Are smallholder farmers' perceptions of climate variability supported by climatological evidence? Case study of a semi-arid region in South Africa

Received 24 January 2020
Revised 20 June 2020
Accepted 21 June 2020

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Abstract

Purpose – Literature contends that not much is known about smallholder farmers' perceptions of climate variability and the impacts thereof on agricultural practices in Sub-Saharan Africa and South Africa in particular. The purpose of this study is to examine the perceptions of smallholder farmers from Botlokwa (a semi-arid region in South Africa) on climate variability in relation to climatological evidence.

Design/methodology/approach – The study area is in proximity to a meteorological station and comprises mainly rural farmers, involved in rain-fed subsistence agriculture. Focus group discussions and closed-ended questionnaires covering demographics and perceptions were administered to 125 purposely sampled farmers. To assess farmers' perceptions of climate variability, their responses were compared with linear trend and variability of historical temperature and rainfall data (1985-2015). Descriptive statistics were used to provide insights into respondents' perceptions.

Findings – About 64% of the farmers perceived climate variability that was consistent with the meteorological data, whereas 36% either held contrary observations or were unable to discern. Age, level of education, farming experience and accessibility to information influenced the likelihood of farmers to correctly perceive climate variability. No significant differences in perception based on gender were observed. This study concludes that coping and adaption strategies of over one-third of the farmers could be negatively impacted by wrong perceptions of climate variability.

This article is based upon the author's thesis, from the University of Limpopo, titled Smallholder farmers' perceptions on climate variability in relation to climatological evidence in the Molemole Municipality (Limpopo Province) South Africa, completed in 2018 by Maropene Tebello Dinah Rapholo. The authors are thankful to the farmers in Botlokwa village, community leaders and the Molemole Municipality for granting permission to conduct the research. The South African Weather Service is recognised for the data provided. The funding from the National Research Fund towards the research is acknowledged.

Conflict of interest statement: There is no conflict of interest.

This paper forms part of special section "Climate change impacts and adaptations in arid and semi-arid regions", guest edited by Zhihua Zhang, Qiang Zhang and Muhammad Jawed Iqbal.

International Journal of Climate Change Strategies and Management
Vol. 12 No. 5, 2020
pp. 571-585
Emerald Publishing Limited
1756-8692
DOI 10.1108/IJCCSM-01-2020-0007

Originality/value – This study highlights discrepancies in perceptions among farmers with similar demographic characteristics. To guarantee sustainability of the sector, intervention by government and other key stakeholders to address underlying factors responsible for observed discrepancies is recommended.

Keywords Perception, Climate change, Climate variability, Farmers, Subsistence agriculture

Paper type Research paper

1. Introduction

Climate variability and agriculture are interrelated processes, both of which take place on a global scale. Global warming is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run-off (Funk *et al.*, 2012; McCarthy *et al.*, 2001). In spite of the widespread scientific debate concerning the impacts of climate variability, not much is known about smallholder farmers' perceptions of these impacts on their agricultural practices (Funk *et al.*, 2012). According to the Intergovernmental Panel on Climate Change, Africa is one of the most vulnerable continents to climate change and climate variability (IPCC, 2001, 2007). Climate variability refers to variations in the occurrence of extremes of climate on temporal and spatial scales beyond that of individual weather events (IPCC, 2001). It includes short-term events such as drought, floods, tropical storms and long-term events such as changes in temperature and rainfall patterns (Boko *et al.*, 2007). The short-term events cause hasty disruptions, which have devastating implications for agriculture and livelihoods. These disruptions appear to be increasing problems such as heat stress, lack of water at crucial times and diseases. All these problems interact with ongoing pressures on land, soils and water resources (Legesse and Drake, 2005).

Climate variability may also be regarded as deviations in the average state of climate and irregularities (wind, temperature and precipitation extremes) on all temporal and spatial scales beyond those of individual weather events, including short-term fluctuations that happen from year to year (Ogalleh *et al.*, 2012; Ziervogel *et al.*, 2006). Variability in this case is an integral part of climate change in which a change in average climatic conditions is experienced through changes in the nature and frequency of particularly yearly conditions including extremes (Smit and Pilifosova, 2001; Ogalleh *et al.*, 2012). The impact of extreme events mainly depends on the extent of natural hazards mitigation and sustainable human development in response to variations in climate (O'Brien *et al.*, 2006).

