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Farmers' perspectives with regard to crop production: an analysis of Nkonkobe Municipality, South Africa

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Abstract

This exploratory study evaluated biophysical, cultural and socio-economic factors affecting crop production and land utilisation in the Nkonkobe Municipality, South Africa. The study sought to establish what farmers in the area perceive as serious threats to crop production, drivers for land abandonment, and how best current agricultural production could be intensified. The farmers' perspectives were assessed through interviews using semi-structured and open-ended questionnaires. The results of the study revealed declining crop productivity and increase in land abandonment in the Municipality. The biophysical drivers of land abandonment were low and erratic rainfall and land degradation while the socio-economic drivers were labour shortages due to old age and youth movement to cities, lack of farming equipment and security concerns. The most abandoned crops were maize, sorghum and wheat. This trend was attributed to the labour intensiveness of cereal production and a shift in dietary preference to purchased rice. These findings should be factored in any programmes that seek to increase land utilisation and crop productivity in the Municipality.

Keywords: crop production, degradation, erratic rainfall, food security, land abandonment

1 Introduction

Many agricultural projects have failed because of a lack of knowledge of the biophysical, cultural and socio-economic variables affecting agriculture and rural livelihoods (FAO, 1997). The situation is pronounced in former homelands of South Africa, including the Transkei and Ciskei in the Eastern Cape Province, where there has been a general decline in agricultural production (Hebinck & Van Averbeke, 2007). Reasons for this decline in crop production in former homelands include crop diseases; adverse climate and water deficits; lack of assets for agricultural production; diminishing farm sizes; changes to government support for irrigated agriculture after the regime change in 1994; poor health and education (Vink & Van Rooyen, 2009; Baiphethi & Jacobs, 2009); limited availability of suitable land (Van Averbeke & Marais, 1991; Van Averbeke & Bennett, 2007; Shackleton *et al*., 2013); able-bodied young men being away as migrant labourers and increased dependency on government grants since 1994 (Hebinck & Van Averbeke, 2007). Expenditure on food has consequently risen to between 60–80 % of the total income for low-income households (Baiphethi & Jacobs, 2009). Identification and development of appropriate intervention measures to stimulate food production and reduce reliance on purchased food are therefore necessary.

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A reconnaissance of Nkonkobe Municipality showed that large areas of previously cultivated land have been abandoned. According to an unpublished report by Van Averbeke in 2003, quoted by Laker (2004b), a survey of four rural villages in the Tyume valley in Nkonkobe Municipality found that 50–80 % of the cultivated areas had been abandoned. Large scale abandonment of cultivated fields is also found in other parts of the world. A study on changes in land use patterns in West Bahia district of Brazil found that between 1985 and 2000 about 1.6 million ha land were cleared and brought into cultivation (Batistella & Valladares, 2009). During the same period about 320,000 ha that were cultivated in 1985 were abandoned, i.e. about 20 % as much land was abandoned as was brought under new cultivation during that period. In contrast the proportion of abandoned fields in the Wild Coast region of the former Transkei homeland in the Eastern Cape was almost insignificant, being only 1.5 % in 1961 and 6.9 % in 2009 (Shackleton *et al.*, 2013). The difference is that the latter has higher annual rainfall (800 to 1,000 mm) and much more stable high quality soils than the problem areas in Nkonkobe Municipality.

Many of the abandoned cultivated fields in Nkonkobe Municipality show very severe gully erosion (D'Huyvetter, 1985). In a 1998 unpublished document, Kakembo, quoted by Laker (2004a), even refers to abandoned cultivated fields in this region as gully erosion "hot spots". There are, however, also many abandoned fields that do not show any signs of erosion. It would be very important to determine why such fields were abandoned and which of them could be recommended for cultivation again.

In Nkonkobe Municipality government services and employment is the biggest contributor to the GDP, contributing 44 % of the gross domestic product (GDP), with agriculture the second largest contributor, with a market share of 17 % (IDP, 2008). There is some tourism potential, but no mining potential and industrial potential is very limited. It is therefore necessary that the productivity of available agricultural land be maximised to increase the contribution of agriculture to the GDP. There are three categories of land that need optimisation, i.e. (i) the previously highly productive white commercial farms, which were bought out by the apartheid government during the late 1970s and incorporated into the then Ciskei as part of the homeland consolidation process, but are presently abandoned and unproductive, (ii) some of the previous cultivated native lands that lie abandoned for which the reasons are yet to be established that may have cropping potential and (iii) high potential land that has never been cultivated. To optimise the use of such land resources, Aliber & Hart (2009) called for greater support of local farmers and an understanding of their thinking. Participatory studies could determine what the local farmers perceive as serious threats to crop production; reasons for land abandonment; and how best current agricultural production could be intensified to reduce pressure on marginal lands (Baiphethi & Jacobs, 2009). Currently grown and future crops also need to be investigated. This information could pave the way for evaluation of alternative crops in order to determine if they could be grown successfully in this region.

