions, and archaeological evidence (Delius *et al*. 2012). We, however, know that some migrated further north, and some communities amalgamated with the Ndzundza Ndebele at KwaMaza (Beinart 2010; Delius *et al*. 2012; Schoeman 1997).

A new Bokoni chiefdom also arose near Mashishing during the late 1820s. This was led by Marangrang, who was a Koni commoner (Delius *et al*. 2012). Delius and Schoeman (2008: 152-154) suggest that the area previously inhabited by Marangrang and his followers was probably Khutwaneng, an earlier Bokoni stronghold characterised with concentrated terraced fields. Marangrang later relocated to the Dwars River, also an area with terraced sites. Marangrang, however, came into conflict with the Pedi polity under the leadership of Sekwati, which resulted in the final destruction of an independent Bokoni, dispersal of Bokoni people, and the end of stonewalling construction practices (Delius & Schoeman 2008: 152-154; Delius *et al*. 2012).

The fourth phase of occupation involves Bokoni communities returning to their old homes and ultimately being forced to accept Boer authority. Some Bokoni communities were absorbed into neighbouring African communities that provided them with refuge during the conflict, while others remained at the peripheries, and maintained some autonomy from their ruling neighbours (Delius *et al*. 2012). Records show that some people from Bokoni, led by Chief Phassoane, found shelter at Botšhabelo, a Berlin Missionary Station, where a Pedi royal member Dinkwanyane was based (Delius *et al*. 2012). Dinkwanyane and his followers later moved to a Bokoni refuge site, Mafolofolo, located near the Spekboom River, north of Mashishing (Delius & Schoeman 2008: 155).

The identity of the people who lived in Bokoni

P.W. Laidler, a specialist in precolonial pottery, used ceramic style to link the area to Zulu speakers (Laidler 1932). Subsequently, E.C.N van Hoepen (1939) visited the farms Blaauboshkraal and Schoongezicht near eNtokozweni, and Boomplaats, near Mashishing, and published the first report on the region’s stonewalled enclosures, terraces, and rock art engravings that depict the stonewalled settlements. He argued that the sites were authored by the ancestors of African communities who were still living in those areas during the 1930s, such as the Pedi and Ndzundza (Delius & Schoeman 2008).

The first excavators (e.g. Evers 1975; Marker & Evers 1976; Collett 1979, 1982) linked these stonewalled settlements to the Pedi. The belief that Pedi people inhabited these settlements remained dominant until Schoeman (1997: 33, 205) asserted that these stonewalled ruins were Koni, because Pedi oral traditions stated that the Kutoane (Badfontein) area was once a Koni stronghold, which the Pedi attacked while under the leadership of king Mampuru.

The origins of the term Koni remain unclear (see Delius and Schoeman 2008: 143). Makhura (2007: 99), however, argued that it was less influenced by Nguni people than previously thought, and that linguistically the word Bokone refers ‘northern region’ or northerly direction, while Bokone people denotes to people of, or from the north. Makhura (2007: 99) further reasoned that people currently residing in areas such as Polokwane, Mokopane, and Mpumalanga, who maintain the Koni identity, immigrated from the north.

This search for a singular origin was problematized by Delius and Schoeman (2008) as they suggest that people who identify as Koni may have common origins connected to the stonewalled settlements situated in Mpumalanga. Their reading of oral traditions, however, suggest that Bokoni itself was made by a variety of groups of people. They in part drew on Mönnig (1963), who indicates that it is probable that other communities adopted a Koni identity, and then claimed to be of Koni origin. Mönnig (1967: 16-17) also pointed out that Koni communities had several different totems in the 1960s, and that not all these totems originated from Nguni communities.

The spatial extent of Bokoni

Bokoni stonewalled settlements occur between regions of Carolina and Ohrigstad, and are scattered over an area of about 10 000 km^2 (Delius & Schoeman 2008; Delius *et al*. 2012; Schoeman & Delius 2011). Mason (1962, 1968) identified 1 972 stonewalled ruins in the locality of Steelpoort, Sabi, Crocodile and Komati Rivers’ drainage basins through a survey of aerial photographs (Mason 1968; also see Evers 1973). Tim Maggs (2008) continued research into the spatiality of Bokoni sites, and his maps of the settlements show that the sites clusters along the main rivers in the region.

Tobias Coetzee (2016) applied geographic information systems (GIS) to establish the extent and complexities of Bokoni sites within the eNtokozweni and Mashishing regions for his masters dissertation. Coetzee (2016) identified 13 899 stonewalled enclosures within his study region, and correlated written records with site concentrations to determine locations of Bokoni towns or strongholds. He indicated that factors such as water proximity affected choices in site selection and location. He also noted that sites clustered on western and north-western aspects, and favoured locations with underlying Andesite geology (Coetzee 2016: 157).

Bokoni settlement patterns, terraces and farming

Marker and Evers (1976) estimated the population size of sites situated in the Dorps River Valley, near Mashishing, to be between 19 000 and 57 000. These sites probably date to the era of phase two and three occupations. Importantly, the configuration of these stonewalled settlements and expansion of population over large areas during these early phases of Bokoni suggest that there was no central political power (Delius *et al*. 2012; Delius & Schimer 2014; Schoeman & Delius 2011). Even though the sizes and complexities of homesteads vary, there are no dominant homesteads, or marked hierarchical architectural features (Delius *et al*. 2012; Beinart 2010; Delius & Schirmer 2014).

Tim Maggs (2008) describes prominent Bokoni settlements features including homesteads, roads, and terraces. Homestead settlement structures vary in shape and size. Smaller enclosures were designed for livestock keeping, and the numerical increase of livestock might have resulted in investments in additional kraal enclosures to contain the livestock at night (Beinart 2010). Immediately outside these smaller enclosures is the domestic area, which is surrounded by the outer circular wall or perimeter wall (Maggs 2008). As seen in (Evers 1975; Collett 1982; Maggs 2008) house floors have been unearthed in areas identified as domestic spaces/areas. Additionally, some of the domestic areas in Bokoni homestead ruins have of distinct household subdivisions which are marked by rows of stones following a radial pattern (Maggs 2008).

Maggs (2008) argues that Bokoni settlement ruins consist of the longest and complex road network systems in southern Africa. These roads are defined by two stonewalled lines occurring alongside each other in a parallel manner. Their purpose is to connect homesteads across the landscape, and to regulate the movement of people and livestock through terraced and agricultural cultivation lands (Beinart 2010; Maggs 2008). Livestock were left to roam freely and graze on agricultural fields after the crops have been harvested, and in the process the cattle might have indirectly fertilized the fields with their dung (Beinart 2010). Roads linked with individual homesteads are mostly narrow (± 1 meter wide), and generally lead to the inner small circular enclosures of the homesteads, therefore, animals could only walk in a row in these narrow paths to the enclosures (Maggs 2008).

Terraces, along with other stonewalled ruins, were constructed using readily and locally available rocks, while open fields away from the settlement area were used as grazing for livestock (Maggs 2008). Terrace boundaries are distinguished by single, or double lines of stone. Yet there are cases where some terrace walls measure up to a height of a meter or more (Maggs 2008 *cf*. Widgren *et al*. 2016). Terrace walls are constructed along natural contours of the land, and are divided by perpendicular stone lines into individual farming plots (Maggs 2010; Marker & Evers 1976; Widgren *et al*. 2016). Terraces occur in different shapes and sizes. Widgren *et al*. (2016) show that terrace construction is a process rather than a single occurrence task. Terrace soils at various sites of Bokoni have also been tested, and have shown great potential for agricultural production. The decay of dolerite, one of the common rock types in the region, enables nutrient-rich soils for cultivable lands that presumably produced flourishing crops (Solomon 2012).

Beinart (2010) suggests that the investment of labour in relation to terracing demonstrates continuous field cultivation and rotation in contrast to slash and burn agriculture that utilizes ash to enrich the soil. He also suggests that the amount of labour invested in terraced fields indicates agricultural intensification, demographic growth and absorption of new crops (Beinart 2010). Bokoni communities cultivated domestic grains such as sorghum (*S. bicolor*), pearl millet (*P. glaucum*) and finger millet (*E. coracana*) (Collett 1979; Hattingh 2014). Maize (Z. mays) only became a common staple amongst precolonial farming communities of southern Africa after the second half of the nineteenth century (Beinart 2010), and no direct evidence for maize has been found in Bokoni, so the presence of maize still needs to be demonstrated. Sorghum and millet crops grow in a range of conditions, and can survive robust weather and soil conditions, therefore, making them ideal for large agricultural scale production and increasing the probability of average yields to tend towards the calculated maximum values (Henshall 2013: 33).

Delius *et al*. (2012) speculate about gender and age composition of labour involved in the making of terraces, construction and maintenance of settlement structures. Beinart (2010) proposes that agricultural specialisation and stonewalling might have resulted from family labour, and that these structures are private rather than public. He (Beinart 2010) further states that the scale of building and maintenance implies subservient labour. Maggs (2010), however, questions the capacity in which large scale labour can be organised, and suggests that youthful men might have contributed during initial phases of forming terraces. Maggs (2010) also argues that constructions of terrace blocks were a communal task, and the crosscutting stone lines demarcated family cultivations plots. Men presumably participated in communal terrace tasks, whilst women controlled crop cultivation activities (Maggs 2010).

Woodborne *et al*. (2015) show approximate rainfall since 1750 (Fig. 1.4). This data, combined with correlations of carbon isotope and studies on phytoliths at Bokoni (Aub 2014; Hattingh 2014; Sjöström *et al*. 2017) suggest that rainfall fluctuated significantly towards the end of the

Bokoni sequence. Henshall (2016: 107) states that if the annual rainfall fell within the lower ranges then the agricultural yields would fall within minimum average yield production, and with rainfall of roughly 500 mm per annum the yield values would expectedly fall within maximum yield production. Factors such as soils and temperature that might impact yields would have unlikely affected outlying yield results due to temperatures of this region remaining moderate and not reaching extreme conditions which may presumably cause gross losses (Henshall 2016: 107).

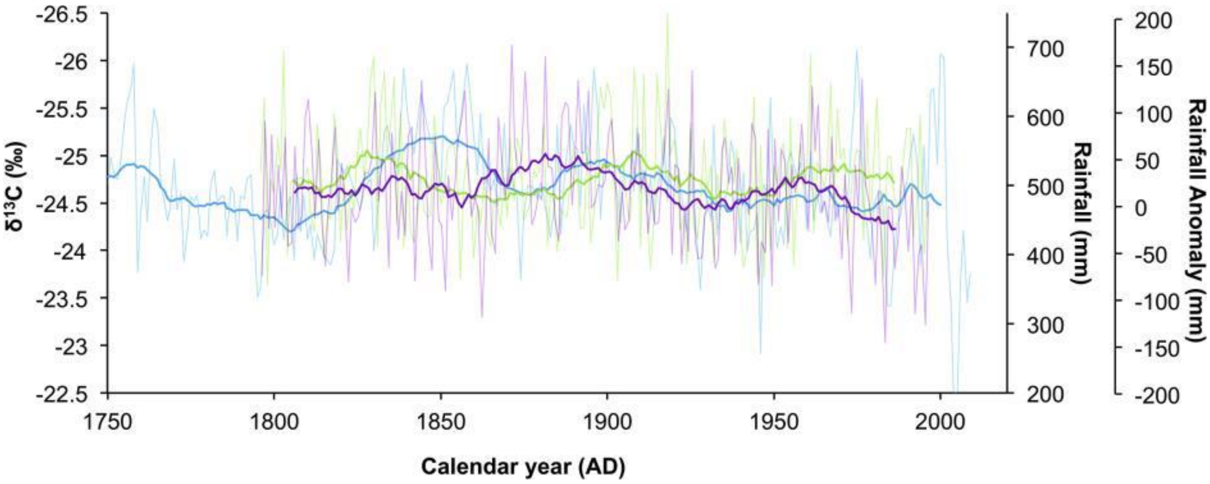

Figure 1.4: Regional rainfall proxy comparisons for southern Africa. Comparison between the 13C boabab record (blue) and rainfall record from Zimbabwe (green), and precipitation reconstruction of Neukon et al. (2013) (Woodborne et al. 2015: Fig. 4)

Chapter outline

Including the introduction chapter, this dissertation contains five chapters:

Chapter 2 reviews existing literature relevant to this research. This includes a general overview of the archaeology of farming communities and their use of stonewalling, as well as gender theory and studies conducted on gender in precolonial African farming communities.

Methods and techniques are outlined in Chapter 3. These describe the techniques I used when conducting my field work, and when capturing and processing data. I also discuss the limitations to my methods and techniques.

In chapter 4 I present the data I collected. This includes an in-depth site description from macro to micro scale. I discuss the various settlement zones, and the context in which these settlements exist. I also discuss the excavations of two excavated homesteads. Finally, I present yield calculations of possible average yields produced by these farming communities.

Chapter 5 discusses the outcomes of the data I presented in the previous chapter. I also discuss the implications of the patterns I observed. I conclude with a summary and suggestion of potential further research.

Summary

Bokoni comprises ruins of settlements across the landscape of north-eastern South Africa. Early research in the area attempted to understand the settlement patterns, and the peopling of the region. Since then it has been identified that the people that constructed and inhabited these stonewalled ruins are descend from *Sekoni* speakers, although numerous other groups also inhabited the region. Inhabitants of these ruins undertook intensive agriculture. Four Bokoni occupation phases have been identified. Archaeological excavations have thus far focused on phase II and phase III sites near Mashishing, and phase I sites in the Komati River Valley, and the zone between these two regions remains largely unstudied. This includes Moxomatsi, which was identified as the first capital by Prinsloo (1936).

CHAPTER 2: LITERATURE REVIEW

Farming Communities in South Africa

The earliest evidence for farming in southern Africa dates to the early first millennium AD (Greenfield & Miller 2004; Maggs 1980). Early farmers lived in villages and inhabited regions with arable cultivable lands (Maggs 1980; Pwiti 1996), and these farmers did not cultivate on a large scale (Maggs 1980: 134). Early farmers of southern Africa introduced new technologies, which included the production of metal (Greenfield & Miller 2004; Pwiti 1996). They also kept livestock, and made pottery (Greenfield & Miller 2004; Huffman 1989; Maggs 1980; Pwiti 1996). Early farming communities inhabited areas that were nearby water resources such as rivers and streams (Pwiti 1996), such as the Sterkstroom in Mashishing, where the Lydenburg Heads were found (Evers *et al.* 1982; Whitelaw 1996).

The relationship between early and late farming communities is still poorly understood, but late farming community material culture dominates the archaeology of the second millennium AD in South Africa (e.g. Boeyens 2003, Hall & Maggs1979; Marker & Evers 1976). These early farming communities shared the landscape with hunter-gatherers and pastoralists already inhabiting the region (Boeyens 2003: 66; Maggs 1980: 136; Maggs & Whitelaw 1991: 3; Schoeman 2013: 933). Genetic studies suggest that there was admixture between the hunter-gatherer, pastoralists and farming communities of southern Africa (Mitchell 2010; Wood *et al*. 2005), and that the paternal genes had significant associations with language dispersal within descendant populations of later agricultural communities (Wood *et al*. 2005).

Several of these late farming communities built their settlements in stone (e.g. Boeyens 2003; Hall & Maggs 1979; Hall 1998; Marker & Evers 1976; Sadr 2016). During the second millennium AD, South Africa underwent a population increase, which resulted in an increase in settlements (Boeyens 2003: 70; Marker & Evers 1976: 159). They did not all employ the same settlement configuration, as will be discussed below.

The first, but not the earliest, of the stone building communities discussed in this chapter, lived at Nqabeni, which is situated near the White Mfolozi and Mzinyathi Rivers west of Babamango of the Zululand. The settlements in this area were built during the 18th century AD (Hall & Maggs 1979: 172). Nqabeni communities kept a range of domestic livestock in large circular enclosures and they also cultivated sorghum, maize, and cow peas (Hall & Maggs 1979: 172, 174).

Sites at Nqabeni were moderately concentrated, but were exceptional in the region since the nearest settlements to the west of Nqabeni are about 150 km away. These settlements were classified as Type B due to their configuration (Hall & Maggs 1979: 175). Type B settlements are comparable to Type V settlements of the Free State province, which have been associated with Sotho speakers (Maggs 1976a: 322; 1976b: 28-33).

Maggs' (1976a; 1976b) pioneering study on variation in the north-western and eastern settlements of Sotho-Tswana late farming communities of the Free State province, identified three settlement types, namely Type N, Type V, and Type Z. Type N settlements comprise circular enclosures organised in a ring fashion connected through stone lines (Maggs 1976a: 321-322; 1976b: 33-37). Type N structures cluster in the north-eastern Free State province and nearby areas of eastern to north-eastern South Africa. A significant number of these sites are located in the valleys of the lower Wilge, Klip and Vaal atop Vereeniging, as well as the Suikerbosrand to the south of Johannesburg (Maggs 1976b: 35).

Type V settlements are structured similarly to Type N settlements; the only apparent difference is that Type V lacks an outer ring wall (Maggs 1976a: 322-324). Type V settlements are most commonly found on the southern Highveld, and the north-eastern regions of the Free State province. Outliers occur in southern vicinities such as Ladybrand on the Free State-Lesotho border, as well as near Bethal and Ermelo (Maggs 1976b: 29) immediately south of Bokoni.

Type Z settlements comprised numerous large circular enclosures clustered together with thicker walls compared to the other settlement types (Maggs 1976a: 322-324). Type Z settlements are concentrated in regions of the north-western Free State province, in valleys of the Sand, Vals and Renoster Rivers, dominant agglomerations of these settlements occur in the Doornberg-Virginia-Venstersburg regions, while smaller clusters are found in the south east and north-west of Kroonstad, at Bothaville and the Renoster River (Maggs 1976b: 41).

Maggs (1976a) argues that the eastern settlements can be regarded as a developing system throughout four consecutive centuries with an increase in population size. Eastern and north-eastern settlements (Type N and Type V) were attributed to the Fokeng, Koena, and Tlokoa, although several other communities might have been present in the regions (Maggs 1976a: 329-330). The north-western settlements (Type Z) might be associated with the Kubung or Hoja, and the differences among these communities indicate that the Sotho and Tswana communities were not as homogeneous as previously thought by anthropologists (Maggs 1976a: 329-330).

Boeyens (2000, 2003, 2012; Boeyens & Cole 1995) studied occupation sequences in precolonial Tswana farming communities in Marico, North West province, South Africa. He combined oral and archaeological sources to identify and analyse Tswana towns. He identified a shift to larger settlements, and a corresponding exponential population growth during the 18th century AD (Boeyens 2003: 69, 70). These stonewalled settlements gradually expanded and intensified over time, and with some growing into large Tswana towns early in the 19th century AD. These towns included Khunwana and Dithakong, as well as several other stonewall settlement clusters such as Buispoort, Modderfontein and Mmakgame in Marico (Boeyens 2003: 70). Kaditshwene is one of the best documented because reverend Campbell visited the site (Boeyens 2000; Boeyens & Cole 1995).

These stonewalled settlements comprised residential areas and enclosures that housed livestock. Close to the livestock enclosures were the *kgotla*, which is a court or a meeting area for men in those communities (Boeyens 2003: 71). These communities also farmed. Their fields, however, were situated at noticeable distances from their homesteads (Boeyens 2003: 72).

Evidence for the presence of stone building late farming communities in north-eastern South Africa was also found in the Mopani district in the Limpopo province, where people specialised in ore reduction and metal production (Plug & Pistorius 1999; van der Merwe & Scully 1971). These sites have been inhabited from the 8th century AD to the 19th century AD (van der Merwe & Scully 1971: 179), but the stonewalling dates to the post 15th century AD Baphalaborwa occupation of the site (Moffett 2017). The communities that inhabited these places constructed their settlements on hillsides with stone, and used terraces in residential contexts. The remains of house floors have been unearthed among these stone structures (van der Merwe & Scully 1971). The settlement configurations at Phalaborwa indicate that areas were demarcated for distinct metal production purposes, where ore smelting spaces are separated from iron and copper manufacturing spaces (Plug & Pistorius 1999: 179). A significant amount of the metal work took place within the domestic context of the settlements (Moffett 2017).

Phalaborwa developed into a hub for short and long-distance trade, and the trading and production of metals were governed by various political domains (Plug & Pistorius 1999: 179). Since the Baphalaborwa communities inhabited areas of extreme environmental conditions they might have acquired livestock and some of their agricultural goods through trade. Cattle, however, seem to have been scarce and iron hoes were used instead of cattle for bride wealth payments (Plug & Pistorius 1999: 179-183). There also was evidence for rudimentary farming along riverbanks (Plug & Pistorius 1999: 178).

Closer to Bokoni, stonewalled settlements at KwaMaza in the Steelpoort River valley have been linked with the Ndzundza Ndebele, and oral histories indicate these sites were inhabited during the late 1600s until early 1800s (Schoeman 1998a; also see Nelson 2009). Recorded oral histories indicate that the Ndzundza Ndebele were continuously joined by other communities such as the Swazi, Kopa, Pedi and Tswana (Schoeman 1998a: 42). The stonewalled section of KwaMaza was located at the foot of the hill, and the stonewalling significantly decreased further downslope, which led Schoeman to suggest that stonewalling was used in the royal area only (Schoeman 1998a).

Archaeozoological studies of the remains excavated at KwaMaza identified the species and age of the animals exploited by the Ndzundza Ndebele people (Nelson 2009). Nelson (2009) established that the Ndzundza Ndebele were dependant on herding, which was augmented by hunting, trapping or snarling wild animals. Slight variations have been perceived between the later KwaMaza A and the earlier KwaMaza B components, with KwaMaza B showing a substantial diversification of exploited animal species (Nelson 2009: 190).

At Esikhunjini, occupied after the destruction of KwaMaza, the Ndzundza were reliant on diversified animal species, and most of the meat consumed there was of hunted non-domesticates. Faunal remains of KoNomtjarhelo (Umklaarmaak), which was occupied in the middle of the nineteenth century, however, indicate a decline in animal variety and an increased reliance on domestic animals especially sheep and goats (Nelson 2009: 191).

Space, materiality and Gender

Acknowledging gender relations and/or gender roles at archaeological sites has deepened insights into archaeological communities (Nelson 2006). Importantly, gender is not a universal concept (Brumfiel 2006), instead it is a socially and culturally constructed concept (Brumfiel & Robin 2008; Hanretta 1998: 414). Gender should also not be perceived as a fixed bilateral notion as there are communities with more than two genders (Solomon 1992). It is also pivotal to discard gender stereotypes when dealing with gender related matters in prehistoric communities (Wadley 2013). Thus, one needs to be cautious when interpreting gender.

Space is given meaning through social, cultural and quotidian practices (Thornton 1980; Moore 1986). For example, distinct activities are allocated to specific spaces, such as areas allocated for initiation rites, areas where pots are made and fired, where refuse is discarded, or where people were buried (Mönnig 1967; Moore 1986). Thus, the making of space and associated material culture is socially informed, and their materiality and configuration in turn informs and shapes social meaning (Lane 2006). Archaeological approaches that recognise this relationship frequently draw on Giddens' (1984) concept of structuration (Joyce & Lopiparo 2005). Joyce and Lopiraro (2005: 365-366) note that "[s]tructuration is simultaneously the exercise of agency and the constitution of society". This approach is useful when interpreting gender in archaeology, and is frequently used in gender theory, because it allows for the recognition that a gendered society is constituted through people's actions, which are frequently gendered, whilst it is simultaneously shaped by them. Thus, space and structures can be viewed as gendered artefacts, and artefacts that shape gender.

Gender Roles in Farming Communities

While there are local nuances, labour appears to be gendered throughout subSaharan Africa. Women's labour is often associated with the earth, products of the earth and food, while male labour relate to livestock and construction (see Schoeman 1997; Wadley 2013). I discuss specific examples here. Henrietta Moore (1986) indicates that men and women of Marakwet, Kenya, have different roles, for instance men manage land and livestock, which they own. Some women also have small herds of livestock, but they do not manage them. These small herds of livestock, however, supplemented their husband's livestock (Moore 1986: 66). Female ownership of livestock has also been identified amongst precolonial farming communities of southern Africa (see Hall 1984; Bradford 1996; Hanretta 1998; Kinsman 1983; Lane 1998; Weir 2006). Lane (1998) for example, indicated that cattle ownership among the Sotho-Tswana was flexible, and men, women and children owned livestock, however, management of these herds was associated with men.

In Kenya where Moore did her fieldwork, men do the heavy digging, clear the agricultural fields, fence the fields, while the women do lighter digging, sow, hoe, weed, harvest crops, cook, collect firewood, gather wild vegetables, and carry water (Moore 1986: 108). Mönnig (1967: 145-146) identified similar roles among the Pedi, where women kept the household areas clean and in good condition, cooked, gathered edible plants, fetched water, collected firewood, prepared food, made beer, cleaned cooking and eating utensils. They also made pottery, sleeping mats, beadwork, and gourds, all while performing agricultural activities.

Mönnig (1967: 145) indicated that among the Pedi, men's duties included hunting, herding, milking, and slaughtering livestock. In the initial phases of agricultural production, both men and women participated. They, however, were assigned different duties, men were responsible for initial clearing of agricultural fields, and breaking new soils for cultivation, while women assisted them. The rest of the agricultural activities were handled by the women (Mönnig 1967: 145).

Another example of research concerned with gendered labour in precolonial farming communities is found in Rachel Maclean's (1998) study of archaeological farming communities situated in the Interlacustrine Region (around the Great Lakes of east-central Africa) where she examined gendered technologies. Maclean (1998: 173, 175) suggested that iron production technology is strictly associated with men, not only in the Interlacustrine communities, but throughout the African continent. Daily cooking of food and doing other related domestic tasks, as well as agricultural production are perceived as women's duties. Men, however, assisted with clearing of agricultural fields (Maclean 1998: 173, 175; Peterson 2006: 546).

Margaret Kinsman (1983: 42) noted that men in southern Tswana communities had property and land ownership rights, and that men had complete control over agricultural products, which aided their property accumulation and social statuses over time (*cf*. Hall 1998). Moreover, men of the southern Tswana acquired land through inheritance, and even though women also retained rights to agricultural fields. Their access to these plots were negotiated by their husbands or fathers (Kinsman 1983: 42). Women's labour included cultivating agricultural fields and breaking new soils (Kinsman 1983: 44).

Some historical knowledge is available for Tswana areas, some of this was collected by Campbell (Boeyens 2003: 74), who noted that sorghum fields where located on a plain near the town of Kaditswene. Kinsman (1983: 42-44) states that women opted for silty fields situated near riverbeds during eras of drought. During the nineteenth century AD these women cultivated drought resistant crops such as cow peas, sorghum, and several types of pumpkins.

Similar to the women of Marakwet studied by Moore (1986), these women also wove household utensils, and the harvest season was an indication of new cycles of labour. This included household and granary repairs, manufacturing of clay pots, plastering, weaving, mending fences, collecting wild vegetables and cooking (Kinsman 1983: 46). Household labour occurred on a daily basis and women (girls) are socialized from a young age into their gender roles as household producers (Kinsmen 1983: 42, 47). Women owned livestock, but control and care of their livestock was passed onto their husbands and sons (Kinsman 1983: 43).

Men’s labour among the southern Tswana included hunting wild game, herding domestic livestock, working and processing animal hides, and carving wooden tools (Kinsman 1983: 41). Animal hides were essential for clothing members of their families and for trade purposes, with men trading animal hides for copper ornaments (Kinsman 1983: 41, 43). Boys are socialised and trained to care for livestock from a young age, and are given responsibility to care for goats and calves of their families (Kinsman 1983: 47-48).

Paul Lane (1998: 183; 188-189) argued that taking care of the household was women’s responsibilities because Tswana houses were perceived as symbolic entities, and that these houses represented a female body’s reproductive organs. He (Lane 1998: 192-98) also compared spatial planning and organization of early and later farming communities. He (Lane 1998: 192) stated that numerous significant changes occurred from the Early Iron Age to the Later Iron Age pertaining to meanings attached to spaces. Suggesting that these changes might have been affected by changes in gender relations.

Strong emphasis on restrictions and/or boundaries in accessing settlement areas or distinct households occur in later Iron Age communities (Lane 1998: 194). Emphasising boundaries and/or restrictions impacts the manner individuals’ move around the area, thus, result in a production of intangible aspects of navigating through the settlements (Lane 1998: 194). Notably, inhabited households in these settlement areas also maintained the ideology of treating their houses as women’s bodies (Lane 1998: 194)

Simon Hall (1998) also explored gender relations among Tswana communities in Gauteng and the North West province. He (Hall 1998) subdivided the precolonial occupation sequence of these communities into three phases, and paid particular attention to the third phase. These phases were demarcated through changes in settlement sizes, the existence of stone walls that divided internal spaces, and the borders between homesteads and outside world (Hall 1998: 238).

The spatial configurations at homesteads of the Tswana were guided by gender. Male and female spaces were near one another in the first phase. Gendered labour patterns, however, resulted in distinct stonewalled defined spaces associated with various activities in the third phase (Hall 1998: 245). Examining the entire homestead, he states that domestic spaces were designed in a manner that accommodated female labour, while simultaneously spatially isolating men from these activities when they are in the household (Hall 1998: 245). The third phase, dates from AD 1700 onwards, was associated with increased socio-political complexities (Hall 1998: 246).

Hall (1998) highlights gender inequalities among the Tswana communities, for instance, he indicates that while women were responsible for agricultural activities, men had control over women's labour and the agricultural cycle. Furthermore, men were also in charge of cattle and cattle related activities (Hall 1998: 235, 245).

For her masters research, Alex Schoeman (1997) employed gender as a framework to examine change and continuity of archaeological data found at Ndzundza Ndebele sites in the Steelpoort valley. She viewed gender relations as fundamental to social structures of the Ndzunzda communities. Schoeman (1997: 79) notes that issues such as strong gender avoidance (*hlonipa*) were present within the Ndzundza Ndebele. Similar to numerous other precolonial farming communities of southern Africa, labour among the Ndzundza was also gendered. Thus, men constructed the stonewalled structures, arranged the layouts of their settlements, and created wooded frames for houses. Women, on the other hand, focused on agricultural production, did work that involved various types of plants, such as thatching houses, made ceramics and plastered houses (Schoeman 1997: 80).

Schoeman (1997: 80) argues that Ndzundza men had opportunities to express their cultural values and identity, and to negotiate their power relations through controlling settlement configurations. Women negotiated their power relations and expressed their identities through ceramic and wall decorations amongst other things. Within Ndzundza communities the construction of houses falls under men's control, while the configuration of the houses results from both male and female labour. The final appearance of the house was associated with women (Schoeman 1997: 80).