According to Turpie and Visser (2013), over the past decade, a rising body of research has emerged because of increasing concerns about the impacts of climate change on the agricultural sector in Africa. Literature also suggests that tropical and sub-tropical countries would be vulnerable to global warming because they are already experiencing high temperatures (Benhin, 2008). According to the Food and Agricultural Organisation, impacts of climate variability on smallholder farmers in Sub-Saharan Africa are further exacerbated by other developmental stressors, notably poverty, HIV/AIDS and food insecurity (FAO, 2008). Agronomic studies also predicted a sharp fall in yields for most African crops in the absence of technological change. Southern Africa is exposed to climate variability because of its overdependence on rain-fed agriculture, compounded by factors such as extensive poverty and weak financial and structural capacity. This has led to overall decrease in agricultural productivity and yields, including rangeland livestock production, threatened food security and increased the risk of famine (FAO, 2008). In one of their reports, the South African National Biodiversity Institute (SANBI, 2013) based on the long-term adaptation scenarios project, suggested that Limpopo Province could face a potential increase in temperature by as much as 2°C by 2035, by 1°C –2°C between 2040 and 2060 and by 3°C –6°C between 2080 and

2100 (accompanied by a decreased rainfall in the long term). Limpopo is the breadbasket and agricultural engine of South Africa, accounting for nearly 60% of all fruit, vegetables, maize, wheat and cotton (GoLimpopo.com, 2015). An estimated 33% of households in Limpopo are considered agricultural households and the province is home to 16% of South Africa's agricultural households (StatsSA, 2013).

Most smallholder farmers in sub-Saharan Africa depend on rain-fed agriculture for their livelihoods (Moyo *et al.*, 2012; Shiferaw *et al.*, 2014; Kihupi *et al.*, 2015). However, they are often afflicted by the vagaries of weather and climate, most notably temperature and rainfall (Moyo *et al.*, 2012; Shiferaw *et al.*, 2014; Kihupi *et al.*, 2015). Past trends for Southern Africa have suggested that the sub-region will experience increase in temperature and declining rainfall patterns as well as increased frequency of extreme climate events such as droughts and floods in future (Ferrier and Haque, 2003; Moyo *et al.*, 2012). For smallholder farmers in South Africa and the sub-region in general, variability and unpredictability of climate is a major challenge which poses a risk that can critically restrict options and limit their development (Shiferaw *et al.*, 2014; Kihupi *et al.*, 2015). Such sensitivity to climatic variations and extremes is further compounded by economic, social, geographical, cultural, institutional, governance and environmental factors (Maponya and Mpandeli, 2012; Rakgase and Norris, 2014). Maponya and Mpandeli (2012) further asserted that vulnerability to climate extremes varies across temporal and spatial scales, with resource-poor farmers in rural areas often the worst hit. For this category of farmers, their perception towards climate change and variability is central to effective mitigation and management of potential hazards (Debela *et al.*, 2015).

Botlokwa Village in Limpopo Province represents a cohort of rural smallholder farmers representative of peers across South Africa and the Southern African region, which are exposed to significant drought risk. Like peers across the country and the continent at large, their activities sustain livelihoods by providing food for households and as a source of income (Eludoyin *et al.*, 2017). A number of studies have been conducted in the area, notably on: the extent of drought risk (Mpandeli and Maponya, 2013a; Mpandeli and Maponya, 2013b), impact of climate variability on agricultural (crop) yield (Mpandeli and Maponya, 2013b; Tshiala and Olwoch, 2010), farmers adaptation strategies (Debela *et al.*, 2015) and factors influencing choice of coping strategies (Maponya and Mpandeli, 2012). However, studies on the farmers' perceptions on climate variability in relation to climatological evidence have received little attention (Gbetibouo, 2009). Given the strong correlation between perception and effective adaptation and coping strategies, this study seeks to examine the perceptions of smallholder farmer's on climate variability in relation to climatological evidence in Botlokwa, a semi-arid region in Limpopo Province, South Africa. It is anticipated that the findings may contribute towards the global discourse on food security in South Africa and sub-Saharan Africa in general.

2. Locality of the study area

Botlokwa Village is in the Molemole Local Municipality, Capricorn District of Limpopo Province, South Africa. Limpopo Province is situated in the northern tip of South Africa (Figure 1). The area represents a typical semi-arid region in South Africa characterised by water scarcity and relies mainly on ground water for sustainability. The study area falls within the summer rainfall region and is prone to drought. Winter seasons are usually mild and mostly frost-free and temperatures rarely fall below 0°C whereas in summer, maximum temperatures often exceed 35°C in certain parts.