The aim of the present study was to determine local farmers' perspectives with regard to crop production as a basis for agricultural development, in order to achieve poverty alleviation and improve livelihoods in Nkonkobe Municipality. The specific objectives were (i) to establish demographic patterns in Nkonkobe Municipality and their likely effect on agricultural production; (ii) to determine constraints on crop production and optimum land utilisation; (iii) to identify reasons for abandonment of croplands, and (iv) to determine farmers' perspectives on their past, present, and future cropping preferences.

2 Materials and methods

2.1 Study area

The Nkonkobe Municipality is situated in the Amathole District of the Eastern Cape province, South Africa, between 32° 21′ and 33° 07′ south and 26° 24′ and 27° 13′ east (Figure 1). It has a total land area of 3,725 km^2 and a population of 133,434 (STATS SA, 2001). The Municipality is characterised by high levels of unemployment, estimated at over 85 % of the indigent population (IDP, 2008). Official figures revealed that the economy was able to create jobs for only 3.5 % of the economically active population (STATS SA, 2001). For their livelihood, the population depended on public sector employment (which contributes to the bulk of income), government grants, agriculture and migratory labour (Hebinck & Van Averbeke, 2007). Small-scale agriculture is dominated by vegetable and livestock production in projects that are mainly funded by the Department of Agriculture. Other economic activities include tourism, forestry and sheep and wool production (IDP, 2008).

For this study the municipality was divided into seven units, based on geomorphology, climate and soils (Figure 1). The Hogsback/ Katberg unit is a high rainfall

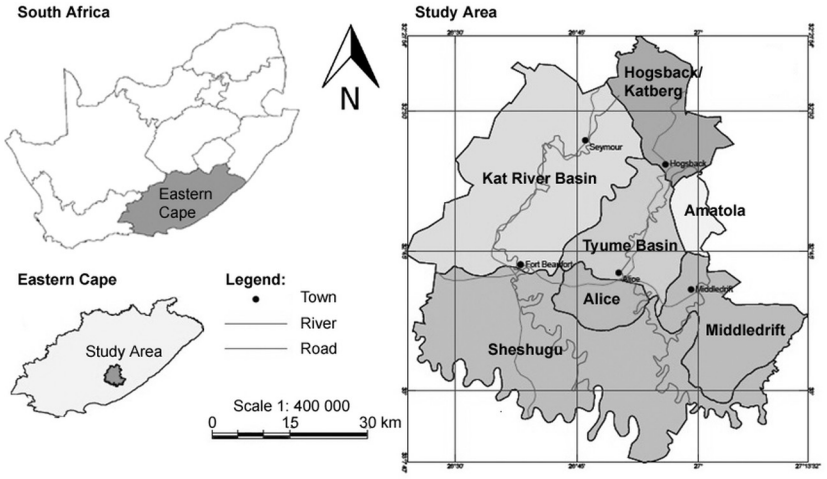

Fig. 1: *Map of the Nkonkobe Local Municipality*

mountainous area, with tourism and forestry as main enterprises and very limited cropping. The Alice and Sheshegu units are characterised by low rainfall and poor quality soils and are thus used almost exclusively for extensive grazing. The Amatola unit has significant cropping potential, but is a small isolated unit surrounded by steep mountains. Thus this study was carried out in the Kat River, Tyume River and Middledrift units, where most of the agricultural activities in the Municipality take place.

The Kat River catchment consists of two main units, namely the sub-humid upper catchment and the semi-arid middle catchment around Fort Beaufort, with annual rainfall approximately 800 mm and 500 mm, respectively. Farming in the Kat River catchment is mainly commercial; comprising both fully fledged commercial farmers and emerging farmers on highly developed former white commercial farms, which were incorporated into the Ciskei as part of the homeland consolidation programme in the late 1970s. The latter include some former highly productive irrigated farms, mainly citrus, on which most of the cropping has been abandoned.

The semi-arid Tyume River catchment lies between the escarpment of the Amatola Mountains and Alice, with rainfall between 580 mm at Lovedale near Alice and 611 mm at Pleasant View closer to the mountains (Laker, 1978). This area includes both traditional small-scale farming areas and former commercial farms, including some former highly productive citrus farms that have collapsed. Alluviums are found on terraces along the Tyume River and on floodplains of seasonal streams, where most cultivation is carried out. Doleritic intrusions are also found on higher ground, especially in the east (Laker, 1978).

The Middledrift unit consists of two parts. One is along the Keiskamma River around Middledrift, which is made up of a combination of river valleys that are dry, with high agricultural potential under irrigation, and semi-arid hills with poor quality soils (Laker, 1978). The other is a large section on the eastern boundary of the Municipality, south of the road from Middledrift to Debe Nek, with limited cropping potential. Mean annual precipitation at Middledrift is about 500 mm. It is characterized by low rainfall and high potential evapotranspiration (PET) in January, causing a severe mid-summer drought (Laker, 1978). Parent material on the river terraces is alluvium, with mudstones, shales and dolerite intrusions dominating the land away from the alluvial terraces.