Schoeman (1997: 80) also contends that gender relations among Ndzundza Ndebele communities functioned within contexts of regional, economic and political processes. Intermarriage was common in Ndzundza communities, and women who had married into communities often networked widely outside of them in order to gain access to regional resources. In contrast, men determined group boundaries through settlement configurations (Schoeman 1997: 85). Thus, she (Schoeman 1997: 89) argues that the continuity in settlement configurations, structure and location of middens, and the designs of houses, in contrast to inconsistent house decorations and regional ceramic styles in the archaeological sequence of the Ndzundza Ndebele indicates an identity divergence between the genders of these communities.

Tiffany Henshall (2013) compared spatial configurations of four stonewalled homesteads at Komati Gorge Valley for her honour's projects, to consider gendered agricultural production practices, and the roles of women in Bokoni communities. Henshall's (2013: 40,42) data illustrated that women of Bokoni played a vital role in guaranteeing that agricultural productions sustained their families throughout the year, and that the created agricultural surpluses implied that some of the grains were traded. Henshall (2013: 42) further argues that the possibilities of women owning cattle at Bokoni implies that women potentially played noticeable roles in their communities rather than being dominated and oppressed by men. The roles women played at Bokoni might have influenced gender relations within their homesteads and their communities at large. She suggested that if women accumulated some form of power and respect as food producers, their daily existence would have not been oppressed (Henshall 2013: 42).

Several anthropological studies concerned with gender theory and gender relations in precolonial farming communities of South Africa contend that women played vital roles in their communities, and that the complexity of women's roles have been ignored in traditional approaches to labour in southern African communities (Bradford 1996; Hanretta 1998; Weir 2006). Jennifer Weir (2006: 6) argued that women with wealth and power acquired and accumulated cattle. This allowed them to participate in bride wealth exchange, and to marry wives of their own for labour purposes. Women marrying other women have been recorded for Zulu, Lovedu, Tonga, and Venda communities (Weir 2006: 6), but probably occurred more widely. Weir (2006: 8-15) also indicated that women played central political roles in their communities. These women held principal positions and exhibited leadership in political, military, and in ritual and religious matters. Zulu women also were commonly regarded as powerful in ritual and religious spheres, these practices included rainmaking, regulation of ritual medicine, and production of scared objects (Weir 2006: 10). Zulu women's connection to the natural world together with the spirit world allowed several of these women to become powerful diviners (Hanretta 1998: 392). Zulu women were involved in military matters. This included leadership roles, leading war purification rituals and battles, and spying (Weir 2006: 12). Henretta (1998: 394) contended that Zulu women might not have perceived themselves, or defined their lives as marginal.

Summary

The chapter started with a review of the archaeology of farming communities, who built in stone. I then reviewed archaeological, historical and anthropology case studies, which shared many commonalities. This includes livestock owned by men and women, but being managed by men, women being associated with domestic spaces and agricultural activities, and space being given cultural meaning through repeated action. Division of labour in relation to agricultural tasks is also common among farming communities, with men assisting women in clearing the agricultural fields, while women work the fields throughout the cultivation season. It also was noted that women have played political leadership and ritual roles. These labour patterns, which manifests on macro spatial scales, form the foundation for my approach to gender.

CHAPTER 3: METHODOLOGY

In order to study and understand the spatial configuration of Moxomatsi, I examined the site at three scales: a broader metropolitan scale, a town scale, and a homestead scale. I used four techniques to gather data. These were remote sensing and mapping, yield calculations, foot surveys, and excavations.

I start by discussing remote sensing.

Remote sensing and GIS

I used Google Earth satellite imagery, helicopter photographs, aerial photographs, and a photogram generated from drone photographs to comprehend the extent of the site, to understand the settlement patterns on a macro scale, and to count the individual stonewalled homesteads situated at Moxomatsi.

I used Google Earth satellite imagery and Agisoft software to demarcate and measure the terrace plots/agricultural fields, and to measure the diameters of homesteads situated at the main town/capital of Moxomatsi. Terrace plots/agricultural fields were measured to indicate how much land was used for cultivation and how much yield was produced on such lands. Homestead diameters were measured to demonstrate the household and domestic area sizes.

The helicopter photographs were taken in 2010 by Graeme Williams. Additional aerial photographs were taken in 2017 by Christoph Grützner with a drone, also referred to as a small unmanned aerial system (sUAS), unmanned aerial vehicle (UAV), or remotely piloted aircraft system (RPAS) (see Woodget *et al*. 2017: 2). The purpose of these aerial images was to perform 3D photogrammetric modelling, which was achieved using photogrammetric software Agisoft LLC, St Petersburg, Russia (see Rahaman & Champion 2019: 1840, Woodget *et al*. 2017: 5).

The Differential Global Positioning System (DGPS) was also used to map the excavated homesteads, excavations within the homesteads and additional features occurring within and proximate to the homesteads. DGPS mapping also supplemented aerial photographic data that were not visible on Google Earth and on aerial photographs.

Yield calculations

Agricultural yield calculations for Moxomatsi were guided by Henshall's (2013: 32-35, 2016: 99-109) work on agricultural yields for Bokoni sites. The average annual agricultural yield calculations for Moxomatsi were achieved using data from the Food and Agriculture Organisation of the United Nations and the International Food Policy Research Institute (Deb *et al*. 2004; Deosthale *et al*. 2012; Fermont & Benson 2011). These data were used to calculate average yields per square meter of terrace fields/agricultural fields and were used based on their reliability and relevance.

The formula used for average yield calculations was:

$$\textbf{Total production} = \sum \textbf{Crop Surface area} \times \mu \textbf{ yield}$$

Minimum and maximum values were calculated for each cultivated plant type, i.e. sorghum, pearl millet and finger millet as they were the types of crops cultivated by Bokoni communities at Moxomatsi (Collet 1979; Hattingh 2014), maize was probably not cultivated in the areas during these periods of occupation (*cf.* Beinart 2010).

Foot survey and site selection

The core settlement area of Moxomatsi is situated on Button farm on the western side of the R541 regional tar road, while the stonewalled settlements at the outskirts, which form small-scale clusters, small-sets and/or are isolated homesteads are located on the eastern side of the road (Fig. 1.2). The core area on the western side of the site is on state owned land, and getting an excavation permit for this part of Moxomatsi was not possible, because while verbal permission was obtained, a letter of permission that is required as part of the SAHRA permitting system could not be obtained. The eastern side, however, is owned privately. The owner of the Button farm, Mr Arahel Elijah Nhlapo, granted me permission to conduct my research on his portion of Button farm. An excavation permit (ID number 2563) was obtained from the South African Heritage Resources Agency (SAHRA).

Foot surveys were conducted to identify possible excavation sites, to clarify the spatial configurations of the stonewalled settlements and additional archaeology found at Moxomatsi. Surveys took place from the 26th of June to the 3rd of July 2017. The surveying team consisted of Keneiloe Molopyane, Kayla Mac Conachie, Kayla Morgan, Julia Pahl, Ronè Oberholzer, Botsisang Sebakeng and me.

We all carried Garmin Handheld GPSes to plot the stonewalled homesteads, terraces, and roads. We also mapped any additional archaeological features that we identified within the homesteads and other stonewalled structures. In addition, artefacts found on the surface throughout the landscape were plotted.

The homesteads and other identified artefacts were photographed using a Nikon D300 camera and a Canon EOS 600D camera. During the survey, notes were taken regarding the homesteads, and I roughly sketched the homesteads to record their spatial configurations.

The plotted coordinates were entered into an excel spreadsheet; coordinates were converted into decimal degrees so that they could be transferred into a Geographical Information System (GIS) programme.

The homesteads chosen for excavations are situated in a small cluster to the north of the core settlement area of Moxomatsi (Fig. 3.1). This cluster was chosen for excavations due to the presence of pottery, and its proximity to the settlement core (see Fig. 3.1). The homesteads targeted for excavation were named MX1 and MX3.

Figure 3.1: Google Earth image indicating where exactions were conducted in relation to the core of Moxomatsi

Excavations

Noting the resolution of the remote sensing data, excavations did not need to clarify the settlement pattern. Instead, excavations aimed at clarifying the use of domestic space and at obtaining comparative pottery samples. The first aim was not met because I was involved in a vehicle accident a few weeks after my initial excavation fieldwork, and as a result of a back injury I could not complete the excavations.

My excavation strategy to obtain pottery differed from that employed at other late farming community sites in the region (e.g. Schoeman 1997). Most Bokoni sites do not have middens, which are common on almost all farming community sites in South Africa. These middens play a role in signalling chiefly sites (e.g. Boeyens 2002, 2003; Schoeman 1997), and are frequently excavated by archaeologist to obtain pottery samples. Finding pottery is more difficult in Bokoni, because these sites in addition to not having middens, often do not have any surface artefacts. This pattern has been attributed to the use of household ash, which would contain broken pottery, as fertilizer on the terraces (Delius *et al.* 2012: 411). Most of the pottery found in Bokoni excavations originated from residential contexts (Schoeman personal communication 2020; also see Collett 1979).

Excavations at MX 1 targeted a concentration of ceramic sherds occurring on the surface of the enclosure. A 3 x 1 m excavation grid was placed in the enclosure. The trench was excavated in a checkerboard manner, thus only two 1 x 1 m squares were excavated, namely: III/C and V/C (Fig. 3.2).

After setting up the grid, a photograph was taken (Fig. 3.2). The surface was examined for artefacts and these were placed in labelled sample bags.

Figure 3.2: Image of grid at MX 1, photograph by A. Masolo

Photographs were also taken after the surface sweep, and photographs were taken at the end of each excavated layer. Ceramic sherds were noted within the walls of the enclosures of MX 1. These, however, were not collected from the walls.

Depth control of 5 cm spits was maintained until stratigraphy was identified. Moxomatsi has never been excavated before, therefore, excavations continued until ±35 cm at MX 1 to explore whether Moxomatsi had similar stratigraphy and occupational layers to other Bokoni archaeological sites.

Soil samples were collected from the centre of each excavated square. These samples were then placed in one litre soil sample bags. Soil sample collection method involved taking soil directly from the ground and placing it in soil sample bags. Soil samples were collected as part of general excavation procedures for Bokoni sites. They will be used for future research focused on phytolith, sedimentological and geo-archaeological analyses.

Excavated deposit was sieved through a 2 mm sieve, and the artefacts found while sieving were bagged and labelled accordingly. The sieved material was then placed in sorting trays and was also sorted on site. Artefacts found during the sorting processes were also bagged and labelled accordingly.

Excavations at homestead MX 3 focused on the domestic area. The trench at this homestead was excavated in a checkerboard manner. Initially, a 3 x 1 m grid was set (Fig. 3.3) and only two 1 x 1 m squares were excavated namely: XXIV/J and XXIV/L. There was a high accumulation of burrows resulting in heavily disturbed deposit in square XXIV/J. Thus, the grid was extended westwards and one square (XXV/M) of the extended grid was excavated.

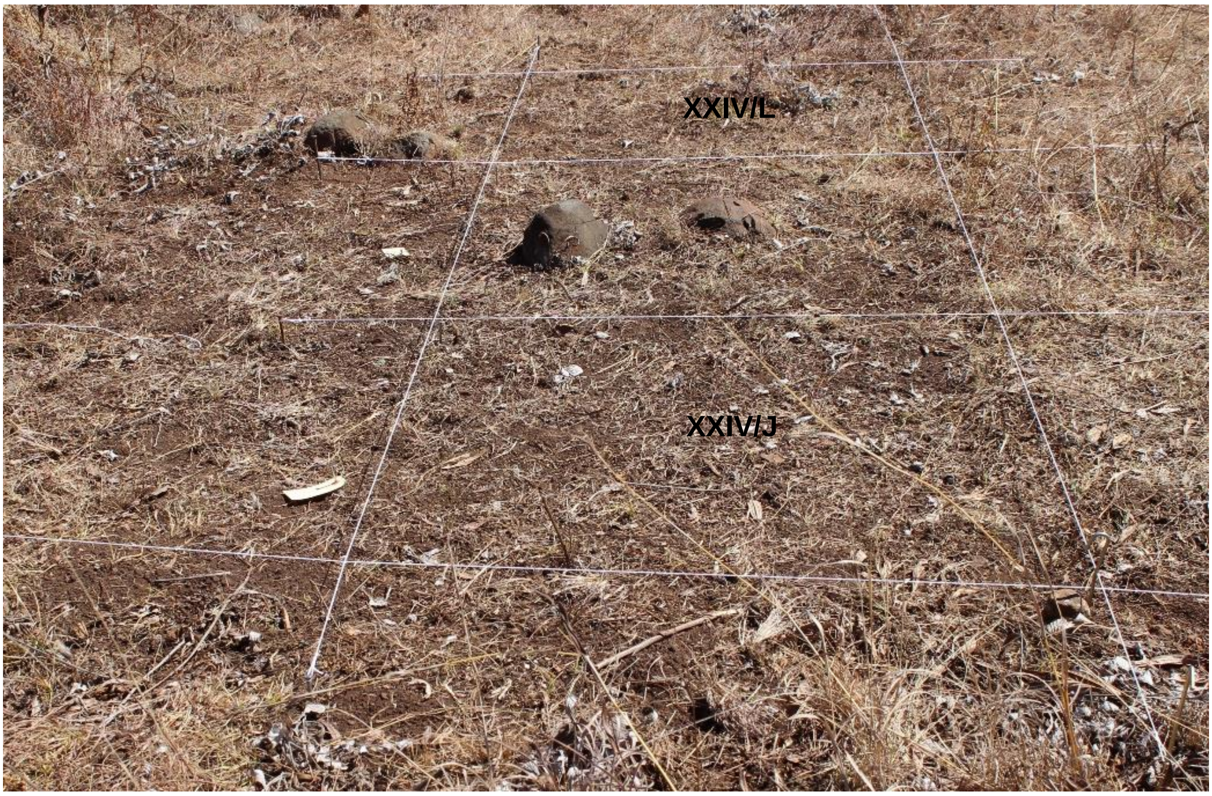

Figure 3.3: Image of grid at MX 3 before extension, photograph by A. Masolo

The excavation grid was photographed after being set for excavations (Fig. 3.3). The surface was examined for artefacts, and the artefacts found were bagged. Homestead MX 3 also had artefacts in the walls of the outer circular wall and inner circular enclosures. These artefacts were bagged and photographed.

The 1 x 1 m squares at homestead MX 3 were excavated to a maximum depth of 10 cm below the surface, because as discovered at MX 1, the occupational layers occurred between 0 – 10 cm below the surface. A stratigraphic depth control of 5 cm spits was maintained throughout due to lack of visible stratigraphy. Each layer was photographed prior to being excavated.

Artefacts found *in situ* during excavations were photographed in their respective contexts; they were also placed in labelled bags. The excavated deposit was sieved through a 2 mm sieve and sorted in sorting trays on site. Artefacts found while sieving and in sorting trays were placed in labelled bags.

The information and notes regarding the excavated 1 x 1 m squares at both homesteads MX 1 and MX 3 were recorded on standard Bokoni Farmscapes site recording sheets. Site recording sheets were filled in per excavated layer. The back of the site recording sheet comprised a drawing section which captures activities occurring at the top of each excavated layer horizontally. Each drawing on this section was drawn to scale. The deposit colour was described and recorded using the Munsell soil colour chart.

Analysis

All the collected artefacts were entered into an excel spreadsheet. The excel spreadsheet recorded the following information: the date on which the artefacts were found and bagged, the name of the homestead, the name of the excavated 1 x 1 m square, the context (layer) in which the artefacts were found, the type of artefact it is, and how many artefacts were there per bag.

The potsherds were washed in a sink with clean tap water using a toothbrush. Only the outside of wall of the sherds was thoroughly cleaned, and the inner part of the sherds was left untouched. The sherds were labelled using white PVA paint, and a Fabre-Castle TG1.S black ink pen. After being cleaned and labelled, the sherds were refitted, clear Bostic adhesive glue was used to stick parts that fit together, and the refitted pieces were left in an upright position in a plastic dish filled with sand to dry. Refitted potsherds were photographed after the refit process.

Photographing artefacts included using a photo stand and a Nikon camera. A measuring scale was placed adjacent to the artefacts during the photographing process. I also used GNU Image Manipulation Programme (GIMP) to edit the background of the photographed artefacts.

Pottery drawings followed standard South African conventions. Only diagnostic sherds were drawn. All drawings were drawn to scale.

Storage

After analyses and photographing processes artefacts were placed in their respective boxes. As per the permit agreement, at the completion of this project artefacts will be lodged in the regional recording centre at the Lydenburg Museum in Mpumalanga.

Integrating gender theory and method

I read gender at Moxomatsi through a gender theory lens. I focus on settlement layout and the different pace at which the homestead stone walls and terraces were constructed. There are no ethnographic accounts that inform on social relationships or labour in Bokoni. Consequently, I followed Beinart (2010) and chose to assume that the gendered division of labour observed in historical and ethnographic accounts throughout South Africa also applied here. I discussed these accounts in the literature review.

Limitations

Although Google Earth imagery is useful for aerial surveys of archaeological stonewalled settlements, it has its limits regarding detecting stone walls occurring beneath heavy vegetation and stone walls occurring at very low heights (see Sadr 2016, Coetzee 2016). Consequently, I might have missed several stonewalled homesteads while counting the homesteads occurring at Moxomatsi when using Google Earth.

While Agisoft software produces accurate 3D models through manipulating digital photographs, it is extremely challenging to create and complete a 3D model at once (see Rahaman & Champion 2019: 1840). Furthermore, photogrammetry also necessitates continuous image resolution and obtaining images at the lowest possible levels, and this can be problematic to acquire when using drones (Woodget *et al*. 2017: 4 *cf.* Banu *et al*. 2016: 558). The other constraint regarding drones is that they do not cover a wide range area in a single flight (Banu *et al*. 2016: 558).

Getting precise estimates for crop yields is difficult and challenging especially when working on small-holder African farming systems, attaining calculations and measurements for crop yields takes time, calculations and measurements are also susceptible to being biased (Fermont & Benson 2011).

There are about one thousand six hundred and nineteen stonewalled homesteads at Moxomatsi, and since this area has never been excavated before, excavating only two homesteads for this research amongst numerous other homesteads found at Moxomatsi do not portray an adequate representative sample of the homesteads in the area (see Seaman *et al*. 1999). It, however, would not be possible to excavate a representative sample during a masters degree. Choosing areas in which to excavate indicates to certain levels of sample biases (see Woodman 1981).

CHAPTER 4: RESULTS

This chapter provides a detailed description of Moxomatsi, beginning from a broad regional scale, followed by a town/capital scale, and ends with excavations and gender. The data presented in this chapter were gathered through remote sensing and mapping, foot surveying, calculating yield productions, and excavations.

Greater Moxomatsi: Metropolitan Scale

Moxomatsi extends from southeast to east of eNtokozweni, situated upslope of Leeuspruit stream, a tributary of the Elands River, in the Mpumalanga province (Fig. 4.1). The stonewalled settlements at the core of Moxomatsi are situated on an erosional slope above the Rietvleispruit stream, a distributary stream of both the Leeuspruit and Elands River.

The topography of Moxomatsi comprises gently undulating slopes, and according to the geology map provided by Council of Geosciences (2008), the dominant geology of the area includes conglomerate, quartzite, dolomite, iron formation, chert, shale, quartzite (base), gabbro, granite, andesite, dionite, and dolerite.

Moxomatsi sits in the grassland biome, categorised as the Mesic Highveld Grassland Bioregion: Gm 18 Lydenburg Montane Grassland (Mucina *et al*. 2006a; Mucina *et al*. 2006b: 405). This biome covers from Pilgrimsrest in the north, stretching southwards and westwards bypassing Mashishing, and also extending to Dullstroom, Belfast, eNtokozweni, and Emgwenya (formerly Waterval Boven) of Mpumalanga—the low-lying areas of this biome consist of dominant grasses, grass swards, and forb species (Mucina *et al*. 2006b: 405).

More than one thousand six-hundred and nineteen (1 619) stonewalled homesteads with a density of about 50 – 60 sites/km^2 (Coetzee 2016: 99) have been counted at Moxomatsi, the core of the complex is a densely clustered urban centre, and the density decreases proportionally as one moves away from high-density core area. Some of the settlements surrounding the core settlement area comprise small-scale concentrated clusters of stonewalled settlements while other and/or the rest of the stonewalled settlements consist of scattered homesteads.

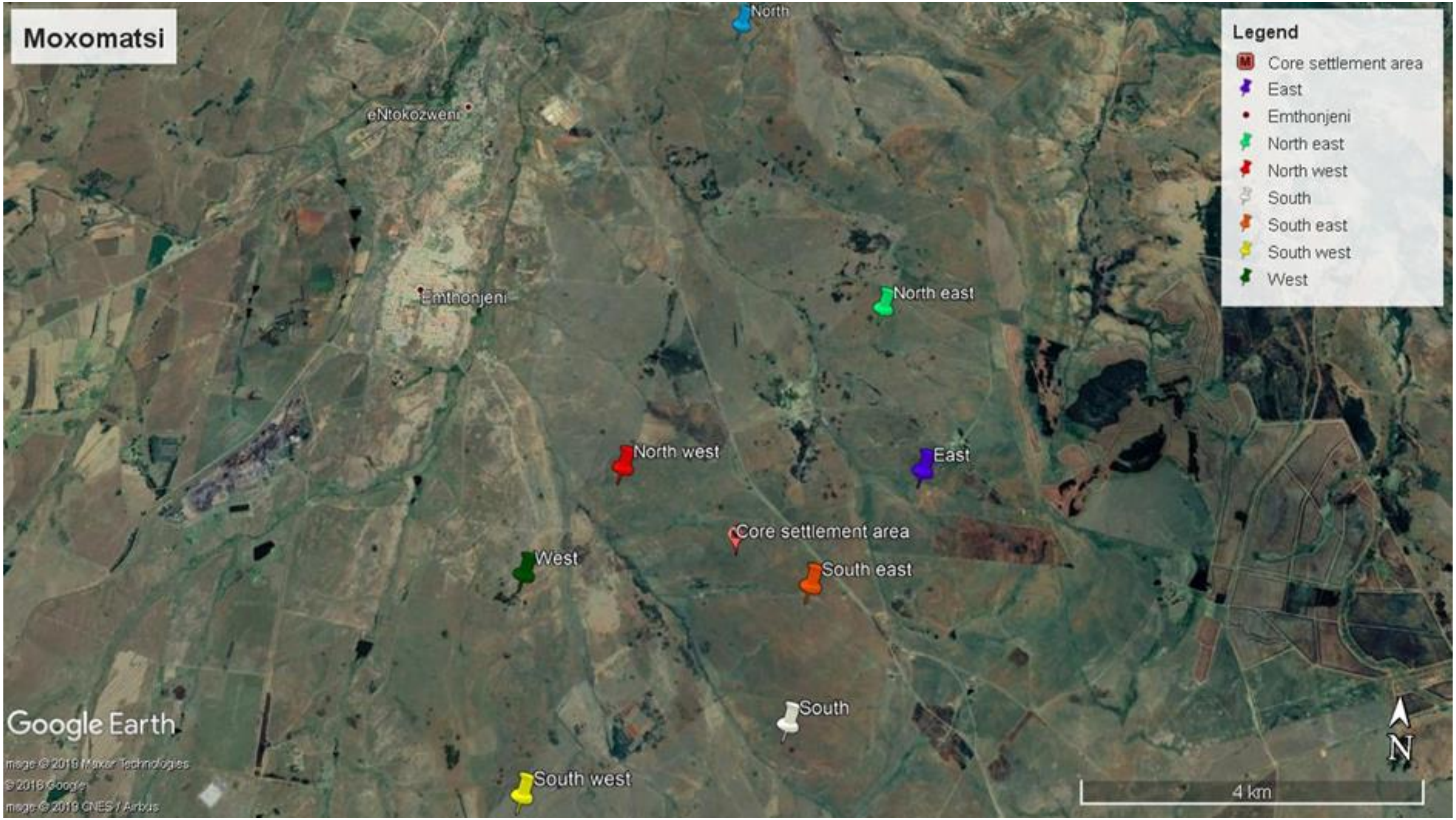

Figure 4.1: Google Earth image illustrating homesteads in relation to those at the core settlement area/main town of Moxomatsi

I have separated the stonewalled settlements into different zones in order to understand the nature of the stonewalled settlement densities in relation to the main town/core settlement area of Moxomatsi. I begin with presenting the northern and north-eastern zone.

Northern and north-eastern zone

Stonewalled settlements clustered to the north and northeast of the main town/core varies. These clusters include small homestead clusters, small homestead sets, and isolated homesteads.

Stonewalled homesteads occurring in small clusters appear similar to those located at the core of Moxomatsi. These homesteads follow a range of configuration patterns, such as having one outer circular wall with one or more central enclosures (Fig. 4.2: A) and having one large circular enclosure with smaller enclosures attached to it (Fig. 4.2: B). These small clusters are interlinked through roads that connect the homesteads and intersect through terraced fields (Fig. 4.2: C). Dense terraces occur in this zone (Fig. 4.2: D).

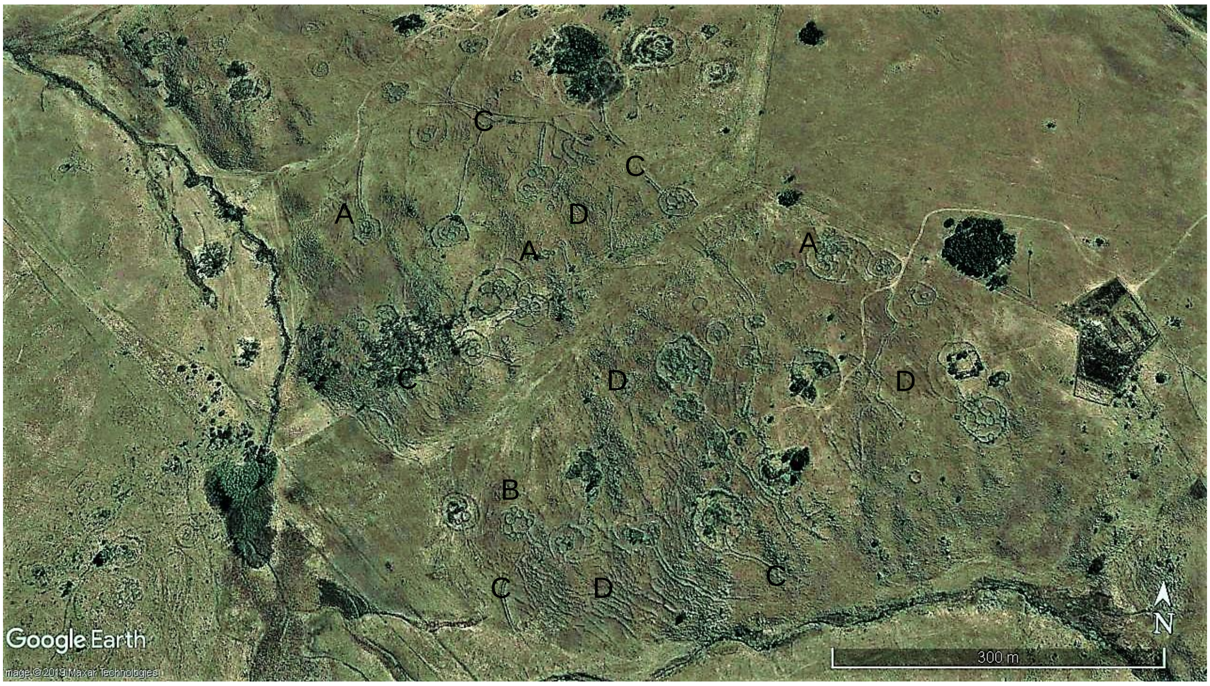

Figure 4.2: Google Earth illustrating small-scale stonewalled settlement clusters

North-western zone

Homesteads situated to the northwest of the core of Moxomatsi comprise settlement clusters that range between 399.22 m and 1 393.08 m in length. There are one hundred and twenty-seven homesteads in the north-western zone. These include homesteads consisting of an outer circular wall with one or multiple central circular enclosures at the centre (e.g. Fig. 4.3: A, B).

Seven homesteads comprise multiple smaller enclosures attached to one large central enclosure. At the centre of this cluster is a very large homestead with a diameter measurement of 109 metres that has thirty-three multiple circular enclosures attached to one another (Fig. 4.3: C). There is one road branching off from this cluster of enclosures (Fig. 4.3: D).

There are homesteads in this zone in which the outer walls of the homesteads are attached to one another (Fig. 4.3: E). Some of the homesteads are also interconnected by roads (Fig. 4.3: F), and there are also numerous terraces (Fig. 4.3: G).

Figure 4.3: Google Earth image illustrating stonewalled settlements in the north-west of the core of Moxomatsi

Eastern and south-eastern zone

Homesteads located to the southeast and east of the main town are not densely clustered. These homesteads do not have roads and terraces visible on Google Earth. The homestead layout varies. There are ten homesteads with an outer circular wall with only one central enclosure (Fig. 4.4: A). Five have multiple enclosures, one of them has central enclosures arranged in a string of pearls configuration (Fig. 4.4: B; also see Maggs 1976a: 321-322; Maggs 1976b: 33-37). Several homesteads are configured in the most common settlement pattern that comprises multiple central enclosures within an outer circular wall (Fig. 4.4: C).

Figure 4.4: Google Earth image illustrating stonewalled settlements in the south of the core of Moxomatsi

Western and south-western zone

Stonewalled settlements situated in the southwest and west of the core also form clusters; these are between 238.43 m and 958.43 m in length. The layout of these stonewalled homesteads also varies. Eighty-two homesteads were built in the most common settlement layout at Moxomatsi, which comprises an outer circular wall with singular or multiple central circular enclosures at their centre (Fig. 4.5: A). There are ten homesteads that consist of a large central enclosure with multiple smaller enclosures attached to the outside of the central enclosure (Fig. 4.5: B).

There are also two homesteads attached to one another, with a road structure extending from both of these homesteads (Fig. 4.5: D) in the south-western zone, one of these homesteads is composed of one central enclosure with rectangular and/or trapezoid features occurring in a radial pattern following the convention of central enclosures (Fig. 4.5: H).

Forty-two homesteads in the south-western and western area are also attached to one another for instance; an outer wall of one homestead is attached to an outer circular wall of another homestead (Fig. 4.5: C, E). Further south of this cluster of Fig 4.5, are stonewalled structures composed of multiple (about eight) homesteads attached to one another, forming an extended line towards the south of this settlement, and three of these homesteads towards the southern area seem to have low lying stonewalling and walls become high again in the last two homesteads (Fig. 4.6). The low-lying stone walls seem to represent earlier settlement structure(s).