The municipality experiences low annual rainfall, which is strongly seasonal with easily identifiable wet and dry seasons. Wet season starts from October to March and contributes 85% of the annual rainfall. The largest portion of the area experiences a mean annual rainfall between 300 mm and 500 mm. Most semi-arid areas, such as the study area, in South Africa, are

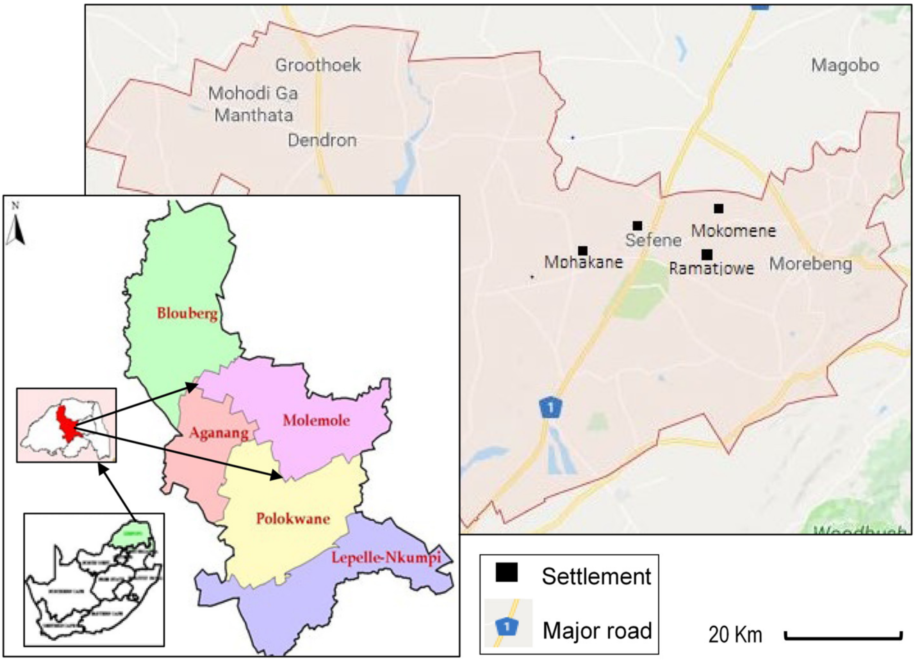


Figure 1. Location of study area

Note: Inset: situation of Molemole Municipality in the Capricorn District, Limpopo Province, South Africa
Source: Google Maps, 2018

dominated by the mixed bushveld vegetation type forming part of the Savanna biome and the vegetation found here varies from dense short bushveld to a more open tree Savanna (Molemole Local Municipality 2017-18 Integrated Development Plan IDP report, 2017). This vegetation type is found in areas where the rainfall varies between 350 mm and 650 mm per annum and the altitude comprises low relief plans at an altitude range from 700 m to 1,000 m (Molemole Local Municipality 2017-18 Integrated Development Plan IDP report, 2017).

3. Materials and methods

3.1 Sampling

The choice of Botlokwa Village as a case study was premised on the following factors:

- it was in proximity to a functional meteorological station;
- rain-fed subsistence agriculture was a major activity undertaken by smallholder farmers;
- the smallholder farmers were documented and the information was readily available from the municipal offices; and
- the semi-arid nature of the region predisposed the farmers to potential drought risk.

In the context of this study, smallholder farmers were regarded as farmers operating on a farmland above 0.5 hectares but less than 4 hectares.

According to records from the Community Liaison Officers in the study area, there were 182 officially registered subsistence crop farmers in the village. The sample population was drawn from the 182 farmers. In this study, farmers were selected and interviewed based on the following criteria:

- practised subsistence agriculture (crop farming) for at least five years;
- registered as a subsistence farmer in the community database;
- lived in the village for over 20 years; and
- their availability and willingness to participate in the study.

Considering the above criteria, 125 participants were recruited from the total population of 182.

3.2 Data collection

Two types of data were sourced for this study. Firstly, a 31-year (1985-2015) monthly temperature and rainfall data obtained from the Polokwane Airport Weather Station. Prior to analysis, the historical data were first evaluated for discontinuities by inspection of each time series and then tested for homogeneity using the student's *t*-test (Kansiime *et al.*, 2013).