2.2 Farmer interviews

Information on farmers' perspectives was obtained through semi-structured and open-ended interviews. To reduce the response error and clarify unclear questions a pilot test of a draft questionnaire was run with 15 selected farmers from each of the three units, extension workers and enumerators. A final questionnaire was then produced to use for interviewing farmers. Because we were dealing with a mainly traditional rural setting where croplands are allocated by tribal authorities to some individuals, no statistical records distinguishing between total households and active farmers were available. It was, therefore, impossible to accurately establish the farmer population size. In this scenario, all farmers who attended the induction meetings

at which the research objectives were explained were afterwards included for individual interviews. One hundred and seventy-five farmers, consisting of 69 from the Tyume, 52 from the Kat and 54 from the Middledrift unit were interviewed. A snap survey was also carried out on 27 commercial and emerging farming units. Emerging farmers in this study were black farmers who were allocated previously white-owned commercial agricultural land under the government land reform programme, including those who received land during the Ciskei homeland consolidation process in the 1970s. Since established commercial farmers were offering technical assistance to emerging farmers, they were used as key informants to validate information provided by the emerging commercial farmers. Key informants also gave background history regarding the farms, management practices and soil fertility problems faced by the farmers. Conversations were steered towards selected topics, including demographic information, using the defined criteria used in census (STATS SA, 2001); proportion of land not in use and reasons for land abandonment; factors limiting crop production; and current and future crops.

2.3 Data analysis

For the purposes of this study an active farmer was defined as the unit of analysis. No household information was captured because from the pilot study the size of the family, gender and income did not feature prominently and were therefore assumed not important. Since 85 % of the farmers were indigent, an assumption was made that the farmers (excluding the commercial farmers) were resource poor, and below the poverty datum line (Monde *et al.*, 2005).

Qualitative and quantitative data were summarised and analysed using Microsoft Excel and SPSS (SPSS Inc., 2008) software. The descriptive statistics was used to generate frequency tables and the unit of analysis was defined. The literacy rate was obtained by assuming that any person who had completed at least grade 7 was literate (SDFP, 2004; STATS SA, 2001). Correlation tests between land abandonment and the main drivers of land abandonment such as high temperatures, low rainfall, soil degradation, farm machinery, security and migration were performed to establish the main factors leading to land abandonment.

The order of importance of crops grown and limitations to crop production in the area were ranked by weighting the factors. A weighted average is calculated for each factor by multiplying the item frequency by the numerical rating (Azar, 1999). Limitations to crop production were weighted by summing up the product of the degree of limitation and the frequency of occurrence of the factor, using the formula:

$$WF = ((H1F1) + (H2F2) + (H3F3))/100$$

Where H is the degree of limitation on a scale of 1–3, representing low, moderate and high respectively; F is the frequency.

Crop rankings were also weighted using the formula:

$$WF = ((R1F1) + (R2F2) + \ldots + (R5F5))/100$$

Where R is the ranking of the crop on a scale of 1–5.

3 Results

3.1 Demographic characteristics of the farming community

Of the smallholder communal farmers in the Tyume catchment, 37 %, 27 % and 34 % were in 30–54, 55–64 and ≥ 65 age groups, respectively, while in Middledrift, these age groups constituted 30 %, 27 % and 40 %, respectively. In the Kat River catchment, 27 %, 24 % and 30 % of the farmers were in age groups 30–54, 55–64 and greater than 65, respectively (Table 1).

The farmers had reasonable experience, with at least 73 % of the respondents in the three areas having more than 5 years' experience, while about 25 %, 34 % and 36 % of the farmers in Tyume, Middledrift and Kat River, respectively had more than 20 years of farming experience.

Literacy levels were low on smallholder farms, with 51 %, 41 % and 49 % of the interviewed farmers at Tyume, Middledrift and Kat being illiterate. Very few farmers had tertiary education, with 7 % (mostly retired teachers) at Tyume and Middledrift, but none in the Kat River valley. Twenty seven percent of the farmers in Middledrift, 24 % in Kat and 17 % in Tyume, had completed a senior certificate.

Of the smallholder communal farmers, in the Tyume catchment, Middledrift and Kat catchment, 29 %, 52 % and 30 %, respectively, were part-time farmers and were employed elsewhere to supplement their income. The remainder of the farmers were farming on a full-time basis (Table 1).

3.2 Land utilisation for crop production

Ninety-five percent of the smallholder communal farmers in the Tyume valley do not fully utilise their land for crop production, with 46 % of them indicating that

Table 1: *Demographic data of farmers at Nkonkobe Municipality.*

Demographic category	*Traditional small-scale farmers*			*Commercial farmers (%) n = 27*
	Tyume River catchment (%) n= 69	*Middledrift* (%) n= 54	*Kat River catchment* (%) n = 52	
Age of farmers				
24–29	2	2	12	8
30–54	37	30	27	43
55–64	27	27	24	29
> 65	34	40	30	20
Farming experience (years)				
< 5	19	27	27	
5–10	22	18	15	28
11–20	34	21	15	51
> 20	25	34	36	21
Levels of education				
Primary education (Grade 7)	51	41	49	–
Grades 8–10	25	25	21	–
Senior certificate (Grade 12)	17	27	24	43
Tertiary	7	7	0	57
Status of farmers				
Part-time	29	52	30	54
Full-time	71	48	70	46

more than half of their land had been abandoned. Correlation results showed that the amount of abandoned land was strongly influenced by lack of farm machinery (0.550), soil degradation (0.467), shortage of inputs (0.326) and low rainfall (0.357) (Table 2).