The configuration of these homesteads includes two small central enclosures linked through stone lines with prominent walls present (Fig. 4.6: A). The other attached homestead, consists of one central enclosure with three stone lines attached to the outside wall of the central enclosure and inner parts of the perimeter wall (Fig. 4.6: B). More stone lines might be present, unfortunately there are trees obscuring this homestead cluster. Furthermore, stone lines might represent domestic spaces of this homestead, however, other stone lines in domestic spaces are less apparent than these stone lines on satellite imagery.

On the eastern side of the homestead with prominent stone lines, is a large circular wall structure. This homestead is missing central enclosures (Fig. 4.6: C). One of the homesteads in the southernmost line of these settlements has a line constructed through the enclosure (Fig. 4.6: D).

Roads interconnect several of the western and south-western homesteads (Fig. 4.5: F). There are, however, homesteads that do not appear to be linked into the road network. Terraces also occur alongside these homesteads (Fig. 4.5: G), although the terraces here are not as intensive as those found at the core settlement area. The settlement density of these homesteads decreases westwards, and the frequency of scattered and isolated homesteads increases.

Figure 4.5: Google Earth image illustrating stonewalled settlements in the south west of the core of Moxomatsi

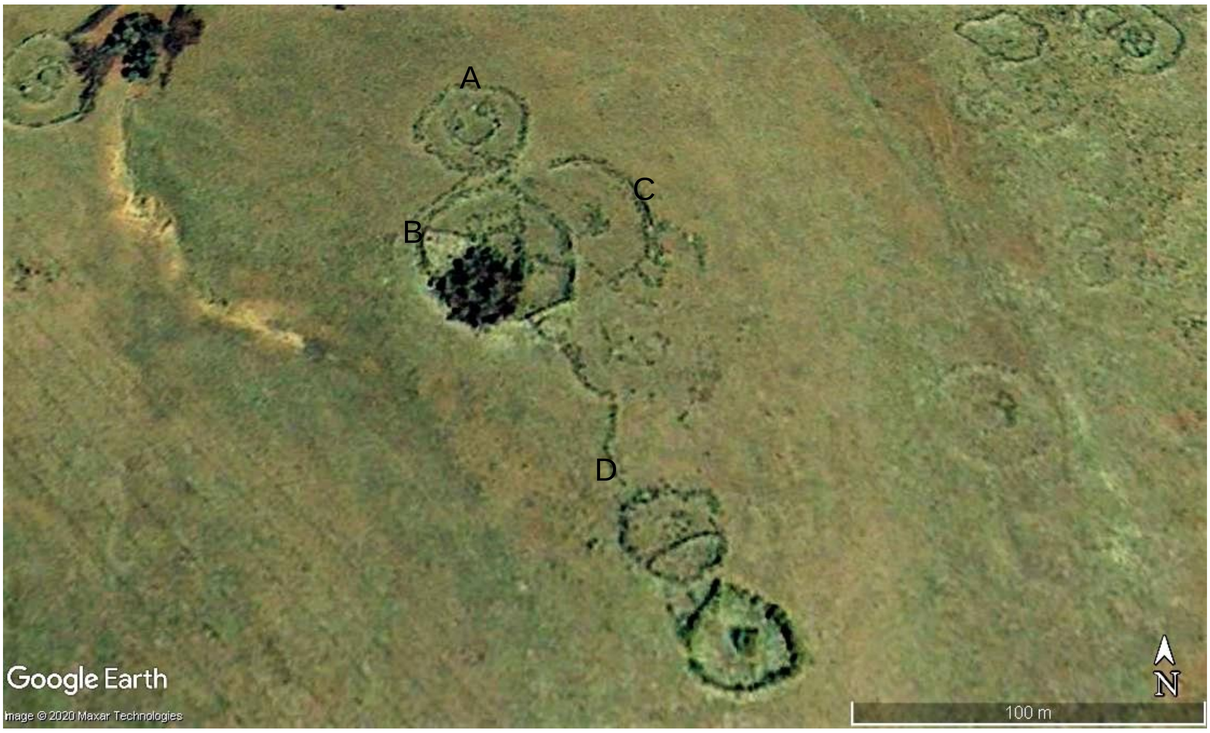

Figure 4.6: Google Earth image illustrating unconventional homesteads in Moxomatsi south western zone

Southern zone

Twenty-five homestead clusters are situated in the southern zone. Clusters to the south of the core settlement area are between 143.91 m and 1 066.78 m in length. Homesteads in these clusters comprise an outer circular wall with either one, or multiple smaller enclosures at their centre (Fig. 4.7: A, B). Some of the homesteads at the margin also have additional smaller enclosures near them (Fig. 4.7: C).

There are instances where homesteads comprise a large central enclosure with one, or multiple smaller enclosures attached to the outside of the enclosures. The secondary homesteads are linked into the road system through their own roads (e.g. Fig. 4.7: D). Homesteads also comprise clusters of central enclosures without perimeter walls (e.g. Fig. 4.7: E). These are linked into the road system (e.g. Fig. 4.7: F). There are about twelve scattered homesteads in the southern cluster, the distance between these homesteads increase as one shifts further away from the main town.

Figure 4.7: Google Earth image illustrating stonewalled settlements in the south of the core of Moxomatsi

Small sets and scattered homesteads

Homesteads occur in small sets and become scattered at the peripheries of these small set clusters. The layouts of the homesteads vary. Fifty homesteads consist of outer circular walls with one or more central enclosures (Fig. 4.8: A, B). About six homesteads do not have perimeter walls (Fig. 4.8: C). There are also isolated, single enclosures with no additional features along the escarpment (Fig. 4.8: D).

Roads are present (Fig. 4.8: E), and terraces occur alongside some homesteads (Fig. 4.8: F). Ten homesteads have one or none of the previously mentioned features (i.e. some homesteads have missing perimeter walls, roads or terraces), notably, the homestead amounts could be inaccurate as there are other homesteads situated beneath trees and high vegetative areas making it impossible to see the stonewalling features present. There is a small number of rectangular stonewalled ruins scattered throughout Moxomatsi.

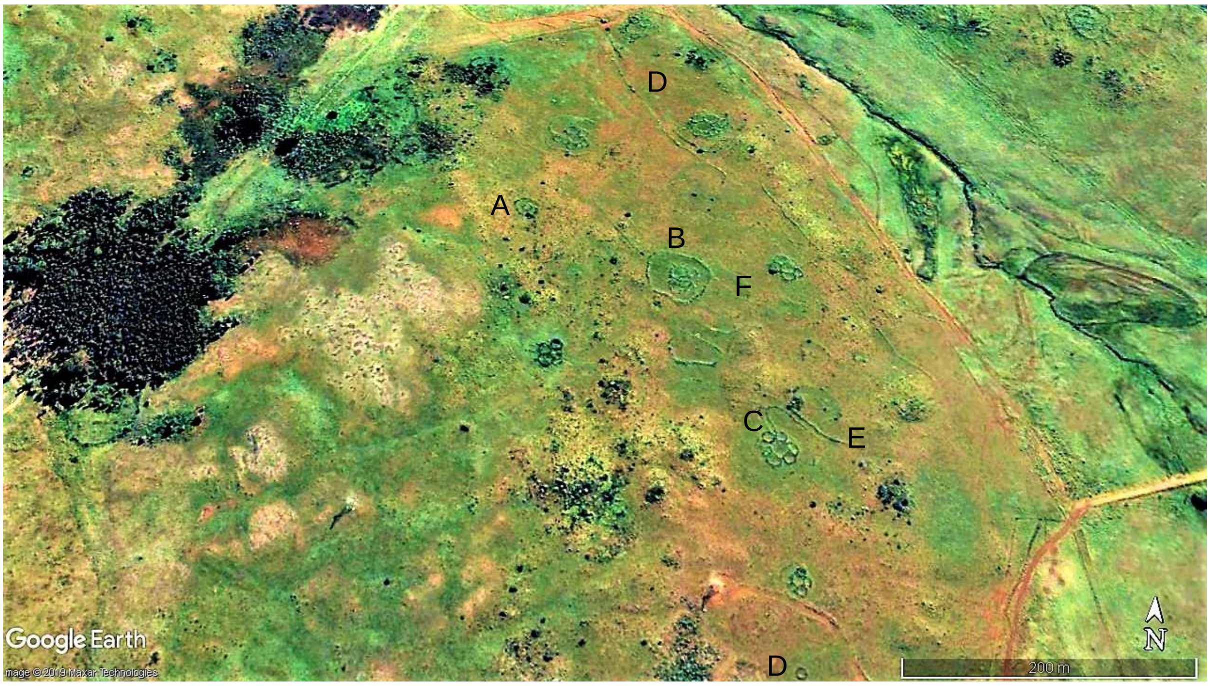

Figure 4.8: Google Earth image illustrating stonewalled settlements located on the outskirts of small-scale clusters

Wall construction and preservation

The homestead and road walls were constructed using double rows of diabase rocks with small stone infill. In addition to rounded diabase rocks, archaeological artefacts, such as potsherds, bored stones, upper grindstones, and lower grindstones, were used in the construction of homestead stone walls. Terrace edges range from single rows of stone to double stone row terrace walls.

The height and width of stone walls at Moxomatsi vary throughout the site (Fig. 4. 9, shows an example of wall height). The variability is due to construction methods, as well as preservation factors. Preservation of the stonewalled ruins varies throughout Moxomatsi (Fig. 4.9).

Figure 4.9: Image illustrating stone wall height Ronè Oberholzer acting as scale, photograph by K. Mac Conachie

Rocky outcrops

There are rocky diabase outcrops to the north, and northeast of the main town. These spaces were used for processing food, as can be seen in smoothened patches on some of the rocks (Fig. 4.10: A). Construction also took place in these areas, for example a low stonewalled line forming a path/road through the outcrop (Fig. 4.11: B).

Figure 4.10: Image illustrating the smoothened and shiny surface found at the outcrops indicated by letters A, photograph by A. Masolo

Figure 4.11: Image illustrating the stonewalled lines occurring on the surface of the outcrops indicated by letters B, photograph by A. Masolo

Moxomatsi: Main town

The homesteads in the main town at the core of Moxomatsi are densely clustered (Figs 4.12, 4.13). The homesteads (Fig. 4.13: A, B and C) are surrounded by terraces (Fig. 4.13: D) and are

Figure 4.12: A photogram of Moxomatsi constructed from drone photographs taken by Christoph Grützner

linked through roads (Fig. 4.13: E). The main town is 0.92 km^2 in size with of one hundred and eighty-two (182) homesteads.

These homesteads are not uniform in layout. One hundred and twenty-five of these homesteads have an outer circular wall with one or more enclosures at their centre (Fig. 4.13: A). Seventeen homesteads consist of smaller semi-circular enclosures attached to the outside of a large perimeter wall (Fig. 4.13: B). Two homesteads do not have perimeter walls (Fig. 4.13: C). The terraces are built immediately adjacent the homesteads (Fig 4.13: D). The boundaries of terrace clusters are defined by roads and boundary walls. There are also single stonewalled lines that run perpendicularly across terraced plots (e.g. Fig 4.13: F). Similar to the homesteads, the intensity of the terraced plots declines towards the outskirts of the centre of the settlement.

The road network is extensive and connects homesteads to one another and the areas around the town centre, such as the stream downslope. These roads intersect the terraced fields and would have ensured that animals and people did not stray onto the terraced gardens and fields (Fig. 4.13). Notably, the intensiveness of the roads decreases at the peripheries of the core settlement area.

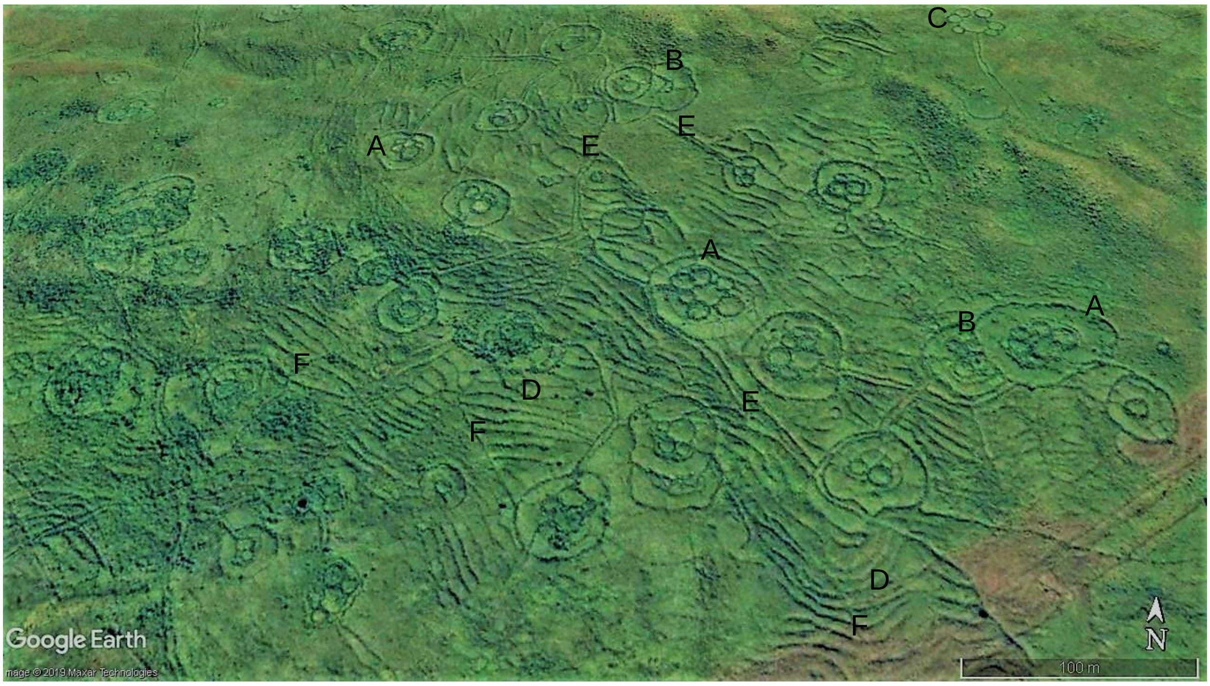

Figure 4.13: Google Earth image illustrating stonewalled settlement configurations at the core of Moxomatsi

Moxomatsi is currently divided into two sections due to the construction of the R 541 regional tar road. This road cuts through numerous stonewalled settlements (e.g. Fig. 4.14: A). In addition to the tar road, historical and contemporary buildings, structures, farm roads and farming activities have impacted the sites, and some homesteads have been destroyed. Thus, the authenticity of the site is skewed to some degree.

Figure 4.14: Google Earth image illustrating the occurrence of the R 541 regional tar road cutting through Moxomatsi

Surface areas and calculations

<u>Population size</u>

The population size of the Moxomatsi metropolitan area, including its main town was calculated using Marker and Evers' (1976: 160) formula for the human population that inhabited the stonewalled settlements at the Lydenburg Valley. They (Marker and Evers 1976) estimated each Bokoni homestead to be inhabited by 10-30 individuals, therefore, amounting to a population size of between 19 000 and 57 000. This figure would have included adults and children, but probably significantly overestimated the population (see Chirikure *et al*. 2017 for a more detailed critique of 20th century population estimates at Great Zimbabwe).

A total number of 1 619 stonewalled settlements have been tallied for Moxomatsi, with about 182 of these being in the core/main town. Therefore, presupposing that 10-30 individuals inhabited 1 619 settlements of the Moxomatsi region and 182 settlements of the main town, equates to between 16 190-48 570 people inhabiting Moxomatsi regionally, and between 1 820-5 460 people inhabiting the main town area of Moxomatsi. It is likely that the upper range significantly over estimates the population of Moxomatsi. Noting the size of homesteads at Moxomatsi, I am inclined to favour the lower spectrum of these values.

Surface Area

At the core settlement area of Moxomatsi, surface area measurements and calculations were achieved through following the distinct terrace shape or form, and in cases when terraces were divided with stones lines those division lines were also taken into consideration (Fig. 4.15). Measurements and calculations were conducted through the use of Google Earth satellite imagery and Agisoft photogrammetry software tool box. Since these measurements were conducted through software programmes, some of these terraces might have not been accurately measured, due to several demarcations not being clear on these platforms. Surface area measurements listed in Appendix A: Table A.1 were used to calculate the average yields of Moxomatsi agricultural fields.

Yield calculations

The community of Moxomatsi were agriculturalists and the number of people that lived in the area had an impact on the totality of the land available for cultivation (*cf*. Marker and Evers 1976). As a result, 63 terrace/agricultural plots were tallied at the core settlement area, and 23 of these terrace plots were further subdivided following the division lines that run through them (Fig. 4.15). The purpose of counting and demarcating these terraces was to determine the surface areas of the agricultural fields/terrace plots. The surface areas of these plots are crucial in calculating how much agricultural produce yielded from these fields.

The total production was calculated through multiplying the total surface area of the terrace/agricultural plot under consideration by the average yield of selected crops. The formula is as follows:

Total production = ∑ Crop Surface area x μ yield

Average yield calculations are conducted to determine specific crop yields per square meter of agricultural/terrace plots. The crops considered for these calculations include sorghum, pearl millet and finger millet because these are the types of domestic plants cultivated by people of Bokoni (Hattingh 2014). Maize was not included in these calculations as it is unlikely to have been present during this occupation phase (*cf*. Beinart 2010). Following Henshall's (2013, 2016) approach, International Food Policy Research Institute (Fermont & Benson 2011), and the Food and Agriculture Organization of the United Nations (Deb *et al*. 2012; Deosthale *et al*. 2012; du Plessis 2008) calculation formula and data were used.

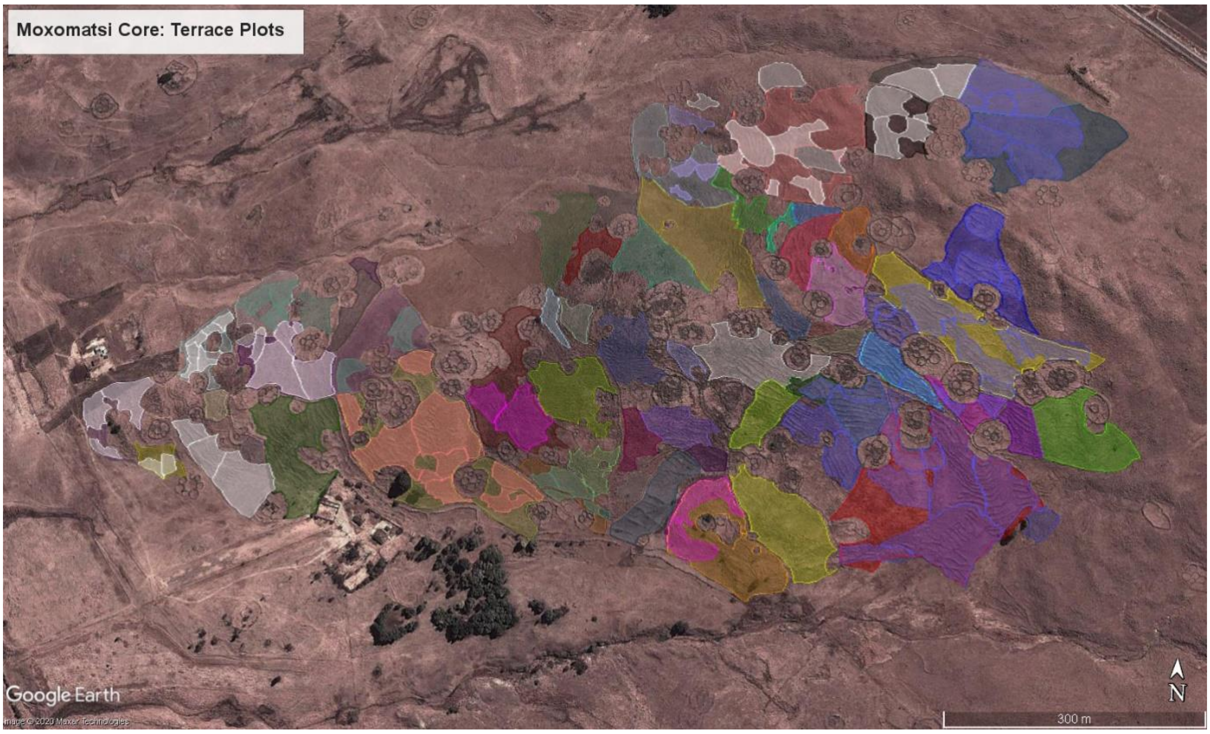

Figure 4.15: Google Earth image illustrating demarcations of terrace plots at the core of Moxomatsi

Two values were calculated for each demarcated terrace/agricultural plot. These are minimum yield potential, as well as maximum yield potential for each type of cultivated domestic plant (Appendix A: Table A.1). Minimum and maximum values demonstrate the average yields produced by inhabitants of Moxomatsi. Tanya Hattingh's (2014) study on phytoliths in Bokoni regions illustrates the expected average rainfall to be 770 mm per annum and climate in Bokoni areas to have been moderate. Plants are affected variedly by changes in rainfall depending on what type of plant species they are.

Overall sorghum has the highest yield potential when compared with pearl and finger millet crops (Figs 4.16, 4.19). Within the maximum ranges, the highest calculated value of sorghum is 8 489.72 kg and the lowest calculated value within the minimum values is 15.02 kg (Appendix A: Table A.1). The average for the maximum values for sorghum calculates to 989.67 kg while the average for the minimum values calculates to 198.98 kg per homestead.

Studies carried out by the International Crop Research Institute for the Semi-Arid Tropics indicate that the average adult human consumes between 65 kg and 100 kg of crops per annum (Deb *et al*. 2004; Deosthale *et al*. 2012). According to these calculations the maximum number of people sustainable per average homestead at Moxomatsi would be between ten to fifteen per homestead for maximum yields, and one to three per homestead for minimum yields (Appendix A: Table A.2). Thus, at best sorghum cultivated in the mapped Moxomatsi town terraces could support between 1 296 and 1 995 people per annum.

Pearl millet yields have a lower average yield than sorghum (Figs 4.17, 4.19). Within the maximum ranges, the highest calculated yield for a terrace field under pearl millet is 5 943.25 kg whilst the lowest minimum value is 9.35 kg (Appendix A: Table A.1). The average for the maximum values calculated to 692.82 kg while the average to the minimum values calculates to 138.55 kg. At consumption of between 65 and 100 kg per annum per person, at the minimum yields, the average terraced field would support one to two people per annum per field, and an average of seven to ten people could be sustained per homestead on the maximum yields (Appendix A: Table A.2). This means that the maximum number of people who could sustain themselves on pearl millet in the maximum yield scenarios at the Moxomatsi main town would range between 908 and 1 396 individuals.

Finger millet has the lowest average yield compared to sorghum and pearl millet (Figs 4.18, 4.19). Within the maximum ranges, the highest calculated yield for finger millet are 3 934.5 kg whilst the lowest minimum value was 12.51 kg (Appendix A: Table A.1). The average for the maximum values calculated to 458.66 kg while average for minimum values calculated to 185.40 kg. Calculations for determining numbers of people sustainable at consumption rates of 65 to 100 kg per annum, show that at maximum yields five to seven people would be sustained per average terrace field and two to three people per terrace field per annum at minimum yields (Appendix A: Table A.2). Consequently, 601 to 924 people would be able to be sustained per annum on finger millet cultivated in the visible terraces at the Moxomatsi main town.

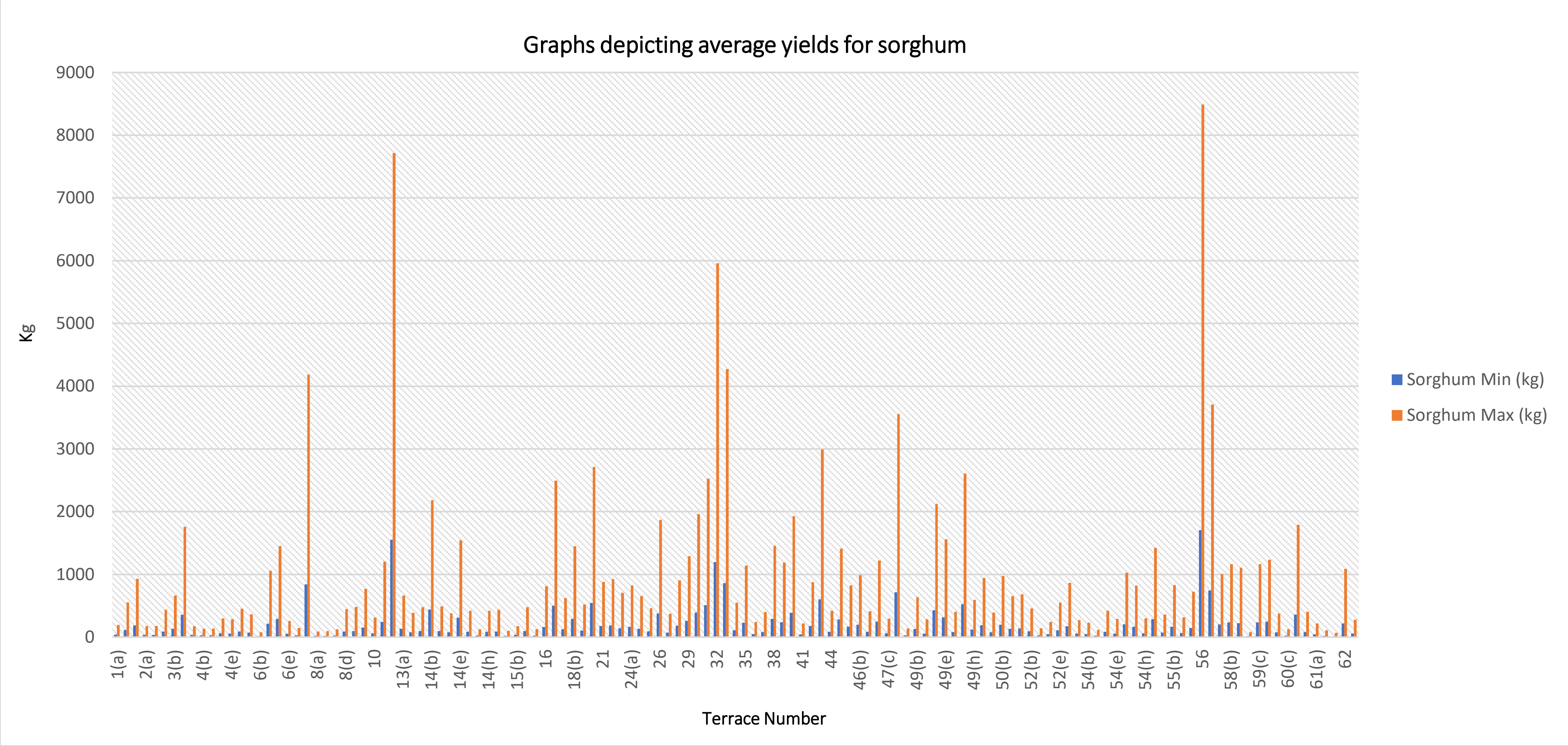

Figure 4.16: Graph depicting average yields for sorghum for demarcated terraces

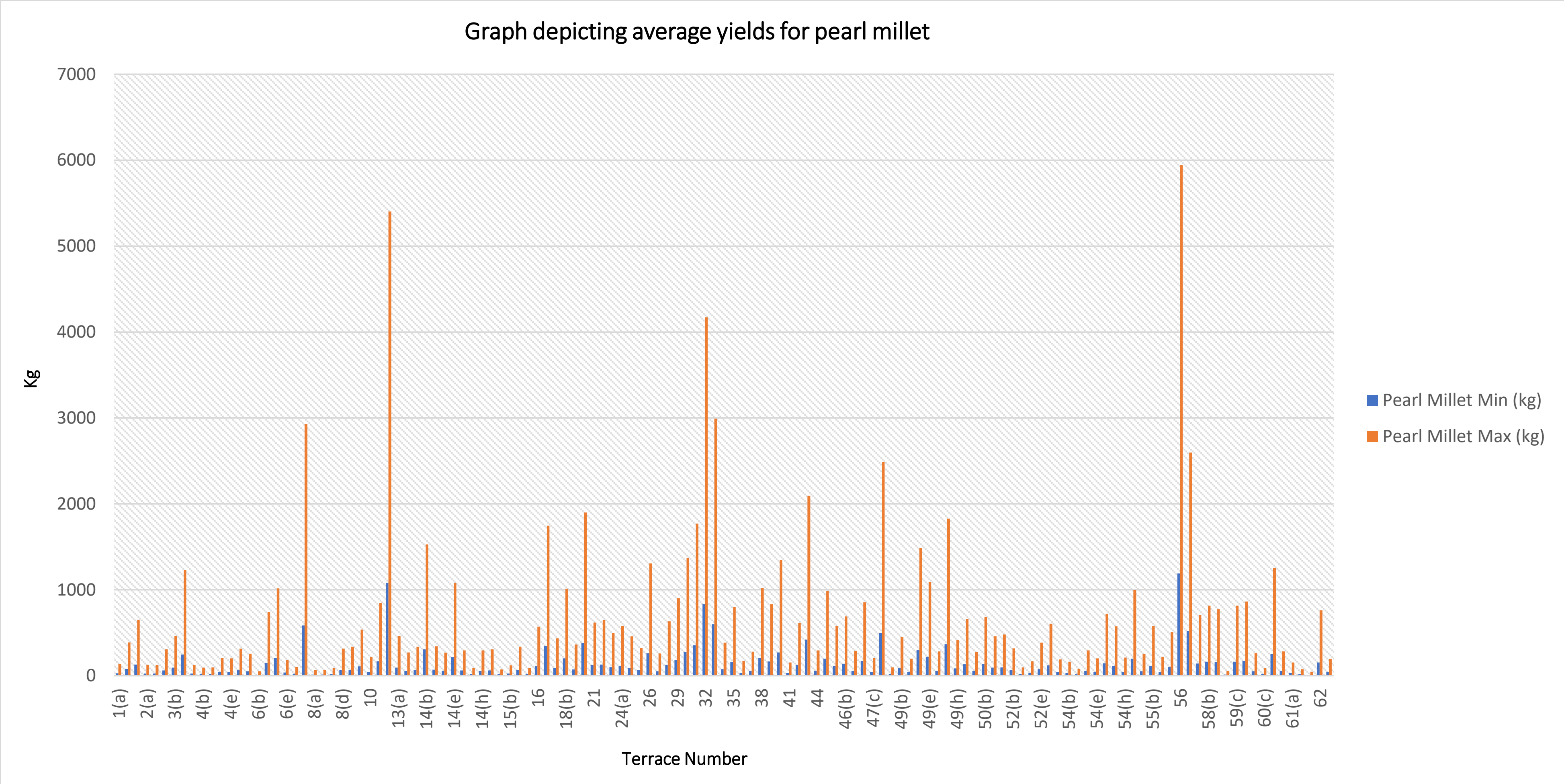

Figure 4.17: Graph depicting average yields for pearl millet for demarcated terraces