Secondly, focus group discussions (FGDs) and semi-structured questionnaires were used to elicit farmers' demographic information and perceptions of climate variability. Farmers' perception of climate change was considered as an aggregated awareness about the trend of the following four climatic parameters (rainfall, temperature, number of rainy days and frequency of dry spells) generated from the historical climate records of the research area. During the surveys, farmers were asked whether they had observed any long-term changes in any of the climate-related parameters over the past ten years (2006-2015). A similar approach was adopted by Amadou *et al.* (2015) to compare farmers' perception of climate change and variability with historical climate data in the Upper East Region of Ghana. Respondents perceptions were expressed in terms of a four-point Likert scale, thus:

(1) increased;
(2) decreased;
(3) no change; or
(4) not sure.

3.3 Data analysis

To elucidate on temperature and rainfall evolution in the area, this study quantified trends and variability in total seasonal and annual rainfall derived from monthly rainfall observations. Trend analysis was done to reveal the general movement of temperature and rainfall patterns. Variability of annual and seasonal rainfall was assessed using coefficient of variation. Graphical methods were used as a tool for visualisation of temperature and rainfall evolution over the study period (1985-2015).

Quantitative data (from semi-structured interviews) were analysed using Statistical Package for Social Science 23 and Microsoft Excel (for drawing graphs and charts). Descriptive statistics were used to characterise the demographic data and farmer perceptions. Descriptive statistics were complemented with tables and figures for graphical representation and visual comparison. To consider that a respondent has perceived climate change and variability correctly, all of the four climate-related parameters must be in agreement with the participant's responses:

(1) decrease in rainfall;
(2) increase in temperature;
(3) decrease in number of rainy days; and
(4) increase in frequency of dry spells.

Any disagreement in one of the four parameters was considered a deviated (wrong) perception of the respondent on climate variability (Amadou *et al.*, 2015). Qualitative data from the FGD were analysed using thematic content analysis (TCA). The most recurrent themes emerging from the TCA were used to express farmer's perceptions on climate variability.

4. Results and discussions

4.1 Demographic characteristics

A summary of farmers' demographic characteristics is presented in Table 1. About 37% of the respondents were between 41 and 50 years old, 26% between 51 and 60 years old and 24% above 60 years old. Farmers less than 30 years old made up the lowest percentage of the farming communities (approximately 2%), followed by the 30 to 40 age brackets (approximately 11%). The distribution of the latter age groupings suggests subsistence agriculture is not perceived as a viable source of livelihood by the active youth population in the study area.

About 45.6% of the farmers had attained secondary education followed by 26.4% with primary education. About 17% had attained college or university education while 11% of farmers had no formal education. Therefore, the average literacy level of farmers was

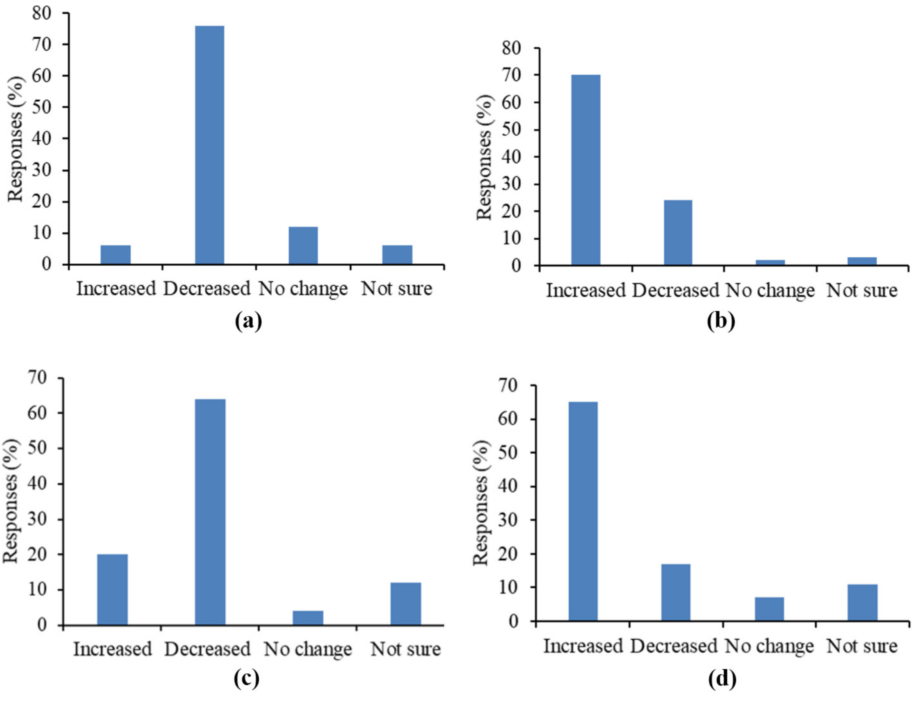
Farming attribute	Description	Frequency	(%)
Age	< 30	2	1.6
	30–40	14	11.2
	41–50	46	36.8
	51–60	33	26.4
	> 60	30	24
Gender	Male	88	70.4
	Female	37	29.6
Level of education	No education	14	11.2
	Primary	33	26.4
	Secondary	57	45.6
	Other*	21	16.8
Farming experience (years)	5–10	9	7.2
	11–20	5	4
	21–30	32	25.6
	> 30	79	63.2
Farm size (hectares)	0.5–1.5	80	64
	1.6–2.9	39	31.2
	3–4	6	4.8
	> 4	Nil	Nil
Access to information	Yes	125	100
	No	Nil	Nil
If yes, through;	Media	38	30.4
	Extension officer	9	7.2
	Indigenous knowledge	78	62.4