Table 2: *Correlations between land abandonment and factors influencing land abandonment.*

Driving factors	*Land abandonment*		
	Tyume	*Middledrift*	*Kat*
Temperature	0.289**	0.017	0.147
Low rainfall	0.357**	0.360**	0.035
Labour shortages	0.184*	0.100	0.088
Lack of interest	0.194*	0.109	0.073
Theft	0.084	0.184*	0.051
Shortage of farm machinery	0.550**	0.346**	0.267**
Poor infrastructure	0.089	0.003	
Disease prevalence	0.0128	0.073	0.176*
Soil degradation	0.467**	0.262**	0.236**
Shortage of inputs	0.326**	0.107	0.380**

** Correlation is significant at the 0.01 level.
* Correlation is significant at the 0.05 level.

In the Middledrift area, 10 % of the farmers indicated that they fully utilised their land, with at least 61 % using less than three quarters of the previously cultivated land. The amount of abandoned land was influenced mainly by low rainfall (r=0.360), shortage of farm machinery (r=0.346) and soil degradation (r=0.262).

In the Kat River catchment, 62 % of the farmers use only about 25 % of the available land and 39 % of the farmers had completely abandoned the available arable land. Shortages of inputs (r=380), farm machinery (0.267) and soil degradation (r=0.236) were the major factors that led to increased land abandonment.

3.3 Limitations to crop production

The main limiting factors to crop production, as ranked by smallholder farmers in the Tyume River catchment were soil degradation, farming equipment, low and erratic rainfall, lack of security and shortage of fertiliser and seed (Table 3). The farmers mentioned that soil erosion, poor soil fertility and compaction were the main soil-related problems experienced in the area. In Middledrift, the order of importance was similar to Tyume, but low rainfall was the second most important factor after soil degradation. In the Kat catchment, farmers cited soil degradation and pests and disease as the

most important factors limiting crop production, with erratic rainfall and lack of security being less important than in the Tyume and Middledrift catchments. Other factors of less importance in the three communal farming areas were labour shortages, limited land and lack of farming interest and expertise.

3.4 Types of crops grown

Maize was ranked as the most common crop grown by smallholder farmers in the three communal areas. The other important crops grown by the smallholder farmers included potatoes, cabbage, spinach and onions in Tyume; and spinach, cabbage, potatoes and beans in Middledrift. In the Kat catchment, the crops are cabbage, spinach, potatoes and butternut (Table 4). The other significant but minor crops grown by smallholder farmers in the three communal areas were pumpkin, beetroot and carrots.

On the smallholder farms, maize, potatoes, pumpkin and onions were grown mainly for subsistence, while spinach, cabbage and beans were grown for consumption and sale. Butternut, beetroot and carrots (minor crops) were grown primarily for family consumption. Apart from maize, no other cereal crop was grown, and beans were the only leguminous crop grown to supplement protein intake. Formerly grown crops most excluded in the Tyume catchment by about 25 %, 24 %, 22 %, 19 % and 15 % of the respondents were wheat, maize, sorghum, beans and pumpkin, respectively (Table 5). The farmers mentioned loss of interest and shortage of farming machinery as reasons for not growing wheat and sorghum, while low rainfall, lack of security and soil degradation were given as reasons for not growing maize, beans and pumpkin, respectively. In the Middledrift region, wheat (36 %), sorghum (30 %), maize and beans (25 %) and peas (16 %) were the most

Table 3: *Limitations to crop production, as identified by smallholder farmers.*

Factor	*Tyume River catchment*		*Middledrift*		*Kat River catchment*	
	Score	*Rank*	*Score*	*Rank*	*Score*	*Rank*
Soil-related problems	1.64	1	1.75	1	1.56	1
Low and erratic rainfall and extreme temperatures	1.53	3	1.67	2	1.24	4
Farming equipment	1.54	2	1.27	3	1.42	3
Pests and disease	1.41	4	1.05	4	1.54	2
Security	0.75	5	0.98	5	0.24	7
Shortage of inputs	0.69	6	0.57	6	0.64	5
Labour shortages	0.32	7	0.50	7	0.61	6
Limited land	0.12	8	0.16	9	0.06	9
Lack of farming interest	0.09	9	0.32	8	0.12	8
Lack of expertise	–	10	–		0.07	10