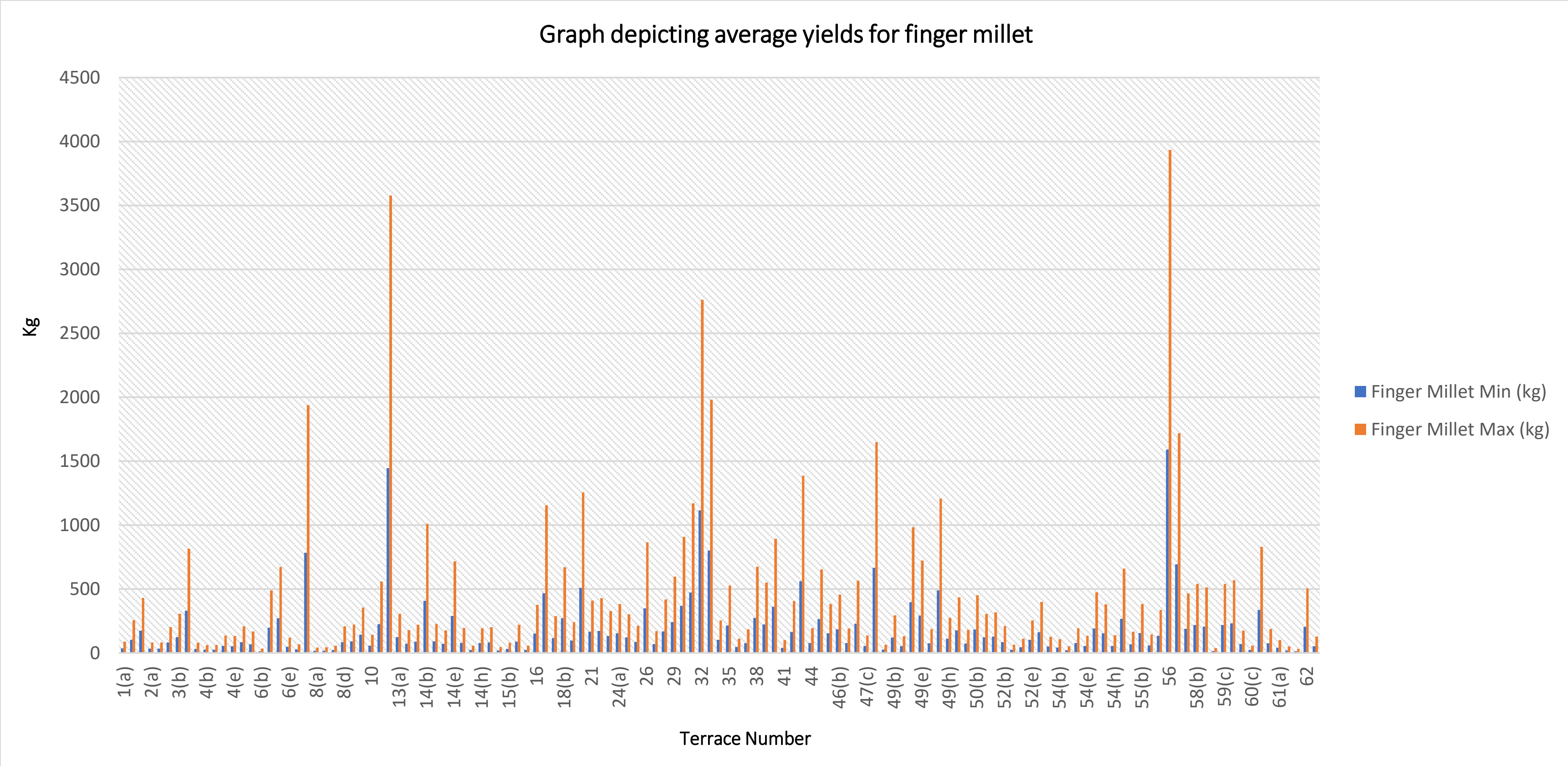

Figure 4.18: Graph depicting average yields for finger millet for demarcated terraces

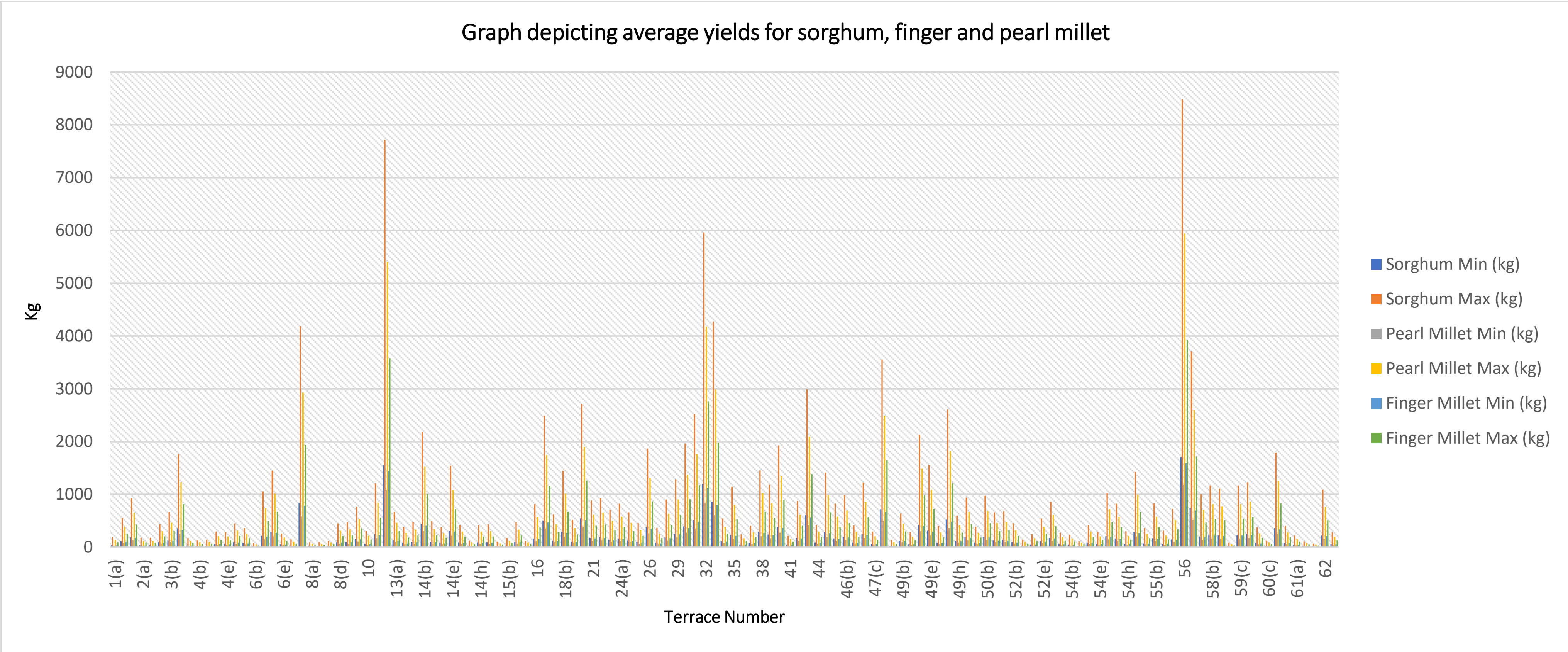

Figure 4.19: Graph depicting average yields for sorghum, finger and pearl millet

Excavations

Homestead MX 1

Ms Kayla Mac Conachie and I conducted the excavations from the 28th of August to the 8th of September 2017. As discussed in the methodology, excavations took place in homesteads near the R 541 regional tar road as these homesteads were the nearest to the core settlement area available to excavate. The two excavated homesteads were named: MX 1 and MX 3 (Fig. 4.20).

Figure 4.20: Google Earth image showing excavated homesteads and excavated areas of MX 1 and MX 3

Homestead MX 1 comprises three lobes attached to one another; these lobes characterise the enclosures usually found in the centre of an outer circular wall structure. The outer circular wall is, however, not present at MX 1. The stone walls at MX 1 are still intact and are about a meter high. No entrances were identified at these ruins of MX 1, the stones might have collapsed in the entrance through time.

Terraced plots are also found occurring alongside the enclosures of MX 1. The terraced slope is not steep and the terrace walls are not high as the walls are almost covered by the surface soil.

<u>Excavations at MX 1</u>

Description

The grid that marked the excavation area was placed in one enclosure (Figs 4.20: A; 4.21). The grid was set in this enclosure due to a high presence of ceramic sherds on the surface of the enclosure (Fig. 4.22: Blue Circles). Since Moxomatsi had not been excavated before, MX 1 was excavated to test its extensiveness and to establish how far down the occupational layers measured below the surface.

Excavations at MX 1 comprised a 3 x 1 m trench. The trench was excavated in a checkerboard manner. Thus, only two 1 x 1 m squares were excavated, namely square III/C and V/C, leaving the square in their centre unexcavated.

A stratigraphic depth control of 5 cm was maintained during excavations, unless stratigraphy was identified. The Munsell Soil Colour Chart was used to establish the colour of the soils.

Walls of homestead MX 1

Numerous ceramic sherds were spotted in the stone walls of the enclosures of homestead MX 1; however, these ceramic sherds were neither collected nor photographed as they were discovered post the survey and excavation period.

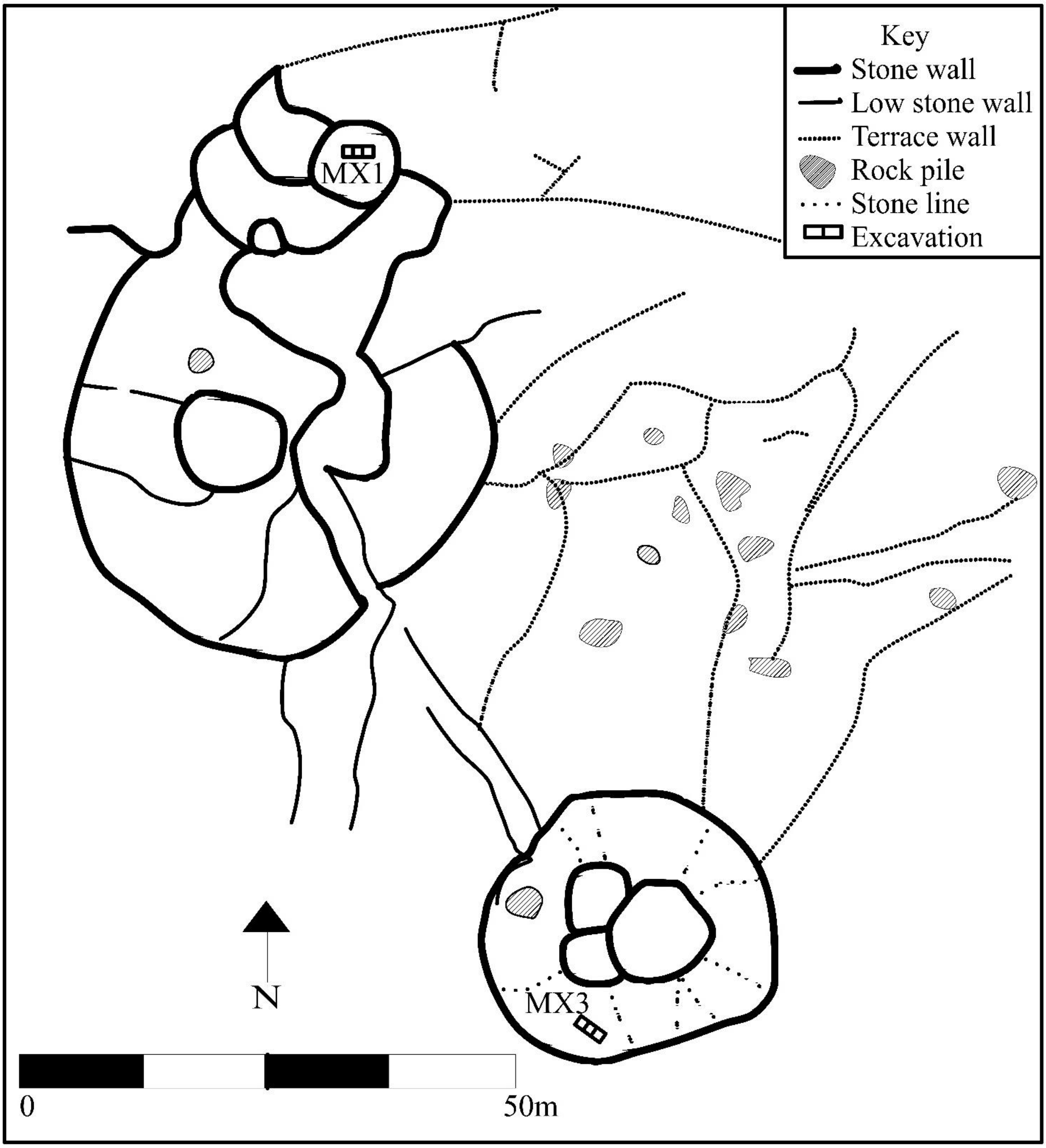

Figure 4.21: DGPS plan of MX1 and MX3 showing the location of the trenches

III/C

The surface of square III/C yielded 56 ceramic sherds (Fig. 4.22). No archaeological features were present in square III/C. The surface material was loose and non-compacted. The soil type was silty loam at the surface and the texture was fine-grained. The soil colour was recorded as 5YR 2.5/1 Black. The deposit was poorly sorted with several rocks (less than 8 cm in size) present.

Figure 4.22: Photograph of square III/C with blue circles indicating the area of square highly concentrated with ceramic sherds, photograph by A. Masolo

The soil colour following the surface remained 5YR 2.5/1 Black, this colour occurred until a depth of ±10 cm below the surface. The soil became moist and medium in compaction with an increase in depth below the surface. The soil also became a mixture of sandy and loamy soils with bits of clay soils present until ±10 cm depth was reached. Grass and plant roots were also present in this ±10 cm layer (Fig. 4.23).

Importantly, this ±10 cm layer yielded a total of 153 ceramic sherds, no other archaeological artefacts yielded from square III/C. Square III/C became sterile with an increase in depth, therefore, no archaeological artefacts yielded beyond ±10 cm depth below the surface.

Figure 4.23: Photograph of rocky layer in square III/C, photograph by A. Masolo

The layer with 5YR 2.5/1 Black soil colour was followed by a layer of rocks of varied sizes between 0.5-30 cm (Fig. 4.24). This rocky layer was characterised as 5YR ¾ Dark Reddish-Brown colour. This soil colour is similar to the colour of the rocks found in this layer. The texture of the soil was course and grainy, the soil became mixed with particles that fell off the rocks. The soil in this layer was moist with minimal grass roots; the soil also became highly compacted. The presence of rocks also decreased with increase in depth. This rocky layer ceased at ±25 cm depth below the surface.

Figure 4.24: Photograph of clay soil layer and the stratigraphy in square III/C, photograph by A. Masolo

A clay soil layer was exposed after the rocky 5YR ¾ Dark Reddish-Brown layer (Fig. 4.24). The colour of the clay soil was 5YR Dark Reddish Brown. The soil texture was rough and grainy as it was damp and moist; the deposit was highly compacted in this layer. Excavations stopped at the bottom of this layer at ±30 cm below the surface.

V/C

The surface of square V/C was largely covered by dry grass (Fig. 4.25). No archaeological artefacts or features were found on the surface of V/C. The surface material of square V/C was loose and non-compacted. The colour of the soil was 7.5YR 3/2 Dark Brown, and this soil colour remained until a depth of 5 cm below the surface.

The soil colour that appeared after the 5 cm depth below surface was 10YR 2/2 Very Dark Brown, this soil colour remained until a depth of 10 cm below the surface was reached. The soil type in this layer was loamy and grainy in texture. The sediment was poorly sorted while the presence of rocks increased with an increase in depth further down the layer.

Figure 4.25: Photograph of the surface of square V/C, photograph by K. Mac Conachie

There were also numerous insects unearthed together with numerous grass roots, however, no insect burrows were detected. Only sixteen moderately and heavily weathered ceramic sherds were unearthed in this layer of square V/C.

A predominantly rocky layer followed after 10 cm below the surface (Fig. 4.26). The rocks in this layer varied in shapes and sizes (between 2 cm-20 cm). The soil colour in this layer was 7.5 YR 3/2 Dark Brown and this soil colour remained until a depth of 20 cm was reached. The texture of the sediment was course and grainy, and the sediment was also medium in compaction.

The compaction and moisture content of the sediment increased with an increase in depth. The deposit in the rocky layer was poorly sorted, insects still occurred with no detection of insect nests or burrows, and the presence of rocks decreased with an increase in depth further down the layer. There were no archaeological artefacts in this layer.

Figure 4.26: Photograph of rocky layer in square V/C, photograph by K. Mac Conachie

A layer of clay soils followed the rocky layer (Fig. 4.27). The soil colour of the clay soils was 5YR ¾ Dark Reddish-Brown. The soil texture continued being a bit grainy, however, the soil was moist and highly compacted. Several rocks were present on the surface of the clay soil layer, but the rocks no longer appeared further down the layer. There were also ant eggs and occasional earthworms found in this layer. No archaeological artefacts were unearthed in this clay soil layer. Excavations stopped in this clay soil layer.

Figure 4.27: Photograph of the clay soil layer and stratigraphy in square V/C, photograph by K. Mac Conachie

Summary of excavations at homestead MX 1

Both 1 x 1 m excavated squares (III/C and V/C) at homestead MX 1 comprised similar stratigraphy. The rocky layer was also exposed at similar depths, however, the rocky layer stops at a depth of ±20 cm in square V/C, while it stops at ±25 cm in square III/C. The stratigraphical sequence exposed in these squares is common among Bokoni sites (see Collett 1979, 1982; Henshall 2016: 98). Moreover, square III/C consisted of abundant ceramic sherds while square V/C had minimal ceramic sherds (Table 4.1).

Homestead MX 3

Homestead MX 3 is situated in the south east of homestead MX 1 (Figs 4.20: B, 4.21). There is another homestead and a road structure between homestead MX 1 and homestead MX 3 (Figs 4.20, 4.21). The stonewall of the outer circular wall of homestead MX 3 is collapsed, yet, still maintains a circular structure. The smaller enclosures in the centre of the outer circular wall are still intact and are about a meter high.

There is a small circular lobe attached to the inside of the outer circular wall in the north side of the homestead. There is also a collapsed circular structure occurring near the lobe structure. Homestead MX 3 also comprised division lines constructed perpendicularly from the inside of the outer circular wall to the outside of the central circular enclosures, these division lines followed a radial pattern of the circular homestead structure.

A road/path structure is attached on the north-western parts of homestead MX 3, this road/path structure extends further into the other homestead structure located between MX 1 and MX 3 (Figs 4.20, 4.21). There are also terraces constructed alongside homestead MX 3. The terrace walls are low and are almost covered by surface soils. There are also small circular stone piles found among these terraces.

Excavations at MX 3

Description

A 3 x 1 m grid was initially set up for excavations in the domestic area of homestead MX 3. The domestic area occurs in the space between the outer circular wall and the smaller central enclosures. The domestic area of MX 3 is divided and marked by the division lines running perpendicularly from the outer circular wall to the central enclosures.

The trench was excavated in a checkerboard manner, initially only two 1 x 1 m squares were excavated namely: XXIV/J and XXIV/L. The trench was then extended further westwards and an additional 1 x 1 m square (XXV/M) was excavated later in the excavations.

Walls of homestead MX 3

Nineteen ceramic sherds, one lower grindstone, and five upper grindstones were found within the stone walls of the central enclosures and outer circular wall structure of MX 3 (e.g. Fig. 4.28). I collected these artefacts during the excavation season. The walls of the central enclosures still maintain circular shapes; however, they are slightly collapsed. The outer circular wall also maintains a circular shape and it has largely collapsed.

Figure 4.28: Photograph of ceramic sherds found within the walls of MX 3, photograph by A. Masolo

XXIV/J

There were no artefacts found on the surface of square XXIV/J (Fig. 4.29). The soil texture was grainy, the soil was dry, loose and non-compacted. The soil type was silty sand. The soil colour was 7.5YR 3/2 Dark Brown. The deposit was poorly sorted with no presence of rocks and/or features in square XXIV/J.

Figure 4.29: Photograph of cleaned surface of square XXIV/J, photograph by A. Masolo

A stratigraphic depth control of 5 cm was maintained in square XXIV/J because no stratigraphic sequence was identified during the excavations. Only a depth of 5 cm was excavated in this square due to a high accumulation of burrows occurring further down the square after a depth of 5 cm.

The burrows measured from a depth of ±5 cm to ±12 cm below the surface. The burrow stretched from the southwest to the southeast and towards the north of the square XXIV/J.

The soil colour was 7.5YR 3/2 Dark Brown, the colour of the soil was the same from the first excavated layer (0-5 cm) and within the burrow. The soil type remained silty sandy. The texture of the soil was also loose, grainy, dry, and non-compacted, the soil texture changed to silty loam within the burrow. The sediment persisted to be poorly sorted with no presence of rocks.

XXIV/L

No archaeological artefacts and/or features were found on the surface of square XXIV/L (Fig. 4. 30). The soil colour of the surface was 7.5YR 3/2 Dark Brown. The surface soil was dry, loose, and non-compacted. The soil type was silty and sandy; the soil texture was grainy. The deposit was poorly sorted with one 25 cm wide rock present in this square.

A stratigraphic depth control of 5 cm was maintained in square XXIV/L due to a lack of a visible stratigraphic sequence. The soil colour was 7.5YR 3/2 Dark Brown until a depth of 10 cm. The soil type was silty and sandy from 0-5 cm below the surface. The soil texture was fine to grainy.

The deposit in this layer (0-5 cm) was slightly compacted at the beginning of the layer and became moderately compacted as 5 cm was reached. The sediment was also poorly sorted, with several rocks of ±4 cm in size present. Vegetation roots, three burrow holes in the north facing wall, and insects were found in this layer.

Figure 4.30: Photograph showing an upper grindstone and ceramic sherds unearthed in situ in square XXIV/L, photograph by K. Mac Conachie

An upper grindstone measuring to 5 cm x 9 cm in size (Fig. 4.30: A) and three ceramic sherds (Fig. 4.30: B) were unearthed *in situ* towards the centre of this square (XXIV/L), and one ceramic sherd (Fig. 4.30: C) was also exposed *in situ* towards the south of the square. Moreover, no features were found and/or unearthed in this layer (0-5 cm).

The soil type changed to loamy after a depth of 5 cm below the surface, however, the soil texture continued being fine and grainy. The deposit was still moderately compact and persisted until a depth of 10 cm below the surface was reached. The sediment was poorly sorted with rocks measuring between sizes of 1-6 cm present in this layer (5-10 cm).

Immediately adjacent the already exposed three ceramic sherds found *in situ* in layer 0-5 cm, three more ceramic sherds were exposed *in situ* during excavation processes of layer 5-10 cm. Thus, a total of six ceramic sherds were exposed *in situ* between 0-10 cm of square XXIV/L (Fig. 4.31).

One bone fragment was also unearthed in layer 5-10 cm. No archaeological features were found and/or unearthed in this layer. Excavations in square XXIV/L stopped at a depth of 10 cm below the surface.

Figure 4.31: Photograph of in situ ceramics in square XXIV/L, photograph by K. Mac Conachie

XXV/M

One ceramic sherd was found on the surface. There were also no features identified in this square, however, there was a rock situated in the west facing wall of the square. The soil colour was 7.5YR 3/2 Dark Brown. The surface material was dry, loose, and non-compacted. The soil type was silty and sandy, and the texture was coarse.

Square XXV/M was only excavated to a depth of 5 cm below the surface (Fig 4.32). Fifteen ceramic sherds were unearthed in this layer (0-5 cm). The soil colour was 7.5YR Dark Brown. The soil type was clay mixed with sandy soils. The soil texture was fine to grainy. The deposit was slightly compacted as the sediment became moist as the depth increased in square XXV/M.

Figure 4.32: Photograph of square XXV/M, photograph by A. Masolo

Summary of excavations at MX 3

The stratigraphy of excavated squares at homestead MX 3 is similar to the stratigraphy exposed at homestead MX 1. The maximum depth excavated at homestead MX 3 was ±10 cm below the surface. This was because no artefacts yielded beyond the ±10 cm layer. Varied artefacts yielded between 0-10 cm depths during excavations at MX 3 (Table 4.2).

The shallowness of the deposit at MX1 and MX3 is similar to that found in excavations of other Bokoni villages and towns, such as Khutwaneng (Badfontein) (Collett (1979, 1982), Buffelskloof (Hattingh 2014), and Komati Gorge (Birin 2017; Ramaoka 2018).

Material culture

<u>Finds from MX 1 and MX 3</u>

The most common material culture recovered comprised pottery. Three grindstones and faunal remains were also found (Tables 4.1 and 4.2).

Table 4.1: Total number of artefacts recovered from homestead MX 1

Square no	Context	Depth	Artefact	Total
III/C	Surface	Surface	Ceramic sherd	56
III/C	1a	0 – 5cm	Ceramic sherd	88
III/C	1b	5 – 10cm	Ceramic sherd	65
V/C	1a	0 – 5cm	Ceramic sherd	1
V/C	1b	5 – 10cm	Ceramic sherd	15

Table 4.2: Total number of artefacts recovered from homestead MX 3

Square no.	Context	Depth	Artefact	Total
XXIV/J	1a	0 – 5cm	Ceramic sherd	2
XXIV/J	Burrow End	5 – 10cm	Ceramic sherd	7
XXIV/L	1a	0 – 5cm	Ceramic Sherd	11
XXIV/L	1b	5 – 10cm	Ceramic sherd	11
XXIV/L	1b	5 – 10cm	Upper grindstone	1
XXIV/L	1b	5 – 10cm	Bone frag	1
XXV/M	Surface	Surface	Ceramic sherd	1
XXV/M	1a	0 – 5cm	Ceramic sherd	15
Stonewall	Surface	Surface	Ceramic sherd	19
Stonewall	Surface	Surface	Upper grindstone	5
Stonewall	Surface	Surface	Lower grindstone	1

Pottery Analysis

A total of 291 ceramic sherds were unearthed during excavations at MX 1 and MX 3 (Table 4.3). Only five of these ceramic sherds are decorated, two of them are decorated slightly below the rim with incisions (Figs 4.33, 4.34), and one undiagnostic ceramic sherd with incision lines on it (Fig. 4.35). These decoration motifs are common across Bokoni and Ndzundza sites and are not unique to Moxomatsi alone (see Collett 1979, 1882; Evers 1975; Schoeman 1997, 1998a, 1998b). The potsherds vary in size, thickness, and with pigment colouration on the outer wall of the sherds (Fig. 4.36).

Sixty-seven ceramic sherds could be refitted from homestead MX 1, square III/C, between two and six of these ceramic sherds would fit together with other sherds, and hence no whole pots were established through the process of refitting (see Appendix B). Based on the colouration and thickness of these refitted sherds, these sherds seem to belong to two different types of pots. The number of sherds found at MX 1, square III/C, suggest that one pot broke down *in situ* in this enclosure.

Table 4.3: Ceramic classifications and totals from excavations at MX 1 and MX 3

Homestead	Square no.	Context	Classification	Description	Total
MX 1	III/C	Surface	Body	Undecorated	56
MX 1	III/C	1a (0-5cm)	Body	Undecorated	89
MX 1	III/C	1b (5-10cm)	Body	Undecorated	18
MX 1	III/C	1b (5-10cm)	Fragments	Undecorated	46
MX 1	V/C	1b (5-10cm)	Rim, neck & body	Undecorated	1
MX 1	V/C	1b (5-10cm)	Body	Undecorated	11
MX 1	V/C	1b (5-10cm)	Rim	Undecorated	1
MX 1	V/C	1b (5-10cm)	Fragments	Undecorated	3
MX 3	XXIV/J	1a (0-5cm)	Body	Undecorated	2
MX 3	XXIV/J	Burrow end	Rim & Neck	Undecorated	2
MX 3	XXIV/J	Burrow end	Body	Undecorated	4
MX 3	XXIV/J	Burrow end	Fragment	Undecorated	1
MX 3	XXIV/L	1a (0-5cm)	Body	Undecorated	4
MX 3	XXIV/L	1a (0-5cm)	Fragments	Undecorated	7
MX 3	XXIV/L	1b (5-10cm)	Body	Undecorated	10
MX 3	XXIV/L	1b (5-10cm)	Rim	Decorated	1
MX 3	XXV/M	Surface	Body	Undecorated	1
MX 3	XXV/M	1a (0-5cm)	Rim & Neck	Decorated	1
MX 3	XXV/M	1a (0-5cm)	Fragment	Decorated	1
MX 3	XXV/M	1a (0-5cm)	Rim & Body	Undecorated	1
MX 3	XXV/M	1a (0-5cm)	Body	Undecorated	9
MX 3	XXV/M	1a (0-5cm)	Fragments	Undecorated	3
MX 3	Wall	Surface	Body	Undecorated	16
MX 3	Wall	Surface	Rim, neck & body	Undecorated	1
MX 3	Wall	Surface	Rim, neck & body	Decorated	2

Twenty ceramic sherds were refitted from homestead MX 3. Ten of these refitted sherds are from square XXIV/L, where majority of the sherds were unearthed *in situ*. The structure of the sherds fitted together formed a shape of a small pot (see Appendix B). Four sherds were refitted from square XXIV/J (Burrow End), two sherds with a rim and neck, and two body sherds. Six sherds stemming from the outer circular wall of MX 3 were refitted, each set of refitted sherds comprise two pieces, and one set of these refitted sherds had decoration occurring slightly below its rim and it formed the shape of a small pot (Fig. 4.37).

Figure 4.33: Ceramic sherd with incision lines slightly below the rim, photograph by A. Masolo

Figure 4.34: Ceramic sherd with incisions slightly below the rim, photograph by A. Masolo

Figure 4.35: Undiagnosed ceramic sherd with incision lines, photograph by A. Masolo

Figure 4.36: Black thin-walled ceramic sherds, photograph by A. Masolo

Figure 4.37: Refitted ceramic sherds with punctates slightly below the rim, photograph by A. Masolo

Summary

Data presented in this chapter showed the extension and distribution of stonewalled settlements of Moxomatsi, it also illustrates varied zones of the stonewalled settlements in relation to the main settlement area of Moxomatsi. I presented probable population sizes of Moxomatsi and its main settlement area. I also provided terrace surface area and average yield calculations, which indicate the potential annual grain production that could have occurred in the main town of Moxomatsi. The excavations presented in this chapter yielded similar shallow stratigraphy and material culture to that found at other Bokoni sites.

CHAPTER 5: DISCUSSION AND CONCLUSION

Assessing Prinsloo (1936) against the archaeology

The identity of Moxomatsi as the first Bokoni town or ‘capital’ is drawn from oral histories collected by Prinsloo (1936). He indicated that a (anonymous) Koni ‘captain’ stated that Moxomatsi was a great town of Bokoni, and that it was located south of eNtokozweni (Prinsloo 1936: 11; also see Figs 1.1,1.2).

Prinsloo’s (1936) masters dissertation included a sketch map that included the locations of Bokoni settlement areas, and their indigenous names (Fig. 1.1). Prinsloo’s (1936) map is important for my research because it shows the location of Moxomatsi, the first Bokoni capital. This identification is borne out by the size of the stonewalled town. It is significantly larger than the earlier sixteenth century stonewalled villages in the Komati River Valley (see Delius & Schoeman 2008; Delius *et al*. 2012; Schoeman & Delius 2011). Settlements situated in the Komati River Valley are not as densely clustered as those found at Moxomatsi. The core settlement area of Moxomatsi alone comprises 182 homesteads, which are densely clustered.

Prinsloo’s (1936: 11-12) reading of the origins of terraces, however, is not supported by the archaeological data. He claimed that terracing was a response to the attacks by the Mapono. This inference was incorrect. In Moxomatsi terracing occurs on sites irrespective of whether they are defensive. Furthermore, Birin (2017) and Ramaoka (2018) have dated terraces at KGV1 and their research has shown that the terraces formed part of Bokoni settlements from at least the 1500s AD.

According to Prinsloo (1936) after Moxomatsi was attacked by the Mapono, the capital moved to Mohloxo-Pela, an area situated north of eNtokozweni on his sketched map. Yet, Coetzee’s (2016) GIS density data suggest that Mohloxo-Pela was situated on the eastern regions of eNtokozweni. When I collected data for this research via Google Earth satellite imagery, it was challenging to distinguish the borders of Moxomatsi and Mohloxo-Pela, because the settlements continuously occur from the south towards the northerly areas. Furthermore, other settlement clusters occur further east near the Blouboskraalspruit, which feeds into the Elands River towards Waterval Boven (Emgwenya).

The settlement clusters near Waterval Boven (Emgwenya) resemble those that are situated at the main town of Moxomatsi, in that the homestead configuration patterns vary across the landscape and the homesteads are placed proximate one another, the terrace/agricultural fields are highly concentrated, and the roads are long and interconnected (Figs 5.1, 5.2). The area in which these settlements are situated could potentially be Mohloxo-Pela or possibly be a part of the Mohloxo-Pela region mentioned in Prinsloo (1936).

Figure 5.1: Google Earth image illustrating homestead clusters of Mohloxo-Pela

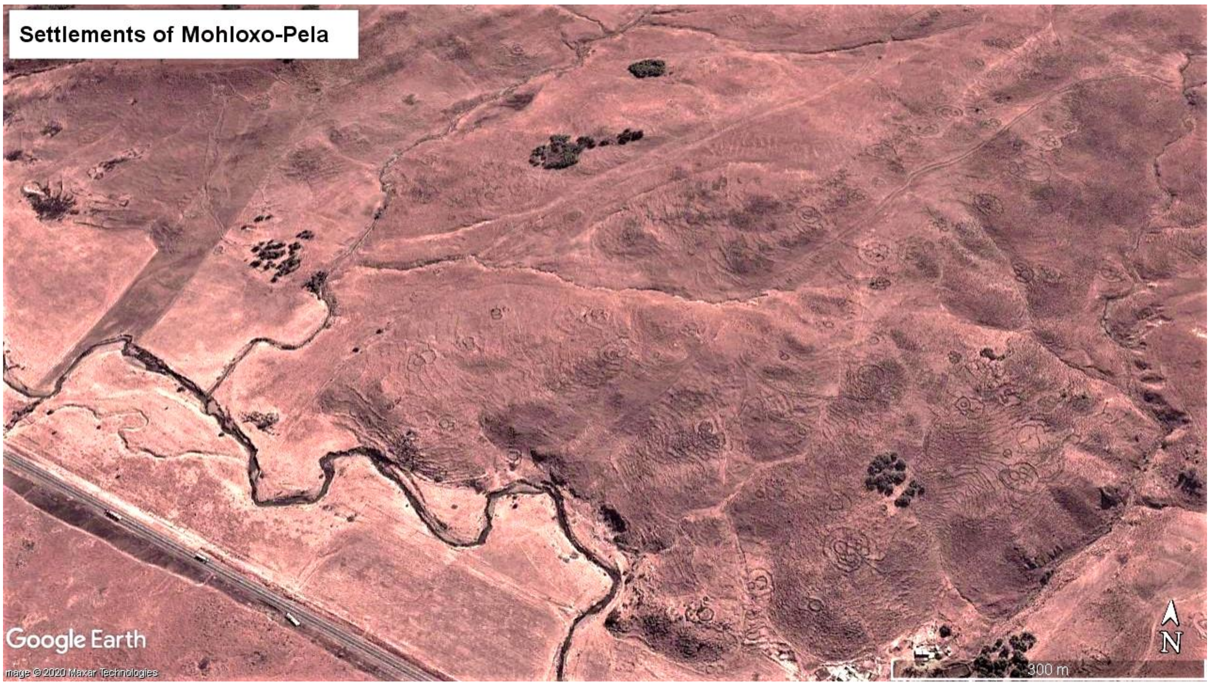

Figure 5.2: Google Earth image illustrating homestead, terrace and road concentrations at Mohloxo-Pela

Moxomatsi as a Bokoni town

A range of settlement configuration patterns start to emerge at Moxomatsi, such as the co-occurrence of simple homesteads with one or two central enclosures, and complex homestead enclosures which comprise multiple enclosures attached to one large central enclosure (Delius *et al*. 2012: 405).

The pots found at Moxomatsi have similar traits and decoration motifs to pots found elsewhere at Bokoni sites (see Collett 1979, 1982; Evers 1975; Henshall 2016). Potsherds, upper and lower grindstones were also found within the wall structures at Moxomatsi. Furthermore, the settlement configuration structures and patterns found at Moxomatsi are similar to the ones identified by Evers (1975), Marker and Evers (1976) and Collett (1979) in areas such as Badfontein and Mashishing valley. The configuration structures and patterns include those of simple enclosures consisting of two concentric circles in isolated homesteads, complex/elaborate enclosures with one large central enclosure with multiple smaller enclosures attached to it, and agglomeration settlements, which do not follow the conventions of the simple or elaborate structural patterns (Marker & Evers 1976).

In addition to the structural layouts described by Marker and Evers (1976), there are homestead structures with multiple (three to six) central enclosures attached to one another with perimeter walls present. Other homestead structures comprise one large central enclosure with multiple smaller enclosures attached to it, which Marker and Evers (1976) refer to as complex/elaborate.

At the peripheries of the main town of Moxomatsi, in the eastern zone, there are three homesteads that do not follow the conventional homestead structural layouts mentioned above, one homestead consists of one small central enclosure with two prominent stone lines structured perpendicularly from the outside wall of the central enclosure to the inside of the perimeter wall (Fig. 5.3: A), while the other homestead consists of an outer perimeter wall with four central enclosures, however, each pair of enclosures are linked with a stone line between them (Fig. 5.3: B) which is a structural pattern identified by Maggs (1976a: 321-322; 1976b: 33-37) in the southern Highveld of South Africa. The third anomaly is the homestead with one enclosure in the centre and two other separate enclosures attached to the inside of the perimeter wall of the homestead (Fig. 5.3: C). These cases could infer incorporation of other precolonial farming communities within the landscape of Moxomatsi, who introduced a different settlement layout to the area.

Figure 5.3: Google Earth image illustrating differently configured homesteads in the eastern zone of Moxomatsi

The manner in which stonewalled settlements are constructed and spatially structured at Bokoni sites during early phases of occupation which includes the occupation of Moxomatsi, indicates that these settlements were inhabited during an era of no prominent central political power (Delius *et al*. 2012; Delius & Schimer 2014). The lack of political structures and/or the lack of investment thereof indicate that other social relationships were prioritised in Bokoni. These include what Jane Guyer and Eno Belinga (1995) refer to as wealth in people.

Guyer and Belinga (1995) argue that some African communities appreciated and valued large numbers of group members more than power over people. These communities traded, and gained goods ensured that they had followers. The undifferentiated settlement patterns at Moxomatsi speaks to a system that is not built on the accumulation of wealth in an individual house, but rather one that valued the presence of people, and therefore tended towards urban clustering.

Developmental processes at Moxomatsi

Delius *et al*. (2012) state that homesteads situated at the peripheries of already established settlements seem to be undergoing varied stages of development. Data from the peripheries of the main town of Moxomatsi support this statement, the settlement structures in those vicinities are not as well established as those in the main town. Furthermore, an example can be drawn from the immediate peripheries of the core settlement area of Moxomatsi where various road structures, terraces, and homesteads seem to be undergoing differentiated levels of structural development. Noting the conditions of the settlement components found at the immediate peripheries, it can be deduced that the town was still growing.

As already mentioned, homesteads at Moxomatsi occur in variety of patterns and sizes, in the main town of Moxomatsi, numerous homestead structures have semi-circular additional structures attached to the primary homestead. Furthermore, there are also constructed homesteads that are attached to one another, i.e. full circular perimeter wall structures attached to one another. These extensions on homestead structures could indicate growth in family sizes and/or the growth of livestock numbers.

Stonewalled structures at Moxomatsi also occur in varied heights, there are instances where stonewalled structures are superimposed onto one another. These instances potentially indicate that low lying structures are of old homesteads that were no longer relevant and therefore, the people reused the space in those particular areas, and they might have also used the stonewall material from these old structures in order to construct and develop their newly inhabited homesteads.

The domestic space at Moxomatsi has been subdivided by radiating walls, such as those found at excavated homesteads. This corresponds to Maggs' (2008) observation that Bokoni domestic space is divided by stone lines constructed in a radial manner demarcating individual huts from one another (Maggs 2008).

Excavated homestead MX 1 is composed of three small circular enclosures attached to one another, with an outer perimeter wall structure of a proximate homestead attached to these smaller enclosures on their western and eastern side. Excavations at these enclosures reached a maximum depth of ±30 cm below the surface of the earth, however, square III/C generated more artefacts compared to square V/C. The potsherds unearthed in square III/C were mostly not weathered, these sherds had the same colouring on their outer surfaces and numerous sherds were able to be refitted (Appendix B), however, they did not form a complete pot. Even though they were unable to form a whole pot, they indicate that a pot must have a broken *in situ* in this enclosure. Moreover, potsherds unearthed from square V/C were mostly weathered and rolled. These contrasting conditions and characteristics of the material culture from these different squares, in addition to the nature of the small enclosure resembling an incomplete homestead, could imply that these areas and spaces were re-used over time.

Excavations in homestead MX 3 were all situated within the domestic area, maximum excavated depth at this homestead was ±10 cm as these were the layers that yielded artefacts, similar to MX 1 and numerous other excavated sites at Bokoni (see Collett 1979, 1982; Evers 1975; Henshall 2016). No house floors were discovered during excavations in the domestic areas of Moxomatsi, however, the unearthed potsherds and upper grindstone *in situ* suggest for certain domestic tasks and gender related activities within this space in which they are located.

Maggs (2008) further contends that Bokoni settlement areas have the longest and complex road network systems. This is true in the case of Moxomatsi, for instance, looking at the southernmost road structure in relation to the established homesteads at the main town which measures to about 1.5 km (1 504 m) long, numerous other road structures branch off this road and extend into and out of the core settlement area, these roads also interconnect with various other road structures stemming from individual homesteads forming road network links across the landscape of the main town of Moxomatsi (Fig. 5.4). The manner in which the road structures appear across the core settlement area of Moxomatsi indicates that Maggs (2008) and Beinart (2010) are accurate in stating that roads served the purposes of guiding humans and livestock movements around the area and away from terraces/agricultural fields. More especially because of the population and size and livestock sizes located in this area of Bokoni, and possible protective measures taken with regards to agricultural plots.

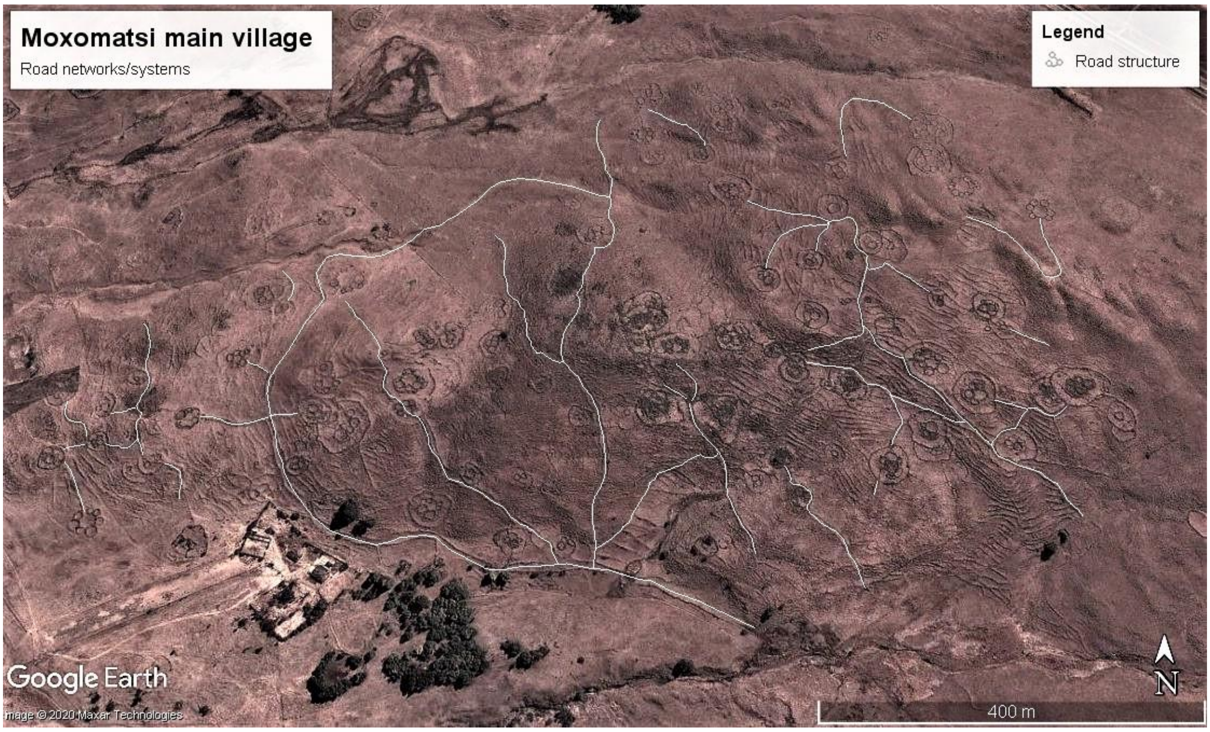

Figure 5.4: Google Earth image illustrating road networks/systems at Moxomatsi main town

Food production

The increase of livestock numbers might have influenced the investments in cattle byre structures in Bokoni (Beinart 2010). Noting the occurrences of livestock enclosures at Moxomatsi generally, it can be inferred that livestock played an important role in these communities, because all complete homesteads consist of one or more of these enclosures. This would be in line with the pattern in other African farming communities, where cattle played an important role in ritual and other cultural activities (Moore 1986; Mönnig 1967; Segobye 1998).

Terraces at Bokoni were for cultivating crops (Beinart 2010; Collett 1979; Hattingh 2014; Maggs 2008; Marker & Evers 1976; Solomon 2012; Widgren *et al*. 2016). Based on the occupation sequence timeline the crops cultivated at Moxomatsi were sorghum, pearl millet and finger millet (Hattingh 2014). Beinart (2010) proposes that the amount of labour invested on terracing illustrates applications of continuous field cultivation and rotation. Henshall (2016: 123), argued that even though there is a lack of direct evidence for Bokoni regarding cultivating strategies it is highly probable that people of Bokoni adopted crop rotation and intercropping to maximize their yields, increase soil fertility, reduce diseases, pests and weeds, and heightened protection in occurrences of erratic rainfall decline. Looking at the extent and concentration of terrace fields at the core settlement area of Moxomatsi, it is highly probable that these farming strategies were incorporated in the area as well. Future research based on these agricultural fields will have to clarify these suggestions.

The population size at the main town of Moxomatsi is estimated to be between 1 820 and 5 460 based on the calculation model conducted by Marker and Evers (1976). This probably overestimates the population, but even if the lower figures are used the average agricultural/cultivation yield figures at the core settlement area of Moxomatsi suggests that the quantities of produced crops from terraced fields in the town probably did not meet the total food requirements of the town's folk. Consequently, it is likely that additional fields existed outside of the town. This would be similar to the crop growing patterns that have been observed in other parts of South Africa (see Henshall 2016).

Gender

One of the remarkable characteristics of Moxomatsi as a town pertain to high concentrations of terraces and quantity of roads navigating through and around the settlement area. Delius *et al*. (2012) propose that labour involved with terracing, construction and maintenance of the stonewalled settlement structures was gendered and might have involved age regiments, while Beinart (2010) suggests family labour, and that these structures are private rather than public. Beinart's (2010) model is more closely aligned with the archaeology of Moxomatsi, where terraces appear to have grown organically as the homesteads and town developed. This would be in accord with the model for terrace construction put forward by Widgren *et al.* (2016).

Slow terrace development has distinct social implications. This form of terracing is formed through quotidian labour that would have be gendered. Based on the patterns of gendered labour in South Africa, which I discussed in the literature review, both men and women probably participated in the initial stages of terrace developments and initial processes of preparing the soils. Women, however, did the daily agricultural labour that would have involved regular hoeing, which probably resulted in rocks being dislocated. These rocks were eventually incorporated in the terrace walls, which would grow season by season. Women also would have expanded and maintained the terraces throughout the year.

Men and boys of marked age sets might have constructed numerous other stonewalled structures at Moxomatsi. Moreover, livestock investments at Moxomatsi might relate to men's labour where men took care of livestock and herded them during cultivating seasons so as to prevent the animals from grazing on the cultivated domestic plants, and to prevent them from trampling on the cultivated lands.

As discussed in the literature review space and structures can be viewed as gendered artefacts shaped by society, as well as artefacts that constitute society. Hence, I contend that agricultural/terrace plots at Moxomatsi that result from women's continuous daily labour, would have shaped and been shaped by gender in Bokoni, and thus can be read as gendered artefacts.

The notion of viewing stonewalled ruins entirely as male artefacts thus has to be revised. Instead, these sites and towns were joint male and female artefacts. While men probably built the homestead walls and the terraces, women's daily labour likely created the most quintessential and recognisable component of Bokoni sites, the terraces.

It is possible that these women obtained access to land through their husbands similar to other African communities (Mönnig 1967; Moore 1986; Kinsman 1983). Small homesteads with few wives inhabiting them would have a smaller labour force, while homesteads with more wives would probably have a larger labour force. This probably impacted on the number and size of areas cultivated. It would not be far-fetched to assume that the smallest cultivated areas at Moxomatsi were associated with households with only one wife, and that the largest terraced field belonged to a well-established, mature household.

Since agricultural activities are associated with women, average yield sizes could be linked to the role of women in the success and sustenance of their respective homesteads (Henshall 2013: 40). The resilience on agricultural produce for successful trade and maintenance of homesteads accentuates the significant role the women of Bokoni played in these communities (Henshall 2013: 40). Thus, at Moxomatsi, women played a significant role in shaping the terraces through their daily labour. These terraces are the most prominent feature on the sites, and thus challenge the traditional notion that women's labour is private and thus not visible.

Summary

Urban farming flourished at Moxomatsi, as can be seen in the extensive terracing at the site. The dense urban core of the town formed the centre of a densifying region. The intensification of settlements and terrace structures express that Moxomatsi was the first town of Bokoni as stated in Prinsloo's (1936) account. Settlement compositions at Moxomatsi demonstrate that there were no hierarchical systems or central political power in the area, therefore, suggesting that Guyer and Belinga's (1995) concept of wealth in people might apply.

It is possible that Moxomatsi was not only a magnet for local people, but that it also drew people from other regions. This is visible in the settlement layouts. Most are similar to other Bokoni sites, such as the ones located at the Mashishing valley and Badfontein, but also includes different patterns suggesting that people from other areas moved into the landscape. The incomplete homesteads suggest that the town was still growing when it was abandoned.

Terraces at Moxomatsi seem to have grown organically as the homesteads and town developed, which implies household rather than regimental labour, which in turn places women at the core of agricultural production and related terrace development in Bokoni. Agricultural plots at Moxomatsi embody women's continuous daily labour and the agricultural intensification in the area was results from women's daily work.

Further research

My research laid the foundation for more extensive excavations at Moxomatsi. These should include fine-grained studies of the configuration of household space and terrace construction. Future research could also explore homesteads and the archaeology on a micro scale. In addition, more detailed ground surveys are necessary to gain better understandings of the configuration patterns of stonewalled settlements of Moxomatsi. Reasons behind the intensification of farming and densification of settlement can also be explored. My research also creates the basis for further research into town and regional planning in Bokoni.

I also highlighted the limitations of Prinsloo's (1936) research; this combined with my identification of settlement clusters in the area creates the potential for further research aimed at establishing the archaeological relationship between Moxomatsi and Mohloxo-Pela.

It also highlights how little research that incorporates gender theories and gender relations has been conducted, and future research at these sites should continue to pursue gendered questions. Further research is also needed in relation to the difference between gender relations in communities that farmed on a large scale, and those that depend on subsistence farming.

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APPENDICES

APPENDIX A: SURFACE AREA AND YIELD CALCULATIONS

Table A.1: Results of yield calculations for sorghum, pearl and finger millet at terrace/agricultural fields of Moxomatsi main town

Terrace Number	Area (m^2)	Sorghum Min (kg)	Sorghum Max (kg)	Pearl Millet Min (kg)	Pearl Millet Max (kg)	Finger Millet Min (kg)	Finger Millet Max (kg)
1(a)	538	38,63	192,13	26,9	134,5	35,99	89,04
1(b)	1 547	111,07	552,46	77,34	386,75	103,49	256,03
1(c)	2 598	186,54	927,79	129,89	649,5	173,8	429,98
2(a)	502	36,04	179,27	25,1	125,5	33,58	83,08
2(b)	493	35,4	176,06	24,65	123,25	32,98	81,59
3(a)	1 223	87,81	436,75	61,15	305,75	81,82	202,41
3(b)	1 856	133,26	662,81	92,79	464	124,16	307,17
3(c)	4 929	353,9	1760,22	246,43	1232,25	329,75	815,76
4(a)	489	35,11	174,63	24,45	122,25	32,71	80,93
4(b)	372	26,71	132,85	18,6	93	24,89	61,57
4(c)	387	27,79	138,2	19,35	96,75	25,89	64,05
4(d)	832	59,74	297,12	41,6	208	55,66	137,7
4(e)	802	57,58	286,41	40,1	200,5	53,65	132,73
5	1 263	90,68	451,04	63,14	315,75	84,49	209,03
6(a)	1 020	73,24	364,26	51	255	68,24	168,81
6(b)	209	15,01	74,64	10,45	52,25	13,98	34,59
6(c)	2 963	212,74	1058,13	148,14	740,75	198,22	490,39
6(d)	4 068	292,08	1452,75	203,38	1017	272,15	673,27
6(e)	725	52,06	258,91	36,25	181,25	48,5	119,99

6(f)	409	29,37	146,06	20,45	102,25	27,36	67,69
7	11 715	841,14	4183,61	585,7	2928,75	783,72	1938,87
8(a)	253	18,17	90,35	12,65	63,25	16,93	41,87
8(b)	266	19,1	94,99	13,3	66,5	17,8	44,02
8(c)	346	24,84	123,56	17,3	86,5	23,15	57,26
8(d)	1 261	90,54	450,32	63,04	315,25	84,36	208,7
8(e)	1 349	96,86	481,75	67,44	337,25	90,25	223,26
9	2 148	154,23	767,09	107,39	537	143,7	355,5
10	868	62,32	309,98	43,4	217	58,07	143,66
11	3 375	242,33	1205,27	168,74	843,75	225,78	558,57
12	21 614	1551,89	7718,71	1080,61	5403,5	1445,95	3577,18
13(a)	1 854	133,12	662,09	92,69	463,5	124,03	306,84
13(b)	1 081	77,62	386,04	54,05	270,25	72,32	178,91
14(a)	1 338	96,07	477,82	66,89	334,5	89,51	221,44
14(b)	6 110	438,7	2181,98	305,48	1527,5	408,75	1011,22
14(c)	1 371	98,44	489,61	68,54	342,75	91,72	226,9
14(d)	1 064	76,4	379,97	53,2	266	71,18	176,1
14(e)	4 325	310,54	1544,53	216,23	1081,25	289,34	715,8
14(f)	1 182	84,87	422,11	59,1	295,5	79,07	195,62
14(g)	350	25,13	124,99	17,5	87,5	23,41	57,93
14(h)	1 174	84,29	419,25	58,7	293,5	78,54	194,3
14(i)	1 223	87,81	436,75	61,15	305,75	81,82	202,41
15(a)	284	20,39	101,42	14,2	71	19	47
15(b)	481	34,54	171,77	24,05	120,25	32,18	79,61
15(c)	1 338	96,07	477,82	66,89	334,5	89,51	221,44
15(d)	346	24,84	123,56	17,3	86,5	23,15	57,26

16	2 275	163,35	812,44	113,74	568,75	152,2	376,52
17	6 986	501,59	2494,81	349,27	1746,5	467,36	1156,2
18(a)	1 738	124,79	620,67	86,89	434,5	116,27	287,64
18(b)	4 053	291,01	1447,39	202,63	1013,25	271,14	670,78
19	1 456	104,54	519,96	72,79	364	97,4	240,97
20	7 595	545,32	2712,3	379,72	1898,75	508,1	1257
21	2 472	177,49	882,79	123,59	618	165,37	409,12
22	2 595	186,32	926,72	129,74	648,75	173,6	429,48
23	1 978	142,02	706,38	98,89	494,5	132,33	327,36
24(a)	2 312	166	825,65	115,59	578	154,67	382,64
24(b)	1 836	131,82	655,66	91,79	459	122,83	303,86
25	1 285	92,26	458,89	64,24	321,25	85,97	212,67
26	5 225	375,16	1865,93	261,23	1306,25	349,55	864,75
27	1 036	74,38	369,97	51,8	259	69,31	171,46
28	2 530	181,65	903,5	126,49	632,5	169,25	418,72
29	3 609	259,13	1288,83	180,44	902,25	241,44	597,3
30	5 486	393,89	1959,14	274,28	1371,5	367,01	907,95
31	7 077	508,13	2527,31	353,82	1769,25	473,44	1171,26
32	16 688	1198,2	5959,55	834,33	4172	1116,41	2761,91
33	11 967	859,23	4273,61	598,3	2991,75	800,58	1980,57
34	1 538	110,43	549,24	76,89	384,5	102,89	254,54
35	3 193	229,26	1140,27	159,64	798,25	213,61	528,45
36	681	48,9	243,2	34,05	170,25	45,56	112,71
37	1 122	80,56	400,68	56,1	280,5	75,06	185,69
38	4 073	292,44	1454,53	203,63	1018,25	272,48	674,09
39	3 329	239,02	1188,84	166,44	832,25	222,71	550,96

40	5 396	387,43	1927	269,78	1349	360,99	893,05
41	609	43,73	217,48	30,45	152,25	40,74	100,79
42	2 456	176,34	877,08	122,79	614	164,3	406,48
43	8 373	601,18	2990,13	418,62	2093,25	560,15	1385,76
44	1 172	84,15	418,54	58,6	293	78,41	193,97
45	3 955	283,97	1412,39	197,73	988,75	264,59	654,56
46(a)	2 312	166	825,65	115,59	578	154,67	382,64
46(b)	2 762	198,31	986,35	138,09	690,5	184,78	457,12
47(a)	1 156	83	412,83	57,8	289	77,34	191,32
47(b)	3 422	245,7	1222,05	171,09	855,5	228,93	566,35
47(c)	827	59,38	295,33	41,35	206,75	55,33	136,87
48	9 960	715,13	3556,88	497,96	2490	666,31	1648,41
49(a)	381	27,36	136,06	19,05	95,25	25,49	63,06
49(b)	1 784	128,09	637,09	89,19	446	119,35	295,26
49(c)	795	57,08	283,91	39,75	198,75	53,18	131,57
49(d)	5 947	426,99	2123,77	297,33	1486,75	397,85	984,25
49(e)	4 364	313,34	1558,45	218,18	1091	291,95	722,26
49(f)	1 128	80,99	402,83	56,4	282	75,46	186,69
49(g)	7 306	524,57	2609,09	365,27	1826,5	488,76	1209,16
49(h)	1 664	119,48	594,24	83,19	416	111,32	275,4
49(i)	2 632	188,98	939,93	131,59	658	176,08	435,6
50(a)	1 093	78,48	390,33	54,65	273,25	73,12	180,89
50(b)	2 731	196,09	975,28	136,54	682,75	182,7	451,99
51	1 838	131,97	656,38	91,89	459,5	122,96	304,19
52(a)	1 918	137,71	684,95	95,89	479,5	128,31	317,43
52(b)	1 274	91,47	454,97	63,69	318,5	85,23	210,85
52(c)	391	28,07	139,63	19,55	97,75	26,16	64,71