Table 4: *Main crops grown by smallholder farmers in Nkonkobe Municipality.*

Crop	*Tyume River catchment*			*Middledrift*			*Kat River catchment*		
	Score	*Rank*	*Reason* *	*Score*	*Rank*	*Reason* *	*Score*	*Rank*	*Reason* *
Maize	2.29	2	2	2.75	1	2	2.18	1	2
Potatoes	2.31	1	2	1.54	4	2	1.56	4	2
Cabbage	1.87	3	2	1.76	3	3	1.91	2	2
Spinach	1.34	4	3	1.84	2	3	1.63	3	3
Onions	0.46	9	3	0.78	7	2	0.69	8	3
Pumpkin	0.90	8	2	0.98	6	2	0.70	7	2
Butternut	1.19	5	5	0.73	8	3	0.94	5	2
Beans	1.16	6	3	1.11	5	2	0.46	9	3
Beetroot	1.09	7	3	0.57	10	2	0.40	10	3
Carrots	0.46	10	2	0.73	8	3	0.76	6	3

* 1 = commercial; 2 = subsistence; 3 = both commercial and subsistence

Table 5: *Formerly grown crops most excluded by smallholder farmers in Nkonkobe Municipality.*

Crop	Tyume River valley		Middledrift		Kat River valley	
	Frequency * (%) n = 69	Reason †	Frequency * (%) n = 54	Reason †	Frequency * (%) n = 52	Reason †
Wheat	22	4	36	10	18	3, 8
Maize	24	2	25	10, 11, 12	21	4, 11
Sorghum	22	4, 10	30	10	18	3, 4
Beans	19	11	25	2,5	12	2
Peas	–	–	16	4, 8, 9	–	–
Pumpkin	15	5	–	–	–	–
Potatoes	–	–	–	–	15	2, 12

* Farmers were asked to give 5 reasons each, hence the total frequency may exceed 100 %.
† 2 = low rainfall; 3 = labour shortages; 4 = lack of interest; 5 = soil degradation; 8 = theft; 9 = limited land; 10 = farm machinery; 11 = fencing; 12 = pests and disease; 13 = inputs

Table 6: *Crops that smallholder farmers in Nkonkobe Municipality show an interest in growing in future.*

Crop	Tyume River valley		Middledrift		Kat River valley	
	Frequency * (%) n = 69	Reason †	Frequency * (%) n = 54	Reason †	Frequency * (%) n = 52	Reason †
Peas	19	2	27	2	12	2
Cabbages	25	1	14	1	15	1
Potatoes	–		23	2	12	1
Tomatoes	20	1			21	1
Butternut	25	1	14	1	12	1
Carrots	19	1	16	1, 2		
Maize	15	2	15	2	9	2
Sorghum	12	2	16	2	6	2
Wheat	14	2	–	2	7	2
Beans	–	–	18	1,2	18	1

* Reason: 1 = sale; 2 = consumption

excluded crops. Shortages of farm machinery were the major reason for not growing wheat, maize and sorghum. Soil degradation and low rainfall were cited as reasons for abandoning bean crops, while loss of interest was the main reason for not growing peas. Smallholder farmers in the Kat River catchment indicated that the most excluded crops were also maize, wheat and sorghum, potatoes, and beans. Labour shortages, loss of interest (due to preference of processed food from shops) and insecurity due to crop destruction by animals were listed as major reasons for not growing maize, wheat and sorghum. Low rainfall and pests and disease were the main reasons for not growing beans and potatoes respectively in the Kat catchment (Table 5).

Farmers in Tyume catchment expressed interest in growing cabbage and butternut (25 %), tomatoes (20 %), peas and carrots (19 %) and maize (15 %) in the future, citing emerging local markets in the nearby town of Alice for cabbage, butternut, tomatoes and carrots, while maize and peas were intended for family consumption (Table 6). About 14 % and 12 % of the respondents indicated that they would in future want to grow sorghum and wheat, respectively. Sorghum would be used for brewing traditional beer, while wheat would be preferred for food security.

Peas (27 %), potatoes (23 %), beans (18 %), carrots and sorghum (16 %) and maize (15 %) were the most preferred crops for future cultivation in Middledrift. Farmers want to grow peas, potatoes, maize, sorghum and wheat for food security, while butternut, carrots and beans would be grown for sale.

Tomatoes (21 %), beans (18 %), cabbage (15 %) and peas (12 %) were the most preferred future crops in the Kat catchment, with the first three crops being grown for sale and the latter for consumption. A low percentage of farmers (10–15 % in Tyume and Middledrift and < 10 % in Kat) cited cereal food crops, maize, wheat and sorghum as their future crops.

3.5 Commercial farms

The main findings on commercial farms indicated that more than half of the previously highly productive orange farms, acquired for crop production in the 1970s and mid-90s, had been completely abandoned. The reasons were poor management of finances (43 %), farmers who do not live on their farms (54 %), who sometimes employ 'farm managers' with no tertiary education and simply act as watchmen. On a positive note, 57 % of the farmers/ farm managers had tertiary qualification.