52(d)	677	48,61	241,77	33,85	169,25	45,29	112,05
52(e)	1 537	110,36	548,89	76,84	384,25	102,82	254,38
53	2 417	173,54	863,15	120,84	604,25	161,69	400,02
54(a)	762	54,71	272,12	38,1	190,5	50,98	126,11
54(b)	649	46,6	231,77	32,45	162,25	43,42	107,41
54(c)	325	23,34	116,06	16,25	81,25	21,74	53,79
54(d)	1 173	84,22	418,9	58,65	293,25	78,47	194,14
54(e)	809	58,09	288,91	40,45	202,25	54,12	133,89
54(f)	2 873	206,28	1025,99	143,64	718,25	192,2	475,49
54(g)	2 300	165,14	821,37	114,99	575	153,87	380,66
54(h)	835	59,95	298,19	41,75	208,75	55,86	138,2
54(i)	3 986	286,19	1423,46	199,28	996,5	266,66	659,69
55(a)	1 011	72,59	361,04	50,55	252,75	67,63	167,32
55(b)	2 315	166,22	826,72	115,74	578,75	154,87	383,14
55(c)	878	63,04	313,55	43,9	219,5	58,74	145,31
55(d)	2 029	145,68	724,59	101,44	507,25	135,74	335,81
56	23 773	1706,9	8489,72	1188,55	5943,25	1590,39	3934,5
57	10 382	745,43	3707,58	519,06	2595,5	694,55	1718,25
58(a)	2 819	202,4	1006,71	140,94	704,75	188,59	466,55
58(b)	3 260	234,07	1164,2	162,99	815	218,09	539,54
59(a)	3 096	222,29	1105,63	154,79	774	207,12	512,4
59(b)	226	16,23	80,71	11,3	56,5	15,12	37,4
59(c)	3 260	234,07	1164,2	162,99	815	218,09	539,54
60(a)	3 447	247,49	1230,98	172,34	861,75	230,6	570,49
60(b)	1 056	75,82	377,11	52,8	264	70,65	174,77
60(c)	351	25,2	125,35	17,55	87,75	23,48	58,09

60(d)	5 017	360,22	1791,65	250,83	1254,25	335,63	830,33
60(e)	1 126	80,85	402,11	56,3	281,5	75,33	186,36
61(a)	610	43,8	217,84	30,5	152,5	40,81	100,96
61(b)	301	21,61	107,49	15,05	75,25	20,14	49,82
61(c)	187	13,43	66,78	9,35	46,75	12,51	30,95
62	3 047	218,77	1088,13	152,34	761,75	203,84	504,29
63	782	56,15	279,26	39,1	195,5	52,32	129,42

Table A.2: Table showing number of people sustainable according to yield for demarcated terraces at the main town of Moxomatsi

Terrace Number	Sorghum Max (kg)	100 kg p/a	65 kg p/a	Sorghum Min (kg)	100 kg p/a	65 kg p/a	Pearl Millet Max (kg)	100 kg p/a	65 kg p/a	Pearl Millet Min (kg)	100 kg p/a	65 kg p/a	Finger Millet Max (kg)	100 kg p/a	65 kg p/a	Finger Millet Min (kg)	100 kg p/a	65 kg p/a
1(a)	**192,13**	2	3	**38,63**	0	1	**134,5**	1	2	**26,9**	0	0	**89,04**	1	1	**35,99**	0	1
1(b)	**552,46**	6	8	**111,07**	1	2	**386,75**	4	6	**77,34**	1	1	**256,03**	3	4	**103,49**	1	2
1(c)	**927,79**	9	14	**186,54**	2	3	**649,5**	6	10	**129,89**	1	2	**429,98**	4	7	**173,8**	2	3
2(a)	**179,27**	2	3	**36,04**	0	1	**125,5**	1	2	**25,1**	0	0	**83,08**	1	1	**33,58**	0	1
2(b)	**176,06**	2	3	**35,4**	0	1	**123,25**	1	2	**24,65**	0	0	**81,59**	1	1	**32,98**	0	1
3(a)	**436,75**	4	7	**87,81**	1	1	**305,75**	3	5	**61,15**	1	1	**202,41**	2	3	**81,82**	1	1
3(b)	**662,81**	7	10	**133,26**	1	2	**464**	5	7	**92,79**	1	1	**307,17**	3	5	**124,16**	1	2
3(c)	**1760,22**	18	27	**353,9**	4	5	**1232,25**	12	19	**246,43**	2	4	**815,76**	8	13	**329,75**	3	5
4(a)	**174,63**	2	3	**35,11**	0	1	**122,25**	1	2	**24,45**	0	0	**80,93**	1	1	**32,71**	0	1
4(b)	**132,85**	1	2	**26,71**	0	0	**93**	1	1	**18,6**	0	0	**61,57**	1	1	**24,89**	0	0
4(c)	**138,2**	1	2	**27,79**	0	0	**96,75**	1	1	**19,35**	0	0	**64,05**	1	1	**25,89**	0	0
4(d)	**297,12**	3	5	**59,74**	1	1	**208**	2	3	**41,6**	0	1	**137,7**	1	2	**55,66**	1	1
4(e)	**286,41**	3	4	**57,58**	1	1	**200,5**	2	3	**40,1**	0	1	**132,73**	1	2	**53,65**	1	1
5	**451,04**	5	7	**90,68**	1	1	**315,75**	3	5	**63,14**	1	1	**209,03**	2	3	**84,49**	1	1
6(a)	**364,26**	4	6	**73,24**	1	1	**255**	3	4	**51**	1	1	**168,81**	2	3	**68,24**	1	1
6(b)	**74,64**	1	1	**15,01**	0	0	**52,25**	1	1	**10,45**	0	0	**34,59**	0	1	**13,98**	0	0
6(c)	**1058,13**	11	16	**212,74**	2	3	**740,75**	7	11	**148,14**	1	2	**490,39**	5	8	**198,22**	2	3
6(d)	**1452,75**	15	22	**292,08**	3	4	**1017**	10	16	**203,38**	2	3	**673,27**	7	10	**272,15**	3	4
6(e)	**258,91**	3	4	**52,06**	1	1	**181,25**	2	3	**36,25**	0	1	**119,99**	1	2	**48,5**	0	1
6(f)	**146,06**	1	2	**29,37**	0	0	**102,25**	1	2	**20,45**	0	0	**67,69**	1	1	**27,36**	0	0
7	**4183,61**	42	64	**841,14**	8	13	**2928,75**	29	45	**585,7**	6	9	**1938,87**	19	30	**783,72**	8	12

8(a)	**90,35**	1	1	**18,17**	0	0	**63,25**	1	1	**12,65**	0	0	**41,87**	0	1	**16,93**	0	0
8(b)	**94,99**	1	1	**19,1**	0	0	**66,5**	1	1	**13,3**	0	0	**44,02**	0	1	**17,8**	0	0
8(c)	**123,56**	1	2	**24,84**	0	0	**86,5**	1	1	**17,3**	0	0	**57,26**	1	1	**23,15**	0	0
8(d)	**450,32**	5	7	**90,54**	1	1	**315,25**	3	5	**63,04**	1	1	**208,7**	2	3	**84,36**	1	1
8(e)	**481,75**	5	7	**96,86**	1	1	**337,25**	3	5	**67,44**	1	1	**223,26**	2	3	**90,25**	1	1
9	**767,09**	8	12	**154,23**	2	2	**537**	5	8	**107,39**	1	2	**355,5**	4	5	**143,7**	1	2
10	**309,98**	3	5	**62,32**	1	1	**217**	2	3	**43,4**	0	1	**143,66**	1	2	**58,07**	1	1
11	**1205,27**	12	19	**242,33**	2	4	**843,75**	8	13	**168,74**	2	3	**558,57**	6	9	**225,78**	2	3
12	**7718,71**	77	119	**1551,89**	16	24	**5403,5**	54	83	**1080,61**	11	17	**3577,18**	36	55	**1445,95**	14	22
13(a)	**662,09**	7	10	**133,12**	1	2	**463,5**	5	7	**92,69**	1	1	**306,84**	3	5	**124,03**	1	2
13(b)	**386,04**	4	6	**77,62**	1	1	**270,25**	3	4	**54,05**	1	1	**178,91**	2	3	**72,32**	1	1
14(a)	**477,82**	5	7	**96,07**	1	1	**334,5**	3	5	**66,89**	1	1	**221,44**	2	3	**89,51**	1	1
14(b)	**2181,98**	22	34	**438,7**	4	7	**1527,5**	15	24	**305,48**	3	5	**1011,22**	10	16	**408,75**	4	6
14(c)	**489,61**	5	8	**98,44**	1	2	**342,75**	3	5	**68,54**	1	1	**226,9**	2	3	**91,72**	1	1
14(d)	**379,97**	4	6	**76,4**	1	1	**266**	3	4	**53,2**	1	1	**176,1**	2	3	**71,18**	1	1
14(e)	**1544,53**	15	24	**310,54**	3	5	**1081,25**	11	17	**216,23**	2	3	**715,8**	7	11	**289,34**	3	4
14(f)	**422,11**	4	6	**84,87**	1	1	**295,5**	3	5	**59,1**	1	1	**195,62**	2	3	**79,07**	1	1
14(g)	**124,99**	1	2	**25,13**	0	0	**87,5**	1	1	**17,5**	0	0	**57,93**	1	1	**23,41**	0	0
14(h)	**419,25**	4	6	**84,29**	1	1	**293,5**	3	5	**58,7**	1	1	**194,3**	2	3	**78,54**	1	1
14(i)	**436,75**	4	7	**87,81**	1	1	**305,75**	3	5	**61,15**	1	1	**202,41**	2	3	**81,82**	1	1
15(a)	**101,42**	1	2	**20,39**	0	0	**71**	1	1	**14,2**	0	0	**47**	0	1	**19**	0	0
15(b)	**171,77**	2	3	**34,54**	0	1	**120,25**	1	2	**24,05**	0	0	**79,61**	1	1	**32,18**	0	0
15(c)	**477,82**	5	7	**96,07**	1	1	**334,5**	3	5	**66,89**	1	1	**221,44**	2	3	**89,51**	1	1
15(d)	**123,56**	1	2	**24,84**	0	0	**86,5**	1	1	**17,3**	0	0	**57,26**	1	1	**23,15**	0	0
16	**812,44**	8	12	**163,35**	2	3	**568,75**	6	9	**113,74**	1	2	**376,52**	4	6	**152,2**	2	2
17	**2494,81**	25	38	**501,59**	5	8	**1746,5**	17	27	**349,27**	3	5	**1156,2**	12	18	**467,36**	5	7

18(a)	**620,67**	6	10	**124,79**	1	2	**434,5**	4	7	**86,89**	1	1	**287,64**	3	4	**116,27**	1	2
18(b)	**1447,39**	14	22	**291,01**	3	4	**1013,25**	10	16	**202,63**	2	3	**670,78**	7	10	**271,14**	3	4
19	**519,96**	5	8	**104,54**	1	2	**364**	4	6	**72,79**	1	1	**240,97**	2	4	**97,4**	1	1
20	**2712,3**	27	42	**545,32**	5	8	**1898,75**	19	29	**379,72**	4	6	**1257**	13	19	**508,1**	5	8
21	**882,79**	9	14	**177,49**	2	3	**618**	6	10	**123,59**	1	2	**409,12**	4	6	**165,37**	2	3
22	**926,72**	9	14	**186,32**	2	3	**648,75**	6	10	**129,74**	1	2	**429,48**	4	7	**173,6**	2	3
23	**706,38**	7	11	**142,02**	1	2	**494,5**	5	8	**98,89**	1	2	**327,36**	3	5	**132,33**	1	2
24(a)	**825,65**	8	13	**166**	2	3	**578**	6	9	**115,59**	1	2	**382,64**	4	6	**154,67**	2	2
24(b)	**655,66**	7	10	**131,82**	1	2	**459**	5	7	**91,79**	1	1	**303,86**	3	5	**122,83**	1	2
25	**458,89**	5	7	**92,26**	1	1	**321,25**	3	5	**64,24**	1	1	**212,67**	2	3	**85,97**	1	1
26	**1865,93**	19	29	**375,16**	4	6	**1306,25**	13	20	**261,23**	3	4	**864,75**	9	13	**349,55**	3	5
27	**369,97**	4	6	**74,38**	1	1	**259**	3	4	**51,8**	1	1	**171,46**	2	3	**69,31**	1	1
28	**903,5**	9	14	**181,65**	2	3	**632,5**	6	10	**126,49**	1	2	**418,72**	4	6	**169,25**	2	3
29	**1288,83**	13	20	**259,13**	3	4	**902,25**	9	14	**180,44**	2	3	**597,3**	6	9	**241,44**	2	4
30	**1959,14**	20	30	**393,89**	4	6	**1371,5**	14	21	**274,28**	3	4	**907,95**	9	14	**367,01**	4	6
31	**2527,31**	25	39	**508,13**	5	8	**1769,25**	18	27	**353,82**	4	5	**1171,26**	12	18	**473,44**	5	7
32	**5959,55**	60	92	**1198,2**	12	18	**4172**	42	64	**834,33**	8	13	**2761,91**	28	42	**1116,41**	11	17
33	**4273,61**	43	66	**859,23**	9	13	**2991,75**	30	46	**598,3**	6	9	**1980,57**	20	30	**800,58**	8	12
34	**549,24**	5	8	**110,43**	1	2	**384,5**	4	6	**76,89**	1	1	**254,54**	3	4	**102,89**	1	2
35	**1140,27**	11	18	**229,26**	2	4	**798,25**	8	12	**159,64**	2	2	**528,45**	5	8	**213,61**	2	3
36	**243,2**	2	4	**48,9**	0	1	**170,25**	2	3	**34,05**	0	1	**112,71**	1	2	**45,56**	0	1
37	**400,68**	4	6	**80,56**	1	1	**280,5**	3	4	**56,1**	1	1	**185,69**	2	3	**75,06**	1	1
38	**1454,53**	15	22	**292,44**	3	4	**1018,25**	10	16	**203,63**	2	3	**674,09**	7	10	**272,48**	3	4
39	**1188,84**	12	18	**239,02**	2	4	**832,25**	8	13	**166,44**	2	3	**550,96**	6	8	**222,71**	2	3
40	**1927**	19	30	**387,43**	4	6	**1349**	13	21	**269,78**	3	4	**893,05**	9	14	**360,99**	4	6

41	**217,48**	2	3	**43,73**	0	1	**152,25**	2	2	**30,45**	0	0	**100,79**	1	2	**40,74**	0	1
42	**877,08**	9	13	**176,34**	2	3	**614**	6	9	**122,79**	1	2	**406,48**	4	6	**164,3**	2	3
43	**2990,13**	30	46	**601,18**	6	9	**2093,25**	21	32	**418,62**	4	6	**1385,76**	14	21	**560,15**	6	9
44	**418,54**	4	6	**84,15**	1	1	**293**	3	5	**58,6**	1	1	**193,97**	2	3	**78,41**	1	1
45	**1412,39**	14	22	**283,97**	3	4	**988,75**	10	15	**197,73**	2	3	**654,56**	7	10	**264,59**	3	4
46(a)	**825,65**	8	13	**166**	2	3	**578**	6	9	**115,59**	1	2	**382,64**	4	6	**154,67**	2	2
46(b)	**986,35**	10	15	**198,31**	2	3	**690,5**	7	11	**138,09**	1	2	**457,12**	5	7	**184,78**	2	3
47(a)	**412,83**	4	6	**83**	1	1	**289**	3	4	**57,8**	1	1	**191,32**	2	3	**77,34**	1	1
47(b)	**1222,05**	12	19	**245,7**	2	4	**855,5**	9	13	**171,09**	2	3	**566,35**	6	9	**228,93**	2	4
47(c)	**295,33**	3	5	**59,38**	1	1	**206,75**	2	3	**41,35**	0	1	**136,87**	1	2	**55,33**	1	1
48	**3556,88**	36	55	**715,13**	7	11	**2490**	25	38	**497,96**	5	8	**1648,41**	16	25	**666,31**	7	10
49(a)	**136,06**	1	2	**27,36**	0	0	**95,25**	1	1	**19,05**	0	0	**63,06**	1	1	**25,49**	0	0
49(b)	**637,09**	6	10	**128,09**	1	2	**446**	4	7	**89,19**	1	1	**295,26**	3	5	**119,35**	1	2
49(c)	**283,91**	3	4	**57,08**	1	1	**198,75**	2	3	**39,75**	0	1	**131,57**	1	2	**53,18**	1	1
49(d)	**2123,77**	21	33	**426,99**	4	7	**1486,75**	15	23	**297,33**	3	5	**984,25**	10	15	**397,85**	4	6
49(e)	**1558,45**	16	24	**313,34**	3	5	**1091**	11	17	**218,18**	2	3	**722,26**	7	11	**291,95**	3	4
49(f)	**402,83**	4	6	**80,99**	1	1	**282**	3	4	**56,4**	1	1	**186,69**	2	3	**75,46**	1	1
49(g)	**2609,09**	26	40	**524,57**	5	8	**1826,5**	18	28	**365,27**	4	6	**1209,16**	12	19	**488,76**	5	8
49(h)	**594,24**	6	9	**119,48**	1	2	**416**	4	6	**83,19**	1	1	**275,4**	3	4	**111,32**	1	2
49(i)	**939,93**	9	14	**188,98**	2	3	**658**	7	10	**131,59**	1	2	**435,6**	4	7	**176,08**	2	3
50(a)	**390,33**	4	6	**78,48**	1	1	**273,25**	3	4	**54,65**	1	1	**180,89**	2	3	**73,12**	1	1
50(b)	**975,28**	10	15	**196,09**	2	3	**682,75**	7	11	**136,54**	1	2	**451,99**	5	7	**182,7**	2	3
51	**656,38**	7	10	**131,97**	1	2	**459,5**	5	7	**91,89**	1	1	**304,19**	3	5	**122,96**	1	2
52(a)	**684,95**	7	11	**137,71**	1	2	**479,5**	5	7	**95,89**	1	1	**317,43**	3	5	**128,31**	1	2
52(b)	**454,97**	5	7	**91,47**	1	1	**318,5**	3	5	**63,69**	1	1	**210,85**	2	3	**85,23**	1	1
52(c)	**139,63**	1	2	**28,07**	0	0	**97,75**	1	2	**19,55**	0	0	**64,71**	1	1	**26,16**	0	0

52(d)	241,77	2	4	48,61	0	1	169,25	2	3	33,85	0	1	112,05	1	2	45,29	0	1
52(e)	548,89	5	8	110,36	1	2	384,25	4	6	76,84	1	1	254,38	3	4	102,82	1	2
53	863,15	9	13	173,54	2	3	604,25	6	9	120,84	1	2	400,02	4	6	161,69	2	2
54(a)	272,12	3	4	54,71	1	1	190,5	2	3	38,1	0	1	126,11	1	2	50,98	1	1
54(b)	231,77	2	4	46,6	0	1	162,25	2	2	32,45	0	0	107,41	1	2	43,42	0	1
54(c)	116,06	1	2	23,34	0	0	81,25	1	1	16,25	0	0	53,79	1	1	21,74	0	0
54(d)	418,9	4	6	84,22	1	1	293,25	3	5	58,65	1	1	194,14	2	3	78,47	1	1
54(e)	288,91	3	4	58,09	1	1	202,25	2	3	40,45	0	1	133,89	1	2	54,12	1	1
54(f)	1025,99	10	16	206,28	2	3	718,25	7	11	143,64	1	2	475,49	5	7	192,2	2	3
54(g)	821,37	8	13	165,14	2	3	575	6	9	114,99	1	2	380,66	4	6	153,87	2	2
54(h)	298,19	3	5	59,95	1	1	208,75	2	3	41,75	0	1	138,2	1	2	55,86	1	1
54(i)	1423,46	14	22	286,19	3	4	996,5	10	15	199,28	2	3	659,69	7	10	266,66	3	4
55(a)	361,04	4	6	72,59	1	1	252,75	3	4	50,55	1	1	167,32	2	3	67,63	1	1
55(b)	826,72	8	13	166,22	2	3	578,75	6	9	115,74	1	2	383,14	4	6	154,87	2	2
55(c)	313,55	3	5	63,04	1	1	219,5	2	3	43,9	0	1	145,31	1	2	58,74	1	1
55(d)	724,59	7	11	145,68	1	2	507,25	5	8	101,44	1	2	335,81	3	5	135,74	1	2
56	8489,72	85	131	1706,9	17	26	5943,25	59	91	1188,55	12	18	3934,5	39	61	1590,39	16	24
57	3707,58	37	57	745,43	7	11	2595,5	26	40	519,06	5	8	1718,25	17	26	694,55	7	11
58(a)	1006,71	10	15	202,4	2	3	704,75	7	11	140,94	1	2	466,55	5	7	188,59	2	3
58(b)	1164,2	12	18	234,07	2	4	815	8	13	162,99	2	3	539,54	5	8	218,09	2	3
59(a)	1105,63	11	17	222,29	2	3	774	8	12	154,79	2	2	512,4	5	8	207,12	2	3
59(b)	80,71	1	1	16,23	0	0	56,5	1	1	11,3	0	0	37,4	0	1	15,12	0	0
59(c)	1164,2	12	18	234,07	2	4	815	8	13	162,99	2	3	539,54	5	8	218,09	2	3
60(a)	1230,98	12	19	247,49	2	4	861,75	9	13	172,34	2	3	570,49	6	9	230,6	2	4
60(b)	377,11	4	6	75,82	1	1	264	3	4	52,8	1	1	174,77	2	3	70,65	1	1
60(c)	125,35	1	2	25,2	0	0	87,75	1	1	17,55	0	0	58,09	1	1	23,48	0	0

60(d)	**1791,65**	18	28	**360,22**	4	6	**1254,25**	13	19	**250,83**	3	4	**830,33**	8	13	**335,63**	3	5
60(e)	**402,11**	4	6	**80,85**	1	1	**281,5**	3	4	**56,3**	1	1	**186,36**	2	3	**75,33**	1	1
61(a)	**217,84**	2	3	**43,8**	0	1	**152,5**	2	2	**30,5**	0	0	**100,96**	1	2	**40,81**	0	1
61(b)	**107,49**	1	2	**21,61**	0	0	**75,25**	1	1	**15,05**	0	0	**49,82**	0	1	**20,14**	0	0
61(c)	**66,78**	1	1	**13,43**	0	0	**46,75**	0	1	**9,35**	0	0	**30,95**	0	0	**12,51**	0	0
62	**1088,13**	11	17	**218,77**	2	3	**761,75**	8	12	**152,34**	2	2	**504,29**	5	8	**203,84**	2	3
63	**279,26**	3	4	**56,15**	1	1	**195,5**	2	3	**39,1**	0	1	**129,42**	1	2	**52,32**	1	1

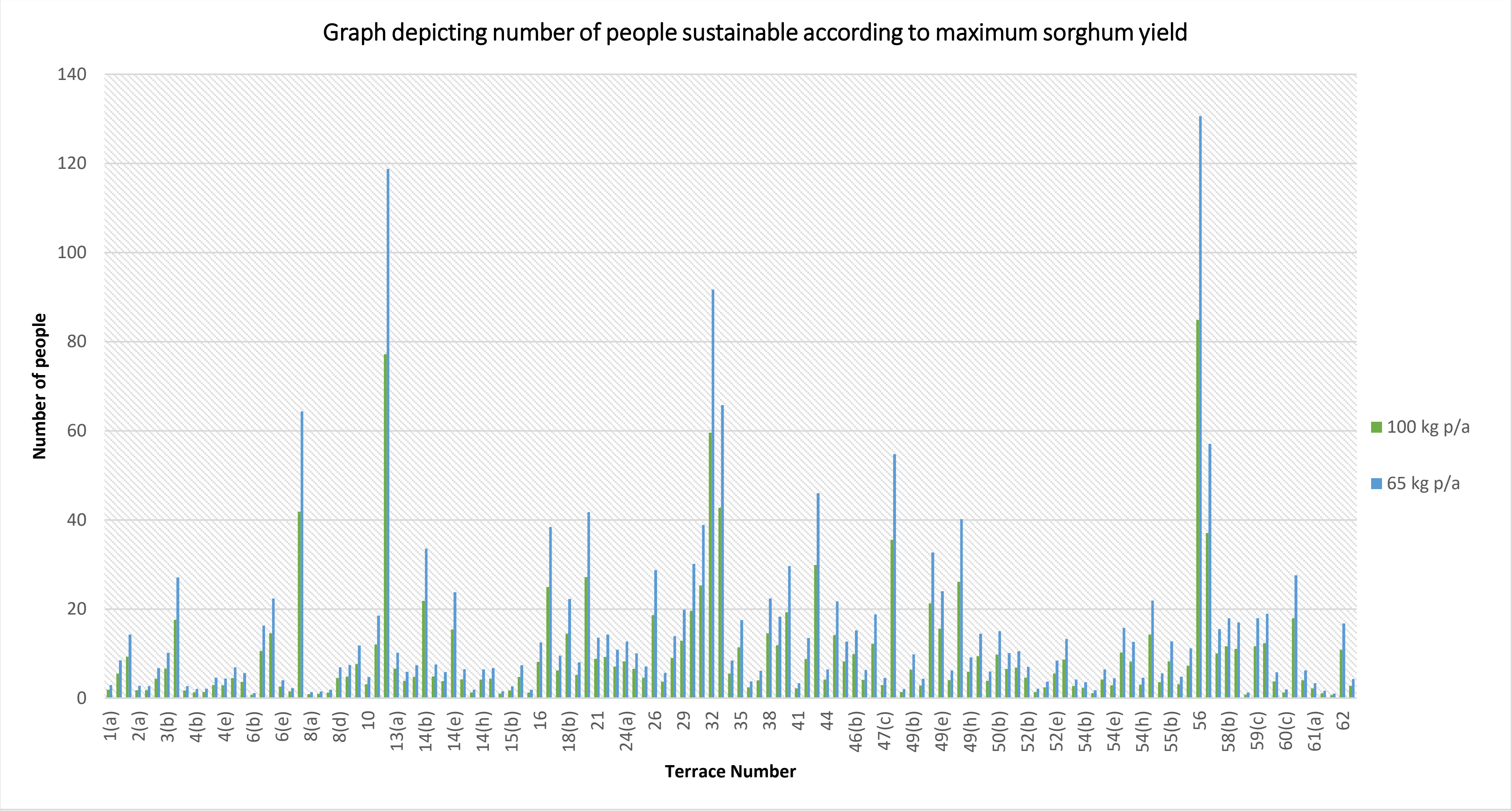

Figure A.1: Graph depicting number of people sustainable according to maximum sorghum yield

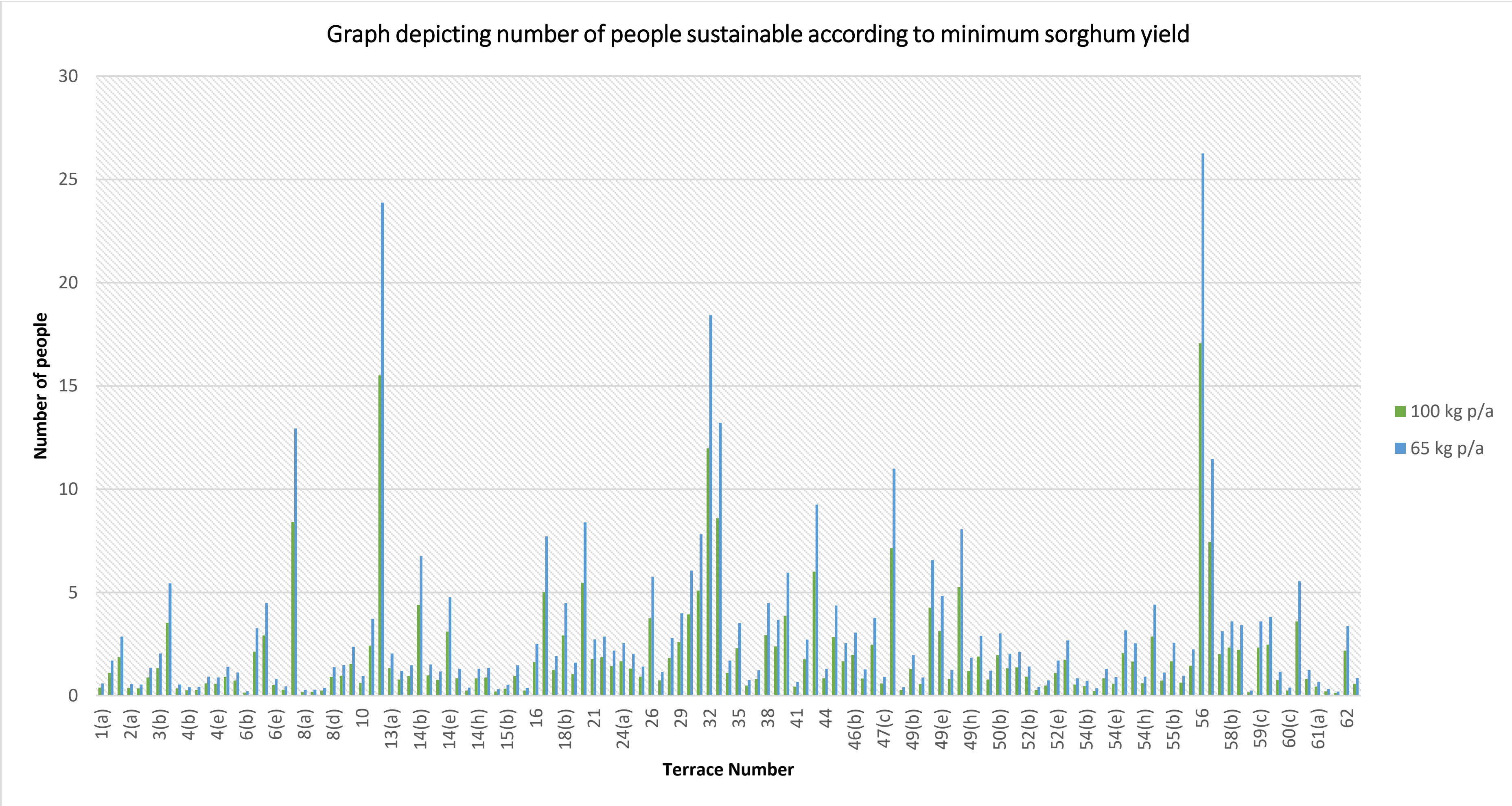

Figure A.2: Graph depicting number of people sustainable according to minimum sorghum yield

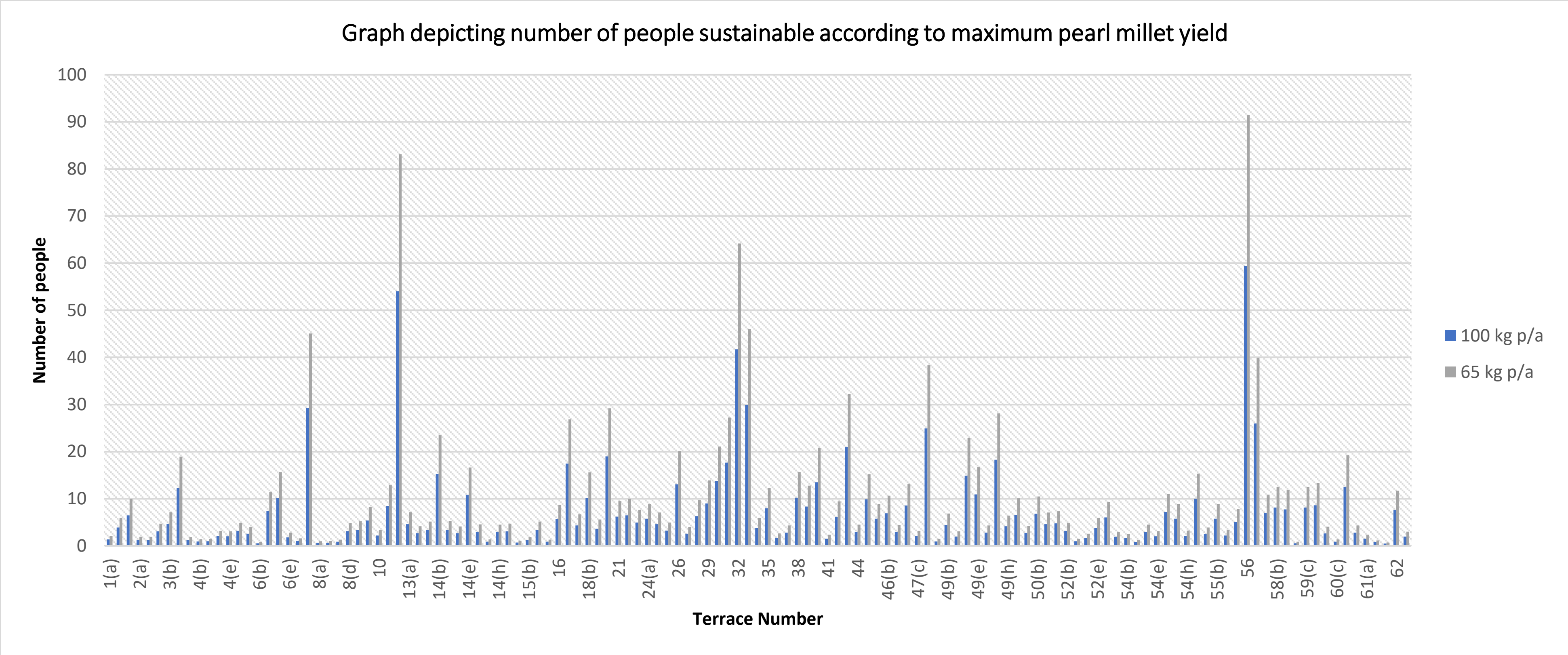

Figure A.3: Graph depicting number of people sustainable according to maximum pearl millet yield

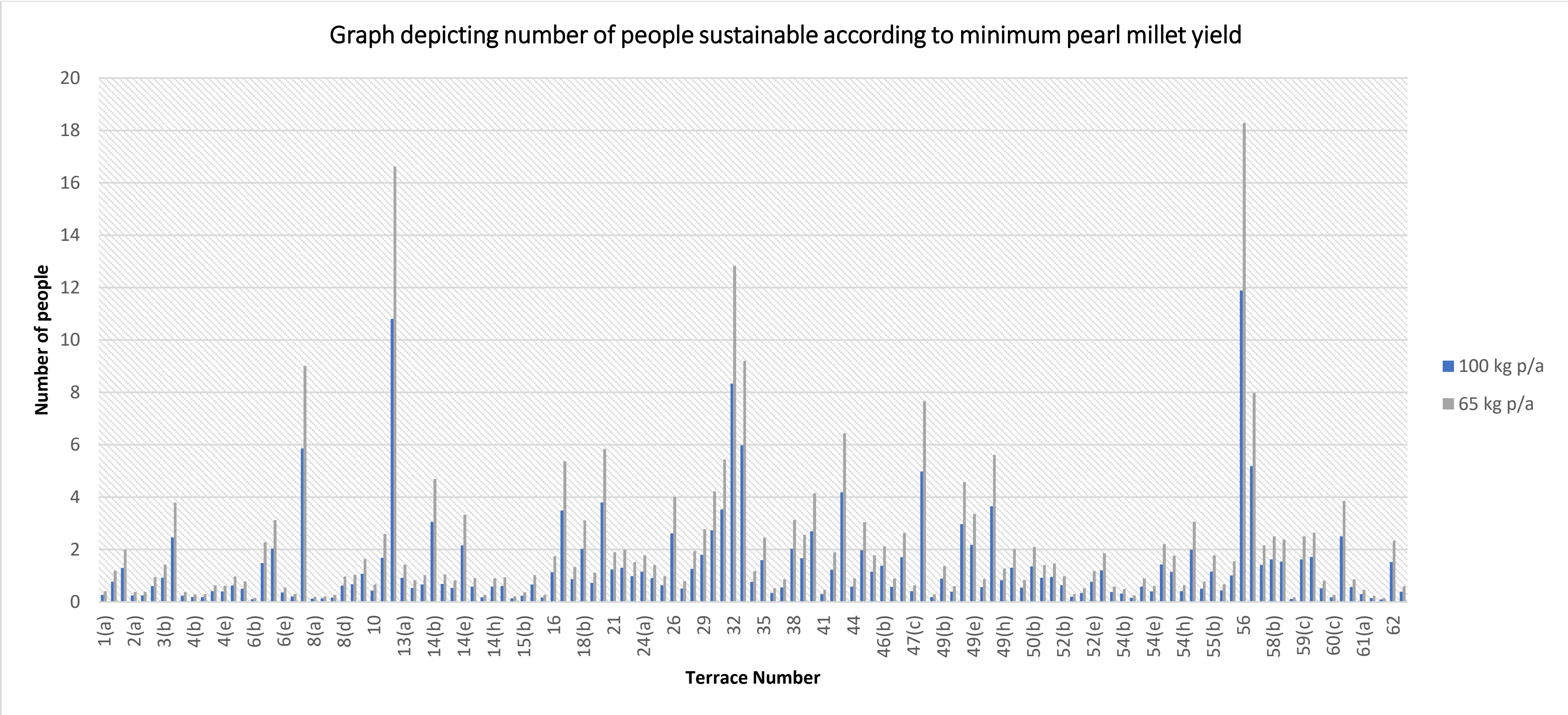

Figure A.4: Graph depicting number of people sustainable according to minimum pearl millet yield

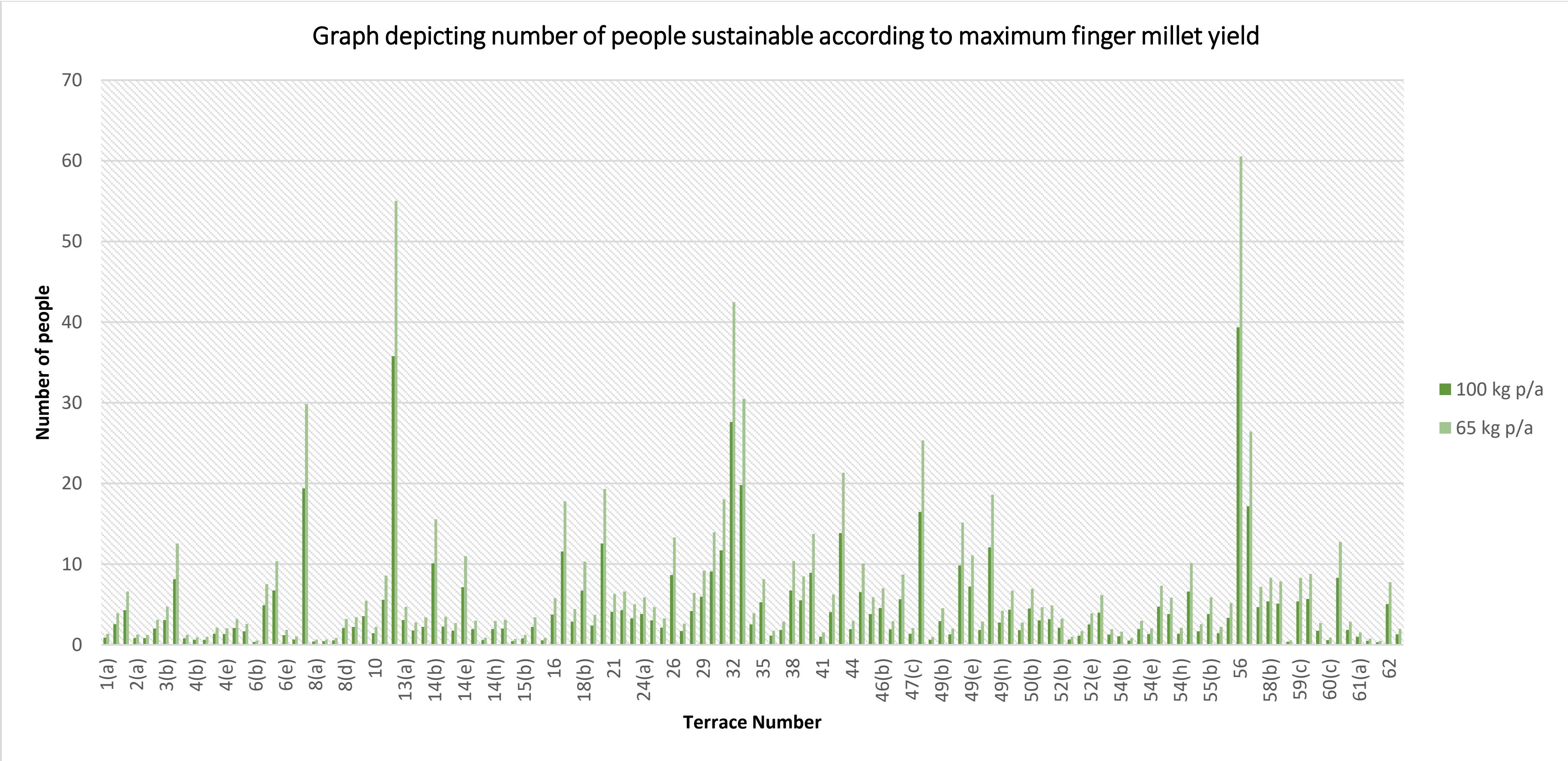

Figure A.5: Graph depicting number of people sustainable according to maximum finger millet yield

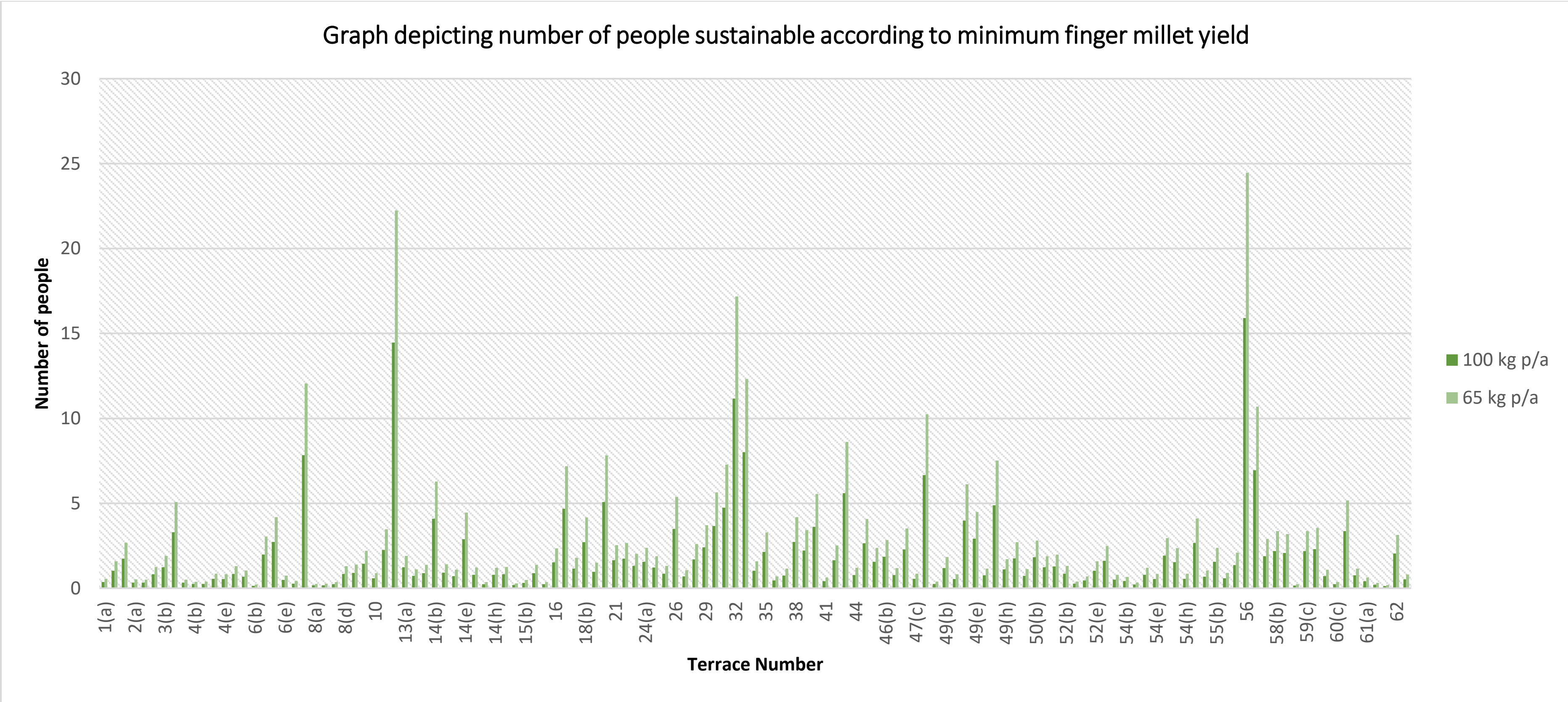

Figure A.6: Graph depicting number of people sustainable according to minimum finger millet yield

Table A.3: Yield calculations for surface areas before being demarcated at Moxomatsi main town

Terrace number	Area (m²)	Sorghum Min (kg)	Sorghum Max (kg)	Pearl Millet Min (kg)	Pearl Millet Max (kg)	Finger Millet Min (kg)	Finger Millet Max (kg)
1	5 473	392,96	1954,50	273,63	1368,25	366,14	905,80
2	2 158	154,94	770,66	107,89	539,50	144,37	357,16
3	8 908	639,59	3181,19	445,36	2227,00	595,94	1474,30
4	4 242	304,58	1514,89	212,08	1060,50	283,79	702,06
5	1 263	90,68	451,04	63,14	315,75	84,49	209,03
6	10 077	723,53	3598,66	503,81	2519,25	674,14	1667,77
7	11 715	841,14	4183,61	585,70	2928,75	783,72	1938,87
8	6 891	494,77	2460,89	344,52	1722,75	461,00	1140,48
9	2 148	154,23	767,09	107,39	537,00	143,70	355,50
10	868	62,32	309,98	43,40	217,00	58,07	143,66
11	3 375	242,33	1205,27	168,74	843,75	225,78	558,57
12	21 614	1551,89	7718,71	1080,61	5403,50	1445,95	3577,18
13	10 217	733,58	3648,65	510,81	2554,25	683,51	1690,94
14	24 800	1780,64	8856,48	1239,90	6200,00	1659,10	4104,47
15	3 584	257,33	1279,90	179,19	896,00	239,77	593,16
16	2 275	163,35	812,44	113,74	568,75	152,20	376,52
17	6 986	501,59	2494,81	349,27	1746,50	467,36	1156,20
18	12 158	872,94	4341,82	607,85	3039,50	813,36	2012,19
19	1 456	104,54	519,96	72,79	364,00	97,40	240,97
20	7 595	545,32	2712,30	379,72	1898,75	508,10	1257,00
21	2 472	177,49	882,79	123,59	618,00	165,37	409,12
22	2 595	186,32	926,72	129,74	648,75	173,60	429,48
23	1 978	142,02	706,38	98,89	494,50	132,33	327,36
24	11 862	851,69	4236,11	593,05	2965,50	793,56	1963,20
25	1 285	92,26	458,89	64,24	321,25	85,97	212,67

26	5 225	375,16	1865,93	261,23	1306,25	349,55	864,75
27	1 036	74,38	369,97	51,80	259,00	69,31	171,46
28	2 530	181,65	903,50	126,49	632,50	169,25	418,72
29	3 609	259,13	1288,83	180,44	902,25	241,44	597,30
30	5 486	393,89	1959,14	274,28	1371,50	367,01	907,95
31	7 077	508,13	2527,31	353,82	1769,25	473,44	1171,26
32	16 688	1198,20	5959,55	834,33	4172,00	1116,41	2761,91
33	11 967	859,23	4273,61	598,30	2991,75	800,58	1980,57
34	1 538	110,43	549,24	76,89	384,50	102,89	254,54
35	3 193	229,26	1140,27	159,64	798,25	213,61	528,45
36	681	48,90	243,20	34,05	170,25	45,56	112,71
37	1 122	80,56	400,68	56,10	280,50	75,06	185,69
38	4 073	292,44	1454,53	203,63	1018,25	272,48	674,09
39	3 329	239,02	1188,84	166,44	832,25	222,71	550,96
40	5 396	387,43	1927,00	269,78	1349,00	360,99	893,05
41	609	43,73	217,48	30,45	152,25	40,74	100,79
42	2 456	176,34	877,08	122,79	614,00	164,30	406,48
43	8 373	601,18	2990,13	418,62	2093,25	560,15	1385,76
44	1 172	84,15	418,54	58,60	293,00	78,41	193,97
45	3 955	283,97	1412,39	197,73	988,75	264,59	654,56
46	5 155	370,13	1840,93	257,73	1288,75	344,86	853,17
47	6 402	459,66	2286,26	320,07	1600,50	428,29	1059,55
48	9 960	715,13	3556,88	497,96	2490,00	666,31	1648,41
49	30 912	2219,48	11039,17	1545,48	7728,00	2067,98	5116,03
50	3 805	273,20	1358,83	190,23	951,25	254,55	629,74
51	1 838	131,97	656,38	91,89	459,50	122,96	304,19
52	8 477	608,65	3027,27	423,82	2119,25	567,10	1402,97

53	2 417	173,54	863,15	120,84	604,25	161,69	400,02
54	17 934	1287,66	6404,52	896,63	4483,50	1199,77	2968,13
55	11 236	806,74	4012,56	561,76	2809,00	751,68	1859,59
56	23 773	1706,90	8489,72	1188,55	5943,25	1590,39	3934,50
57	10 382	745,43	3707,58	519,06	2595,50	694,55	1718,25
58	9 076	651,66	3241,18	453,76	2269,00	607,18	1502,11
59	10 559	758,14	3770,79	527,91	2639,75	706,39	1747,55
60	25 585	1837,00	9136,81	1279,15	6396,25	1711,61	4234,39
61	2 173	156,02	776,01	108,64	543,25	145,37	359,64
62	3 047	218,77	1088,13	152,34	761,75	203,84	504,29
63	782	56,15	279,26	39,10	195,50	52,32	129,42

Table A.4: Table showing number of people sustainable according to yield before terrace demarcations

Terrace number	Sorghum Max (kg)	100 kg p/a	65 kg p/a	Sorghum Min (kg)	100 kg p/a	65 kg p/a	Pearl Millet Max (kg)	100 kg p/a	65 kg p/a	Pearl Millet Min (kg)	100 kg p/a	65 kg p/a	Finger Millet Max (kg)	100 kg p/a	65 kg p/a	Finger Millet Min (kg)	100 kg p/a	65 kg p/a
1	**1954,5**	20	30	**392,96**	4	6	**1368,25**	14	21	**273,63**	3	4	**905,8**	9	14	**366,14**	4	6
2	**770,66**	8	12	**154,94**	2	2	**539,5**	5	8	**107,89**	1	2	**357,16**	4	5	**144,37**	1	2
3	**3181,19**	32	49	**639,59**	6	10	**2227**	22	34	**445,36**	4	7	**1474,3**	15	23	**595,94**	6	9
4	**1514,89**	15	23	**304,58**	3	5	**1060,5**	11	16	**212,08**	2	3	**702,06**	7	11	**283,79**	3	4
5	**451,04**	5	7	**90,68**	1	1	**315,75**	3	5	**63,14**	1	1	**209,03**	2	3	**84,49**	1	1
6	**3598,66**	36	55	**723,53**	7	11	**2519,25**	25	39	**503,81**	5	8	**1667,77**	17	26	**674,14**	7	10
7	**4183,61**	42	64	**841,14**	8	13	**2928,75**	29	45	**585,7**	6	9	**1938,87**	19	30	**783,72**	8	12
8	**2460,89**	25	38	**494,77**	5	8	**1722,75**	17	27	**344,52**	3	5	**1140,48**	11	18	**461**	5	7
9	**767,09**	8	12	**154,23**	2	2	**537**	5	8	**107,39**	1	2	**355,5**	4	5	**143,7**	1	2
10	**309,98**	3	5	**62,32**	1	1	**217**	2	3	**43,4**	0	1	**143,66**	1	2	**58,07**	1	1
11	**1205,27**	12	19	**242,33**	2	4	**843,75**	8	13	**168,74**	2	3	**558,57**	6	9	**225,78**	2	3
12	**7718,71**	77	119	**1551,89**	16	24	**5403,5**	54	83	**1080,61**	11	17	**3577,18**	36	55	**1445,95**	14	22
13	**3648,65**	36	56	**733,58**	7	11	**2554,25**	26	39	**510,81**	5	8	**1690,94**	17	26	**683,51**	7	11
14	**8856,48**	89	136	**1780,64**	18	27	**6200**	62	95	**1239,9**	12	19	**4104,47**	41	63	**1659,1**	17	26
15	**1279,9**	13	20	**257,33**	3	4	**896**	9	14	**179,19**	2	3	**593,16**	6	9	**239,77**	2	4
16	**812,44**	8	12	**163,35**	2	3	**568,75**	6	9	**113,74**	1	2	**376,52**	4	6	**152,2**	2	2
17	**2494,81**	25	38	**501,59**	5	8	**1746,5**	17	27	**349,27**	3	5	**1156,2**	12	18	**467,36**	5	7
18	**4341,82**	43	67	**872,94**	9	13	**3039,5**	30	47	**607,85**	6	9	**2012,19**	20	31	**813,36**	8	13
19	**519,96**	5	8	**104,54**	1	2	**364**	4	6	**72,79**	1	1	**240,97**	2	4	**97,4**	1	1
20	**2712,3**	27	42	**545,32**	5	8	**1898,75**	19	29	**379,72**	4	6	**1257**	13	19	**508,1**	5	8
21	**882,79**	9	14	**177,49**	2	3	**618**	6	10	**123,59**	1	2	**409,12**	4	6	**165,37**	2	3
22	**926,72**	9	14	**186,32**	2	3	**648,75**	6	10	**129,74**	1	2	**429,48**	4	7	**173,6**	2	3
23	**706,38**	7	11	**142,02**	1	2	**494,5**	5	8	**98,89**	1	2	**327,36**	3	5	**132,33**	1	2
24	**4236,11**	42	65	**851,69**	9	13	**2965,5**	30	46	**593,05**	6	9	**1963,2**	20	30	**793,56**	8	12

25	**458,89**	5	7	**92,26**	1	1	**321,25**	3	5	**64,24**	1	1	**212,67**	2	3	**85,97**	1	1
26	**1865,93**	19	29	**375,16**	4	6	**1306,25**	13	20	**261,23**	3	4	**864,75**	9	13	**349,55**	3	5
27	**369,97**	4	6	**74,38**	1	1	**259**	3	4	**51,8**	1	1	**171,46**	2	3	**69,31**	1	1
28	**903,5**	9	14	**181,65**	2	3	**632,5**	6	10	**126,49**	1	2	**418,72**	4	6	**169,25**	2	3
29	**1288,83**	13	20	**259,13**	3	4	**902,25**	9	14	**180,44**	2	3	**597,3**	6	9	**241,44**	2	4
30	**1959,14**	20	30	**393,89**	4	6	**1371,5**	14	21	**274,28**	3	4	**907,95**	9	14	**367,01**	4	6
31	**2527,31**	25	39	**508,13**	5	8	**1769,25**	18	27	**353,82**	4	5	**1171,26**	12	18	**473,44**	5	7
32	**5959,55**	60	92	**1198,2**	12	18	**4172**	42	64	**834,33**	8	13	**2761,91**	28	42	**1116,41**	11	17
33	**4273,61**	43	66	**859,23**	9	13	**2991,75**	30	46	**598,3**	6	9	**1980,57**	20	30	**800,58**	8	12
34	**549,24**	5	8	**110,43**	1	2	**384,5**	4	6	**76,89**	1	1	**254,54**	3	4	**102,89**	1	2
35	**1140,27**	11	18	**229,26**	2	4	**798,25**	8	12	**159,64**	2	2	**528,45**	5	8	**213,61**	2	3
36	**243,2**	2	4	**48,9**	0	1	**170,25**	2	3	**34,05**	0	1	**112,71**	1	2	**45,56**	0	1
37	**400,68**	4	6	**80,56**	1	1	**280,5**	3	4	**56,1**	1	1	**185,69**	2	3	**75,06**	1	1
38	**1454,53**	15	22	**292,44**	3	4	**1018,25**	10	16	**203,63**	2	3	**674,09**	7	10	**272,48**	3	4
39	**1188,84**	12	18	**239,02**	2	4	**832,25**	8	13	**166,44**	2	3	**550,96**	6	8	**222,71**	2	3
40	**1927**	19	30	**387,43**	4	6	**1349**	13	21	**269,78**	3	4	**893,05**	9	14	**360,99**	4	6
41	**217,48**	2	3	**43,73**	0	1	**152,25**	2	2	**30,45**	0	0	**100,79**	1	2	**40,74**	0	1
42	**877,08**	9	13	**176,34**	2	3	**614**	6	9	**122,79**	1	2	**406,48**	4	6	**164,3**	2	3
43	**2990,13**	30	46	**601,18**	6	9	**2093,25**	21	32	**418,62**	4	6	**1385,76**	14	21	**560,15**	6	9
44	**418,54**	4	6	**84,15**	1	1	**293**	3	5	**58,6**	1	1	**193,97**	2	3	**78,41**	1	1
45	**1412,39**	14	22	**283,97**	3	4	**988,75**	10	15	**197,73**	2	3	**654,56**	7	10	**264,59**	3	4
46	**1840,93**	18	28	**370,13**	4	6	**1288,75**	13	20	**257,73**	3	4	**853,17**	9	13	**344,86**	3	5
47	**2286,26**	23	35	**459,66**	5	7	**1600,5**	16	25	**320,07**	3	5	**1059,55**	11	16	**428,29**	4	7
48	**3556,88**	36	55	**715,13**	7	11	**2490**	25	38	**497,96**	5	8	**1648,41**	16	25	**666,31**	7	10
49	**11039,2**	110	170	**2219,48**	22	34	**7728**	77	119	**1545,48**	15	24	**5116,03**	51	79	**2067,98**	21	32
50	**1358,83**	14	21	**273,2**	3	4	**951,25**	10	15	**190,23**	2	3	**629,74**	6	10	**254,55**	3	4
51	**656,38**	7	10	**131,97**	1	2	**459,5**	5	7	**91,89**	1	1	**304,19**	3	5	**122,96**	1	2
52	**3027,27**	30	47	**608,65**	6	9	**2119,25**	21	33	**423,82**	4	7	**1402,97**	14	22	**567,1**	6	9

53	**863,15**	9	13	**173,54**	2	3	**604,25**	6	9	**120,84**	1	2	**400,02**	4	6	**161,69**	2	2
54	**6404,52**	64	99	**1287,66**	13	20	**4483,5**	45	69	**896,63**	9	14	**2968,13**	30	46	**1199,77**	12	18
55	**4012,56**	40	62	**806,74**	8	12	**2809**	28	43	**561,76**	6	9	**1859,59**	19	29	**751,68**	8	12
56	**8489,72**	85	131	**1706,9**	17	26	**5943,25**	59	91	**1188,55**	12	18	**3934,5**	39	61	**1590,39**	16	24
57	**3707,58**	37	57	**745,43**	7	11	**2595,5**	26	40	**519,06**	5	8	**1718,25**	17	26	**694,55**	7	11
58	**3241,18**	32	50	**651,66**	7	10	**2269**	23	35	**453,76**	5	7	**1502,11**	15	23	**607,18**	6	9
59	**3770,79**	38	58	**758,14**	8	12	**2639,75**	26	41	**527,91**	5	8	**1747,55**	17	27	**706,39**	7	11
60	**9136,81**	91	141	**1837**	18	28	**6396,25**	64	98	**1279,15**	13	20	**4234,39**	42	65	**1711,61**	17	26
61	**776,01**	8	12	**156,02**	2	2	**543,25**	5	8	**108,64**	1	2	**359,64**	4	6	**145,37**	1	2
62	**1088,13**	11	17	**218,77**	2	3	**761,75**	8	12	**152,34**	2	2	**504,29**	5	8	**203,84**	2	3
63	**279,26**	3	4	**56,15**	1	1	**195,5**	2	3	**39,1**	0	1	**129,42**	1	2	**52,32**	1	1