4 Discussion

4.1 Demographic characteristics of the farming community

The large proportion of ageing smallholder farmers between 55–64 years and >65 years could be the main reason for labour shortages on the farms. This suggests that there would be fewer able-bodied farmers if no new farmers emerged in the near future as the older farmers retire. The low proportion of able-bodied young farmers could be attributed to migration to cities (Lahiff, 2000) and mines. This trend is supported by national household surveys conducted country-wide (STATS SA, 2001; Aliber, 2009), which also reported a larger proportion of old farmers in the country. Old age removes the incentive to engage in crop production (Hebinck & Monde, 2007), thus, the higher proportion of farmers over 65 years of age in the Middledrift could have led to the high percentage of part-time farmers. Part-time farmers are mostly those who have other sources of income, such as remittances from relatives working in towns and recipients of government grants in the form of old age pensions, child support and disability grants. The full effects of state grants on agricultural production have not yet been established. (Hebinck & Monde, 2007) suggested that grants and remittances gave farmers start-up capital to invest in agricultural activities but could also create a dependency syndrome. The latter view was supported by responses from some of the farmers during this survey.

Old age could have contributed to low land utilisation, as most of the aged farmers still retain the land, which they cannot fully utilise. In the Kat, Middledrift and Tyume catchments, shortage of land was among the five most important reasons for inefficient land utilisation by the smallholder farmers. This was the case despite the vast tracts of underutilised land and could be because land is sometimes in the hands of people who are working in towns (Monde *et al.*, 2005). Fewer farmers in Tyume cited land shortage as a major problem mainly because a large proportion of the farmers in the area have been absorbed into cooperatives such as the AgriPark initiated recently by University of Fort Hare and, as a result, do not need additional land outside these schemes. Such initiatives could be adopted in Middledrift and Kat to provide land to willing farmers who do not own land. Owing to the present land tenure legislation, whereby chiefs allocate land under the Permission to Occupy (PTO) land tenure system, transfer of land from old people to the youth, women and the able-bodied is difficult. Land tenure legislation should give able-bodied men and women, who wish to farm, full rights to the land. However, such legislation threatens to legally remove the powers that traditional leaders still have over land and would, therefore, be opposed (Claasens, 2003; Mufundo Kalawe, Zanyokwe Irrigation Scheme, Middledrift, Eastern Cape, South Africa, 2010 pers. comm.). In similar work done in Wild Coast of South Africa, Shackleton *et al.* (2013) reported that farmers did not want to part with their land even if it is not cultivated due to a strong sense of entitlement.

Farming could present a good employment opportunity for the youth in Nkonkobe, where 41 % of the population is unemployed (STATS SA, 2001). The high unemployment figure is partly attributed to an absence of a strong economic base, which can absorb only 3.5 % of the economically active group, and the dominance of subsistence-related activities, with little surplus being produced for profit (SDFP, 2004). Consequently, the youth should be given an opportunity to venture into farming activities.

Findings from this study suggest that the unemployed youth are not involved in farming because of limited land in Middledrift and Kat or lack of interest, in all areas, possibly due to dependency on guardians' government grants (Hebinck & Monde, 2007). Concerted

efforts are therefore necessary to lure the youth into agriculture by providing them with land rights.

The effects of shortage of labour due to high proportion of the aged and non-involvement of the youths in agriculture could have been worsened by low literacy rates leading to more land abandonment. The low literacy rate of the farmers is a concern as it creates difficulties in promoting new farming ideas through extension services. The low literacy rate is reflected, firstly, in the overall population census figures for Nkonkobe Municipality, where between 42 % and 67 % in Kat and about 40 % in Middledrift and Tyume are illiterate (STATS SA, 2001). The low literacy rate could be because the youth who have obtained senior certificates might have left for towns in search of employment, instead of staying on the farms and in the villages (SDFP, 2004; Hebinck & Monde, 2007). The lack of expertise that emerged as one of the reasons for low land utilisation, suggest that there is a need for strong capacity building in extension services as earlier recommended by Laker (2004b).

4.2 Land utilisation for arable crop production

The overall low land utilisation in Nkonkobe was also reported by Vedoordt *et al.* (2003), who indicated that more than 70 % of what is perceived as potentially productive fields was left uncultivated in Nkonkobe, and that only about one-third of such land in the former homelands was being cultivated at any one time while Shackleton *et al.* (2013) observed a similar trend in the Wild Coast of South Africa, where they found land cover in the fields to have decreased from 12.5 % in 1961 to 2.7 % in 2007.

Perhaps the major driving factor for land abandonment in this study was shortages of farm machinery. This could be attributed to a decline in animal draught power at household and community levels due to decreased livestock farming (Fraser *et al.*, 2003; Shackleton *et al.*, 2013). Correlations were stronger in Tyume because of the prevalence of the red soils with very hard dry consistency making it difficult to till using small implements. To increase draught power there is need for government support in livestock production. Hiring of tractors for tillage would be a problem, especially during peak farming periods as farmers share and could miss critical planting periods (Monde *et al.*, 2005). The Animal Traction Centre at the University of Fort Hare is currently conducting research on the use of animal draught power for production of vegetables, and preliminary results in terms of cost reduction and yield increase are encouraging (Joubert, 2010). This technology is less labour-intensive and could serve other purposes, including bulk transportation, ripping, ploughing, planting and weeding (Joubert, 2010). Fewer farmers in Kat catchment indicated that farm machinery contributed to low land utilisation probably because the government had provided these farmers with tractors at some point.

While land abandonment was strongly correlated with shortage of inputs in the Tyume and Kat, the projects carried out by the University of Fort Hare (AgriPark and ARDRI) have provided considerable support through the provision of seed and fertilizers. Chimonyo (2012) recommended the use of improved open pollinated varieties (OPVs) as a viable option to reduce seed costs. With these (OPVs), farmers can retain seed for future seasons for themselves and other farmers by harvesting, treating and packaging the seed. Under low-input smallholder farmer conditions, locally derived “land races” are often better adapted and perform better than hybrids (Mendes *et al.*, 1985).

Traditionally, kraal manure is widely used in the Eastern Cape particularly in home gardens to alleviate fertiliser shortages (Mandiringana *et al.*, 2005). There is also need to develop fertiliser use efficient strategies, such as the use of leguminous green manure cover crops and kraal manure to reduce the requirement for inorganic fertilisers for the farmers who cannot afford them (Musunda, 2010).

Strong correlations found between land abandonment with low rainfall and soil degradation in Tyume and Middledrift concurred with reconnaissance studies carried out in the area indicating that 85 to 95 % of the available land is not capable of supporting cultivation, mainly because of low and erratic rainfall, shallow soils and high erodibility (Van Averbeke & Marais, 1991; Laker, 2000). The high sodium content and high fine sand fraction in these soils caused high crusting and erodibilities (Laker, 2004a). The insignificant correlation between land abandonment and low rainfall in the Kat was due to the provision of irrigation services in some farms. To mitigate the low and erratic rainfall farmers could consider drought tolerant crops like sorghum, sunflower and cowpea in all the three smallholder areas.

However, studies carried out over many years in the Municipality reported that the average yield of maize was higher at Guquka, which had more favourable conditions than Koloni, but the proportion of the field area planted to crops turned out to be equally low in both cases (Vedoordt *et al.*, 2003), suggesting that biophysical conditions were not the main factor for the low land utilisation. Apart from shortages of farm machinery,

low rainfall, soil degradation and shortages of inputs which generally showed a strong relationship with land abandonment other factors influencing low production were lack of security (crop theft), labour and land shortages. The latter is anomalous in view of the vast tracts of unused abandoned land.

Lack of security from thieves and livestock could be because the Kat and Tyume catchments are densely populated, encompassing numerous relatively large rural villages and the towns of Alice and Fort Beaufort. Criminals from these towns and villages could be responsible for thefts, and this is supported by information from Alice and Fort Beaufort police stations (South African Police Service, 2009 pers. comm.). Theft may cease to be a major problem if farming becomes an attractive business to the youth.

Labour shortages were also major reasons for crop production in Tyume and Kat, probably because of migration to the nearby towns of Alice and Fort Beaufort, and also to commercial farms in the case of the Kat River catchment. This trend was less pronounced in the Middledrift area, where there is little commercial activity. As discussed earlier, migration, lack of farming interest, government grants and old age constitute some of the major reasons for shortage of labour in communal areas. Family labour is also mostly provided by women, who usually have other household chores to take care of (Monde *et al.*, 2005). In addition, Aliber (2009) argued that in over 60 % of the households in former homelands, family labour is provided by one member of the family. During peak periods, farmers form labour co-operatives, which help to alleviate the labour shortages (Hebinck & Monde, 2007). Hiring of labour is costly and most resource-poor farmers cannot afford it (Van Averbeke & Mohamed, 2006). Research needs to focus on identification of labour-saving technologies, such as animal draught power (Joubert, 2010; Fanadzo *et al.*, 2010).

There are several areas in the Nkonkobe Municipality with moderate to high cropping potential that have never been cultivated or have never been used to their full potential. This is despite the fact that many other people, especially the youth, are landless, while some active farmers cultivate on less suitable lands (Mbuti, 2000). A significant number of farmers in Middledrift and Kat catchment cited land shortages and expressed concerns that they were leasing land from the older farmers, partially in exchange for their produce. This group of people need help to secure land rights. A land reform policy that is designed to transfer productive land to potential young farmers with the will and energy to venture into farming should be put in place without creating land conflicts.