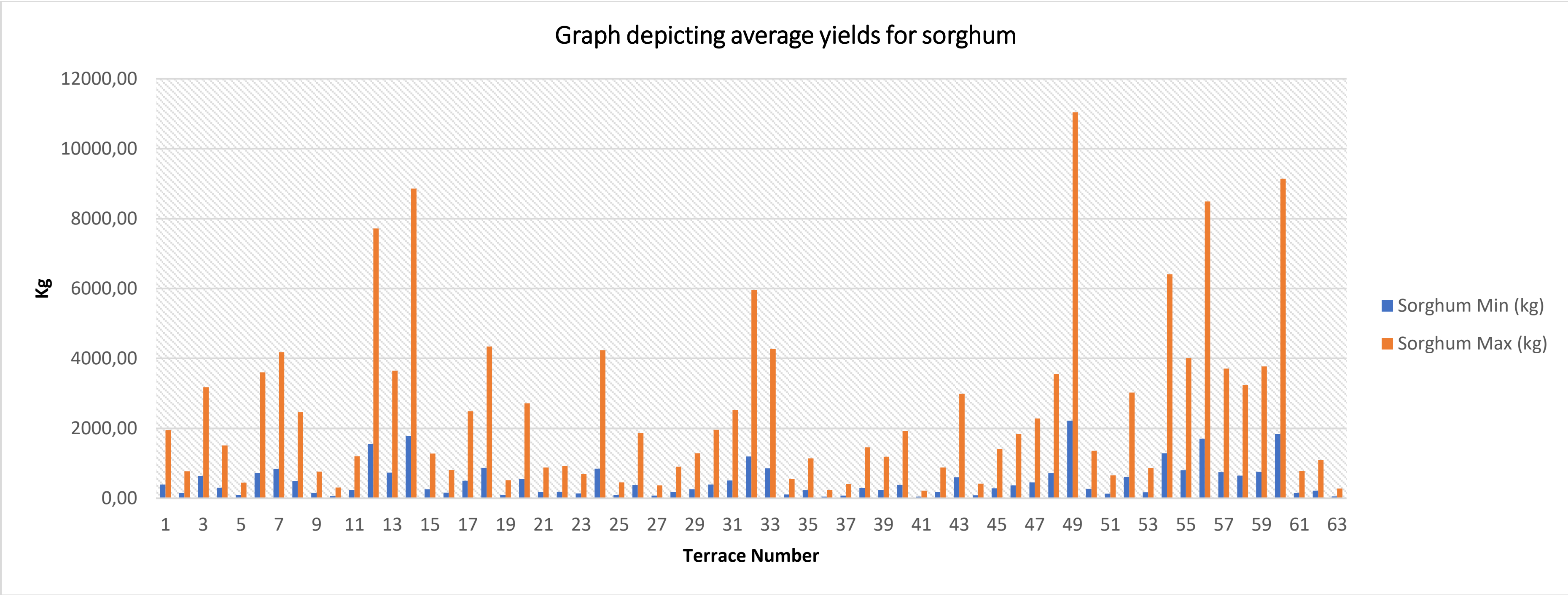

Figure A.7: Graph depicting average yields for sorghum

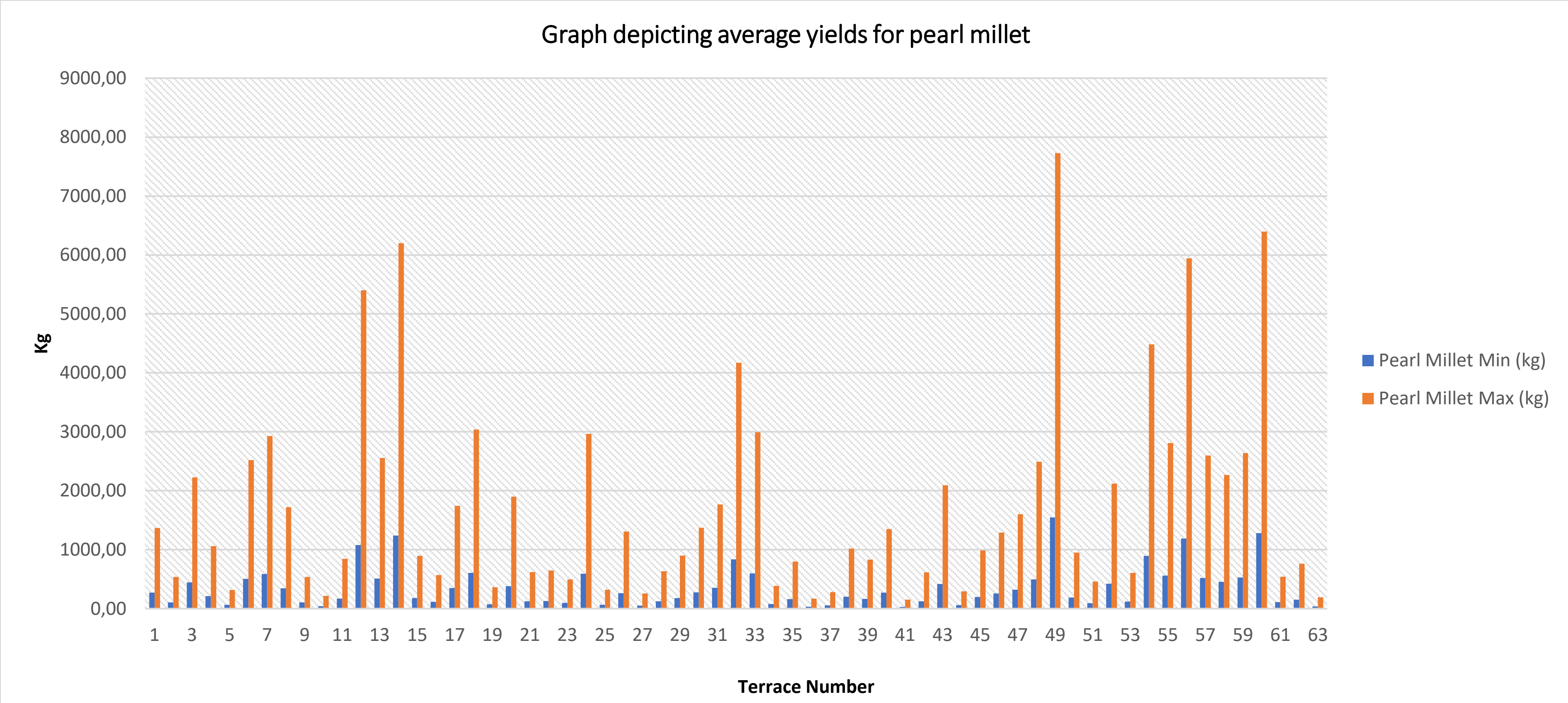

Figure A.8: Graph depicting average yields for pearl millet

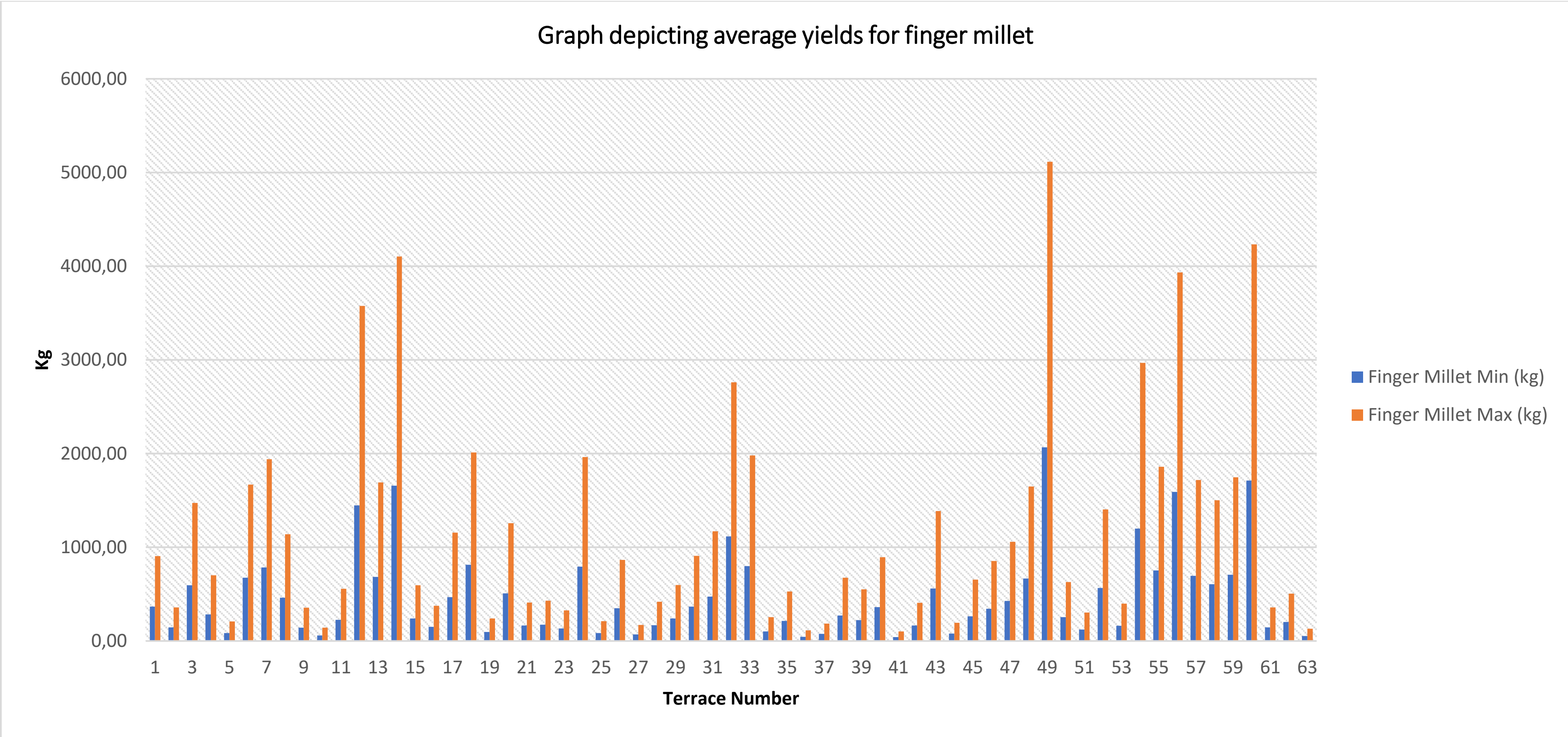

Figure A.9: Graph depicting average yields for finger millet

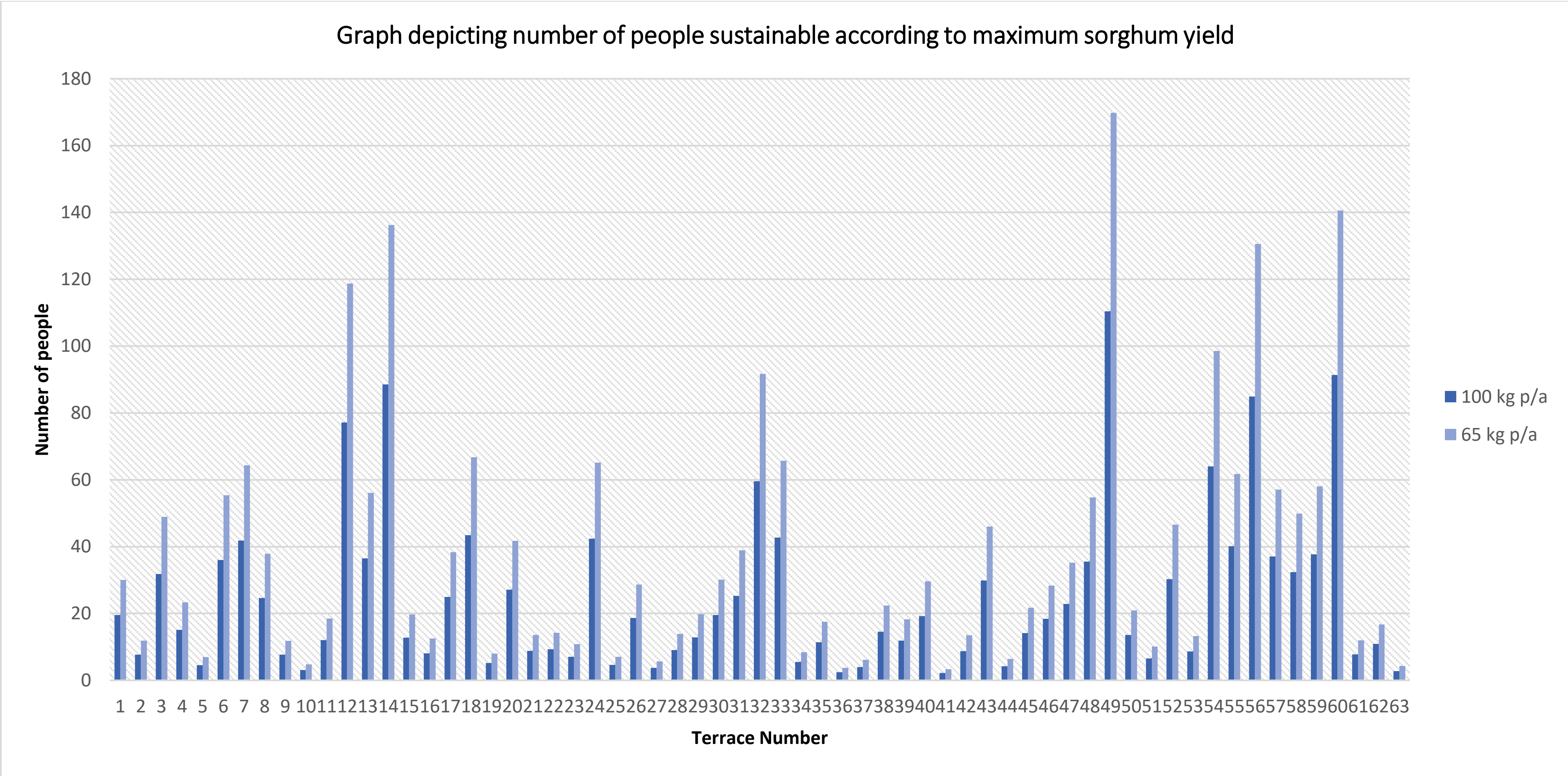

Figure A.10: Graph depicting number of people sustainable according to maximum sorghum

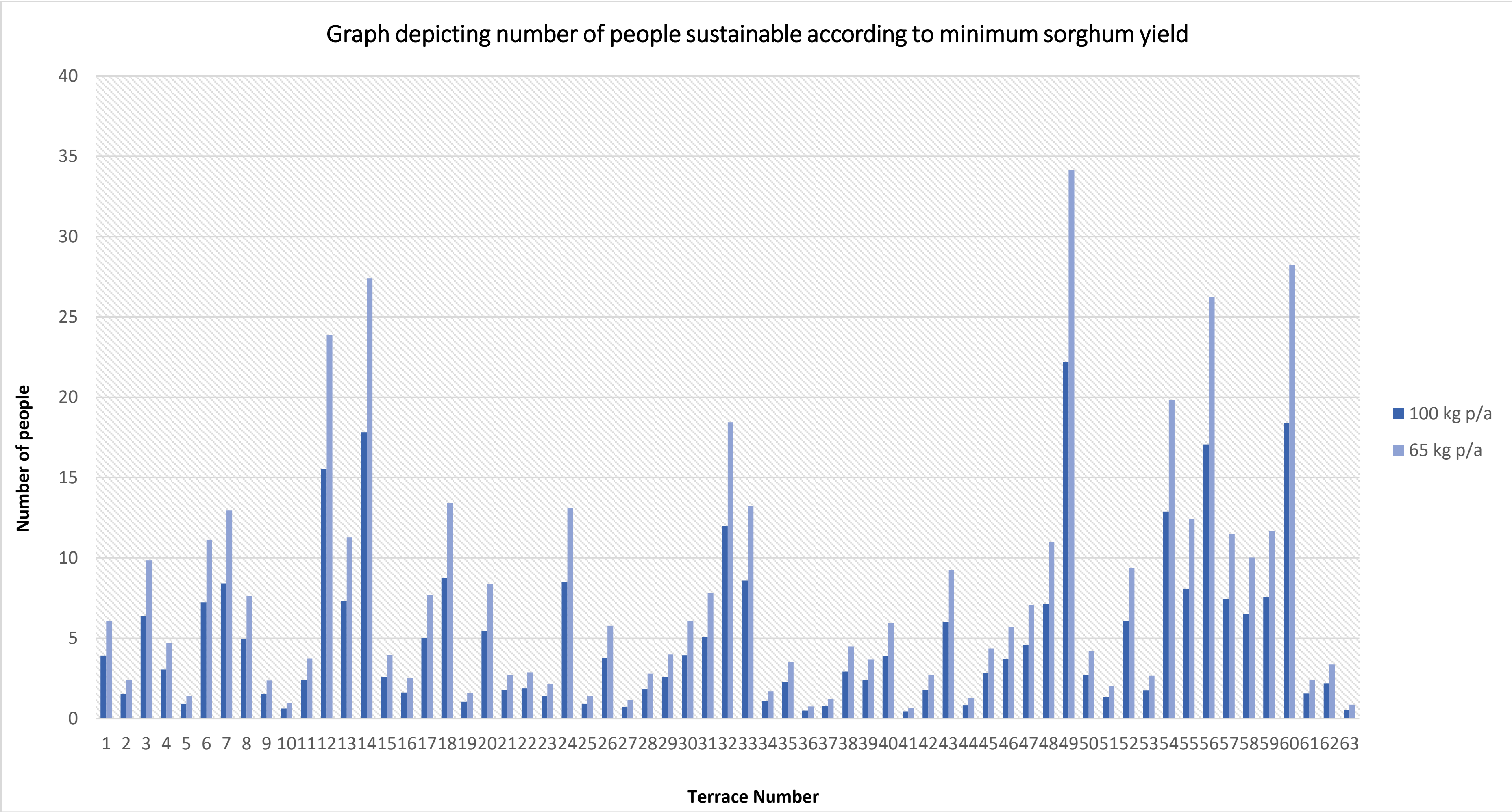

Figure A.11: Graph depicting number of people sustainable according to minimum sorghum yield

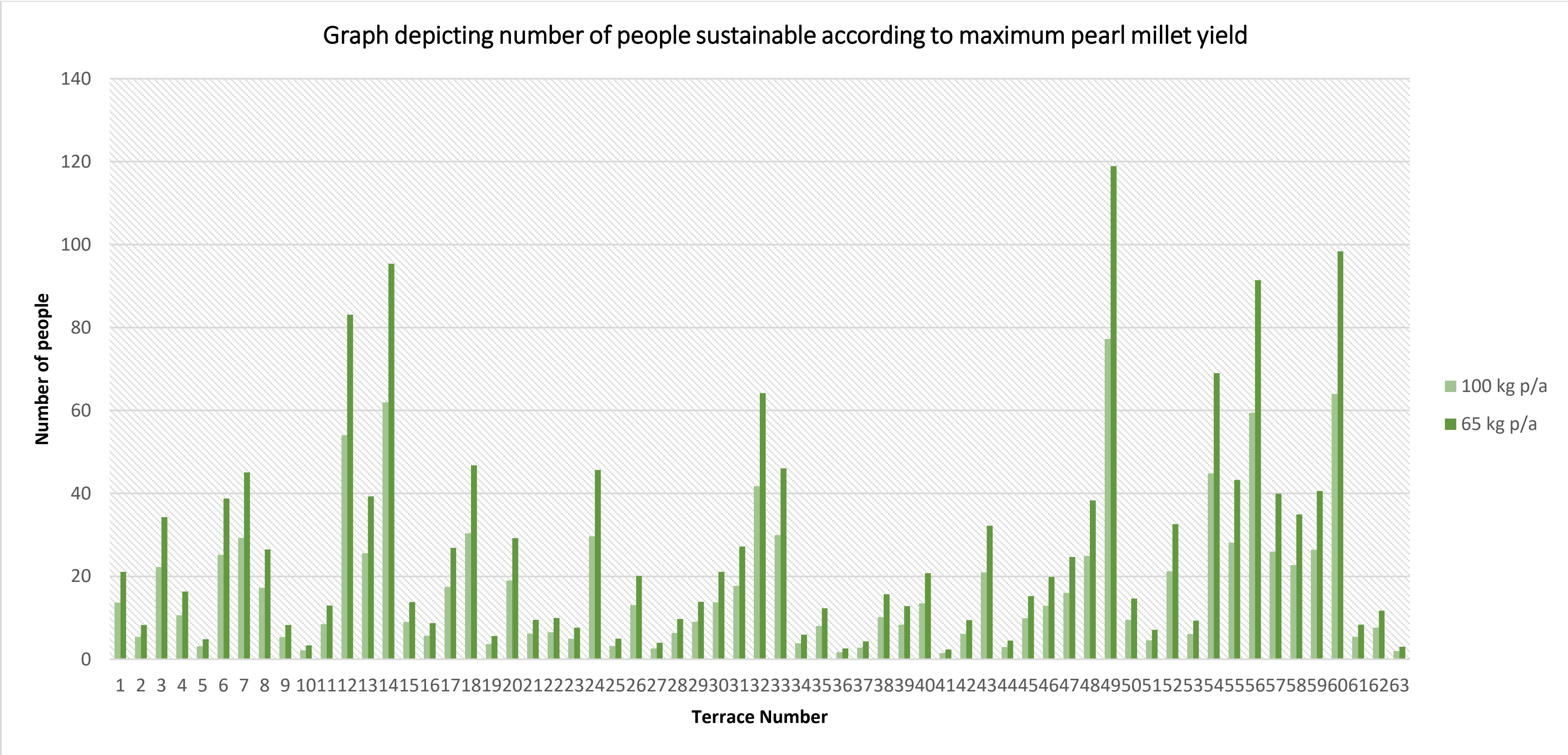

Figure A.12: Graph depicting number of people sustainable according to maximum pearl millet yield

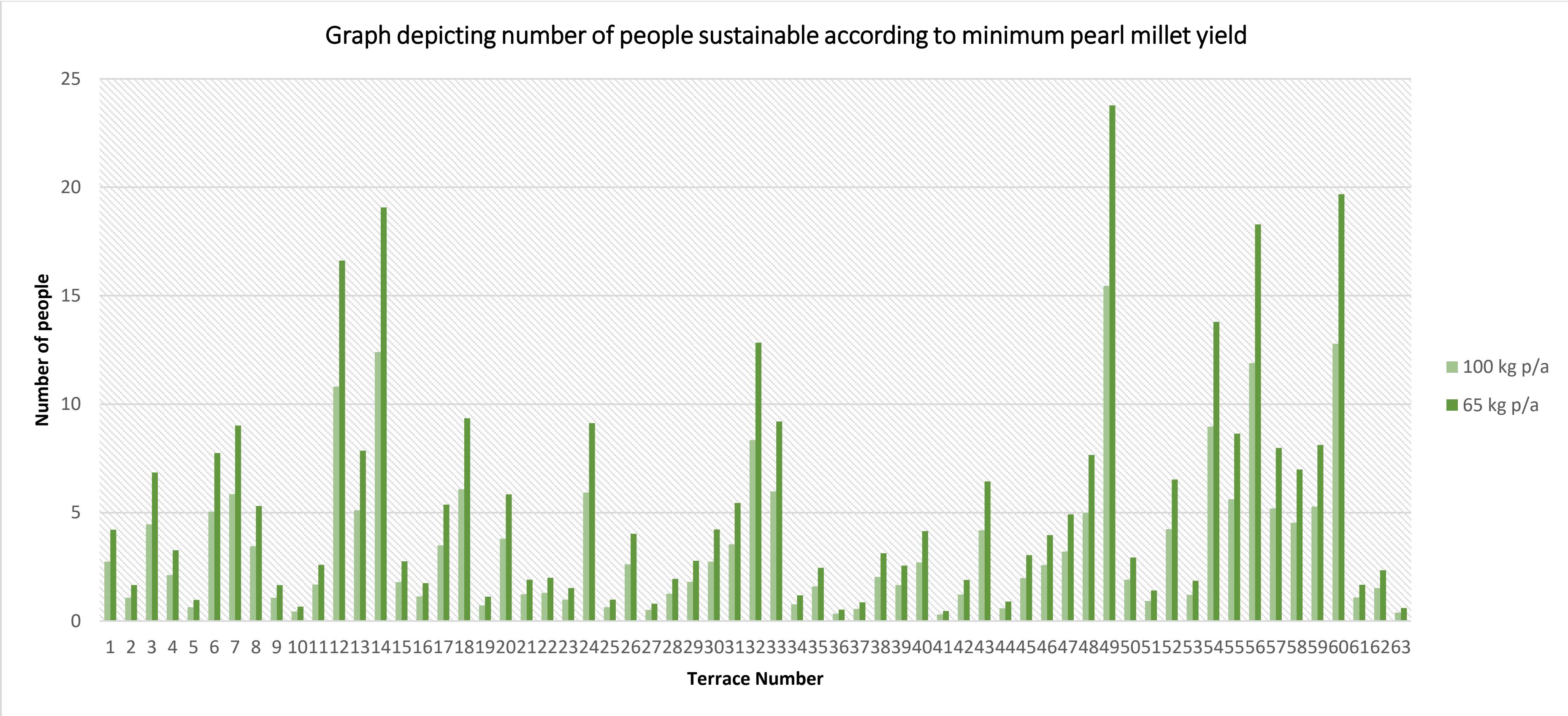

Figure A.13: Graph depicting number of people sustainable according to minimum pearl millet yield

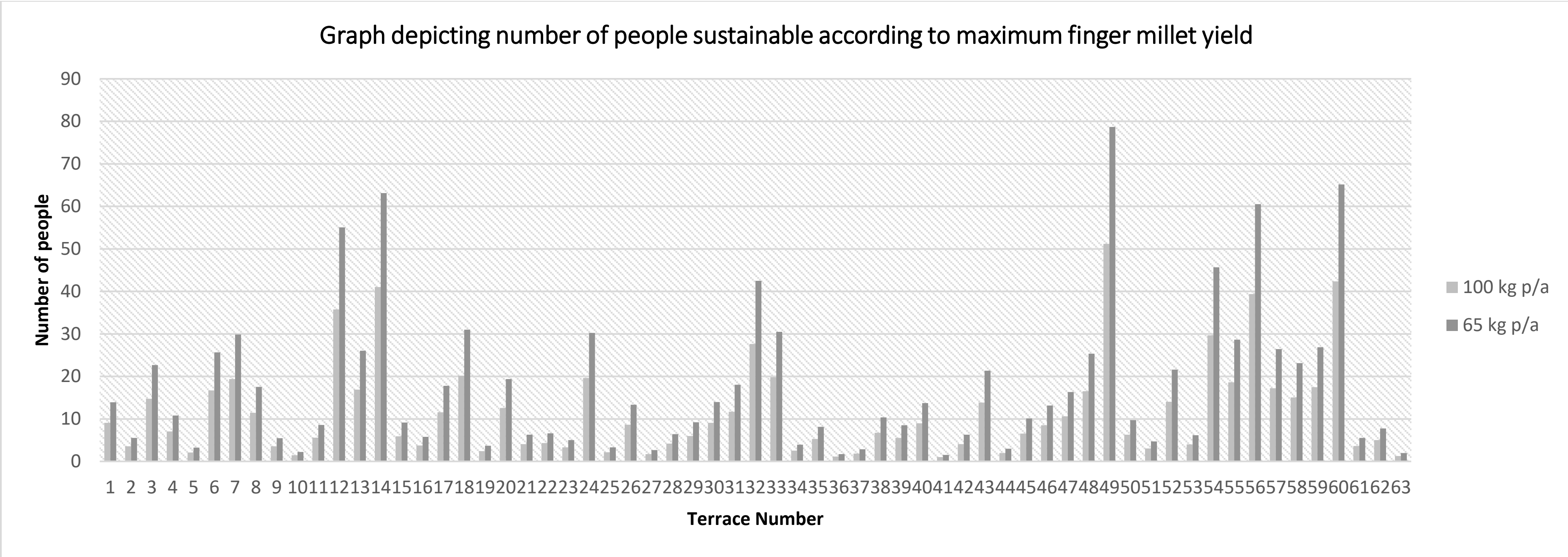

Figure A.14: Graph depicting number of people sustainable according to maximum finger millet yield

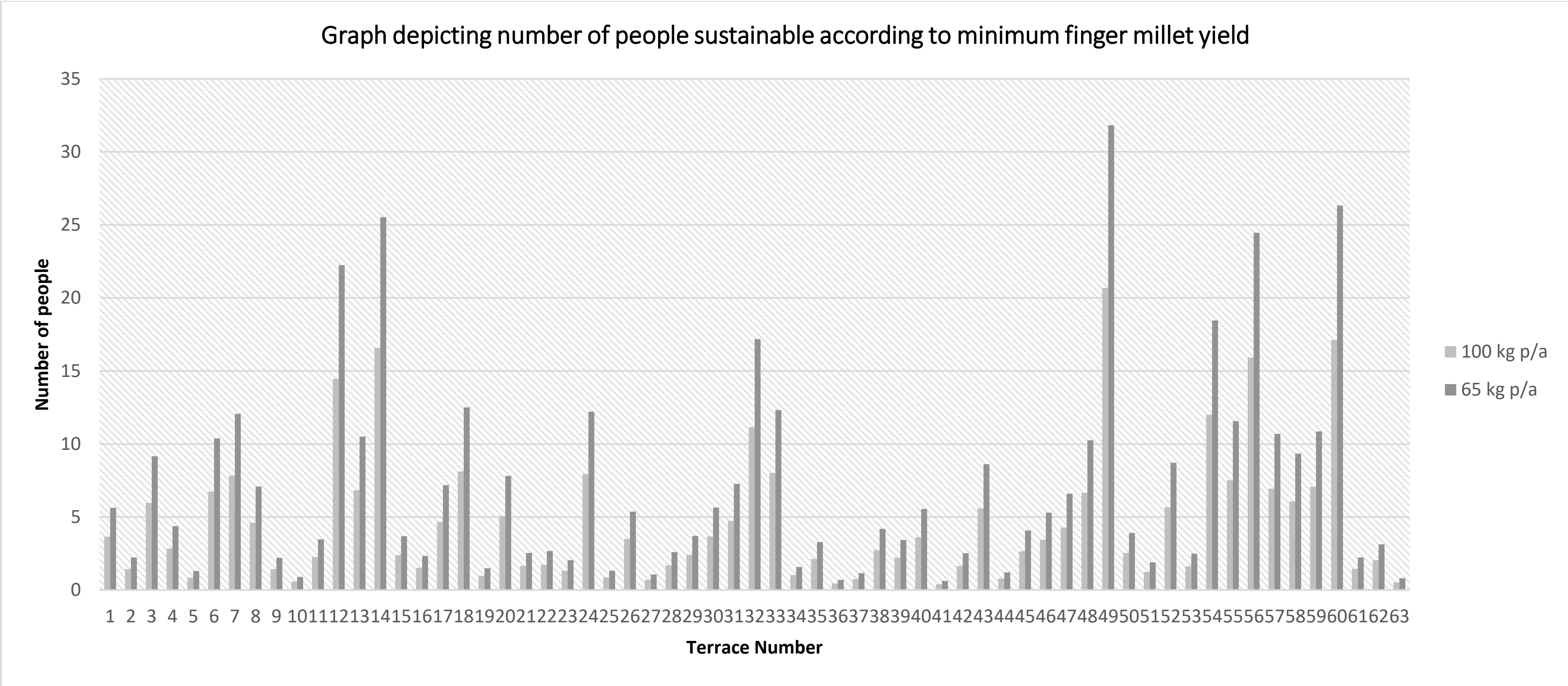

Figure A.15: Graph depicting number of people sustainable according to minimum finger millet yield

APPENDIX B: REFITTED POTSHERDS OF HOMESTEADS MX 1 AND MX 3

Figure B.1: Refitted sherds from square III/C at MX 1, photograph by A. Masolo

Figure B.2: Refitted sherds from square III/C at MX 1, photograph by A. Masolo

Figure B.3: Refitted sherds from square III/C at MX 1, photograph by A. Masolo

Figure B.4: Refitted sherds from square III/C at MX 1, photograph by A. Masolo

Figure B.5: Refitted sherds from square III/C at MX 1, photograph by A. Masolo

Figure B.6: Refitted sherds found in situ in square XXIV/L at MX 3, photograph by A. Masolo