4.3 Types of crops grown

Maize was the most common crop grown by smallholder communal farmers in Tyume River catchment, Middledrift and Kat River catchment. However, the role of traditional cereal food crops is slowly diminishing, as indicated by the high proportion of farmers who no longer grow maize, wheat and/or sorghum. At one time some parts of the Eastern Cape near Peddie (which borders Nkonkobe municipality to the South) were big suppliers of wheat in the Province but now production has almost ceased (M.C. Laker, 2012 pers. comm.). The decline in production of cereals such as wheat and sorghum could be because they are labour intensive where labour is a challenge and an ageing population. The decline could also have been caused by a shift by farmers from fields to smaller home gardens as a result of security concerns. The cereal crops have been abandoned in favour of vegetable crops, with potatoes, cabbage and spinach dominating in these areas. Beans and butternut are also common in Middledrift and the Kat catchment. These findings are supported by information from Baiphethi & Jacobs (2009), who reported that 92 % of the consumers in former homelands buy their basic staple food needs from food chain stores, which has increased food expenditure to between 60–80 % of the total household income for low-income earners. Shackleton *et al.* (2013) also reported that maize production decreased because of the increased preference to rice which is normally purchased from food chains. The abandonment of cereal food crops is a threat to food security in the Municipality and ways to revitalize these excluded food crops should be sought.

The farmers were more willing to continue growing cabbage, potatoes and beans in the future for sale (commercial purposes). Though the general impression of homeland agriculture that emerges from literature is that farming is practised on a small scale and that produce is mainly for home consumption (Lahiff, 2000), findings from this study reflect encouraging signs of a shift towards commercial agriculture. This was evident among people around Upper Ncera village under Chief Mabandla, who have been producing mainly cabbage and spinach on a commercial basis. Farmers have acknowledged that they want to grow crops mainly for sale and therefore efforts are needed to help these farmers achieve this goal.

Emerging crops such as cowpeas, beans are important as for daily consumption and are a very good source

of protein (Adeyemi *et al.*, 2012). Dry beans, mixed with samp (crushed maize) is a popular food in the former Transkei and Ciskei. The mixture is known as umngqusho (gnush). The legumes have also been used as intercrops with maize and fertility improvement crops, both in the Eastern Cape and Limpopo provinces, owing to their high biomass and N-fixation capacity (Musunda, 2010; Odhiambo & Nemadodzi, 2007). Tomato, another emerging crop, was grown for sale to the nearby town markets of Alice and Fort Beaufort. However, all these crops should be grown only after crop suitability studies have been carried out. Future studies should focus on evaluation of current, forgotten and future crops to determine their potential in these regions.

4.4 Commercial farms

Literacy levels among the commercial farmers were higher, a situation which makes training of such farmers easier. In the Kat River region, the established farmers provide on-farm training to emerging farmers. Laker (2004b) also emphasised the importance of such mentorship programmes and highlighted that they could be successful if conducted in a spirit of good faith between the emerging and established farmers. While high levels of education are encouraging, it should be noted that more than half of those farmers – mostly those with tertiary education – are 'absentee farmers' who have employed 'farm managers'; and in most cases the latter do not have relevant agricultural qualifications or experience. This challenge has serious implications for land ownership and maximisation of efficient use of land resources. A land audit could be required to determine the number of absentee farmers and the amount of land they occupy in order to formulate meaningful land reform policies.

In the emerging commercial farming sector of Kat River catchment, financial indiscipline was highlighted as a major factor for reduced land utilisation and crop production. Some farmers claimed that at times loans were not used for their intended purposes and, ultimately, farmers fail to service them. Other common problems, such as lack of farming machinery and inputs, were also cited as a manifestation of financial indiscipline. Emerging farmers get technical advice from nearby established farmers on farm management, and marketing is done by an organised commodity chain, which is supported by farmer cooperatives, although the farmers complained that middlemen normally swindle them.

The citrus crop, once grown on now abandoned farms, was meant mainly for overseas markets, although low-grade fruit was sold locally. According to figures from Lugg, Harrison & Associates (cited in Page, 1982) citrus production was once dominant in the Keiskamma River, Tyume River and the Kat River areas where 205,000 citrus trees were planted on area equivalent to some 730 ha of which 42 % was within the Tyume sub-area, while the Keiskamma River and Kat River accounted for 30 % and 28 % respectively. Approximately 75 % of citrus was exported and with the present devaluation of the rand against other currencies in addition to the firming of export prices, citrus, could have been a major driver for the economy of the Municipality notwithstanding the jobs loses with could have been prevented. This translates to millions of rands in lost revenue. There is therefore need to adopt appropriate decisions to resuscitate citrus production.

5 Conclusions

Demographic discrepancies such as old farmers, low levels of education and absentee farmers call for policy that encourages youth to stay on farms. Government support in terms training, marketing of crops and outreach programmes to sensitise youth on importance of agriculture could be used.

With > 60 % of the farmers not fully utilising their land and > 75 % of the land having been abandoned in some areas, increased government support in cattle restocking and provision of tractors to improve draught power could be adopted. Amendment of the Land Tenure Act to include repossession of unused land could also increase area under crop production. The department of Agriculture could also adopt soil and water conservation programmes to combat soil degradation and alleviate the effects of low and erratic rainfall.

Maize, cabbage and potato were the main crops grown, while sorghum and cow-peas were identified as future crops. These crops need to be evaluated for their suitability in the Municipality to formulate a cropping programme that could be used in the province. Collapsed orange farms need resuscitation through sound management and provision of irrigation services.

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