Table 1. Demographic characteristics of farmers from Botlokwa area

moderate. The total number of male respondents in the study area was 88 (70.4%) and females were 37 (29.6%). The results indicate a significant disparity in the number of male and female farmers in the study area. The percentage of female respondents was mostly dominated by widows who had to fend for themselves and their children. Most of the women in the study area were focussed on other businesses (such as retailing of farm produce) besides farming to sustain their families. Length of farming experience was distributed as follows; 5-10 years (7.2%), 11-20 years (4%), 21-30 years (25.6%) and >30 years (63.2%). About 90% of the respondents were farming on their own land, while the remaining 10% (mostly women) were farming on land that belonged to either family or friends. None of the respondents was farming on rented land. The size of the farm holdings varied from farmer to farmer, with 64% owning between 0.5 and 1.2 hectares, 31.5% between 1.6 and 2.8 hectares and 4.5% between 2.8 and 4 hectares. The farmers received information on climatic conditions from three major sources: media (30.4%), extension officers (7.2%) and indigenous knowledge (64%).

4.2 Farmers' perceptions of climate variability in relation to climatological evidence

A summary of farmers' perceptions of climate variability is presented in Figure 2. Majority of the farmers (76%) interviewed indicated that there was a decrease in the amount of rainfall, while 6% instead observed an increase. About 12% reported no change in rainfall, while another 6% were unsure. Most farmers (70%) felt there was an increase in temperature while 24% reported a decrease. Farmers' responses on temperature variability



Notes: (a) Rainfall; (b) temperature; (c) number of rainy days; (d) dry spells

Figure 2.
Farmer's perception of climate variability

were consistent with perceptions of dry spells, with 65% reporting an increase in dry spells. A decrease in frequency of dry spells was reported by 17%, whereas 7% felt there was no change while 11% was not sure. With regard to the number of rainy days, 64% reported a decrease, while 20% felt there was an increase. Just over 12% were unsure of any change in number of rainy days while only 4% reported no change. Most of the farmers (97%) reported that the onset of the rainy season had shifted from around October to end of November and early December. Based on the participants' responses, about 64% correctly perceived climate variability whereas 36% perceived wrongly.

During the FGDs, the farmers revealed that the rainy season ended as early as the beginning of March unlike in the past when rainy seasons ended at the beginning of April. One farmer in his late sixties indicated that during his teens, effective rains used to start early in the month of October, but nowadays, the rainy season starts at the end of November or even in December. There was a consensus on the fact that climatic conditions had become more erratic over the past five years. The farmers reported that there has been a change in the start and end of the rainy season, over past five years. The farmers raised concerns about the effects of the unpredictability weather patterns on their agricultural activities. Some farmers noted that over a decade ago rainfall distribution over the season was normal (implying enough and predictable) and they could plan their agricultural activities appropriately and effectively. Applying similar patterns of planning have proved abortive and fruitless, often resulting in financial loss. Another concern emanating from FGDs was regarding the spatial distribution of rainfall in the area. Farmers alluded to experiencing uneven distribution of rainfall, with some settlements receiving rainfall, while the neighbouring villages or communities were experiencing no indication of rainfall during the same time frame.

Graphical visualisation of mean annual maximum and minimum temperatures is presented in Figures 3 and 4, respectively. Between 1986 and 2015, mean minimum and maximum temperatures were recorded as 11.8°C and 25.4°C, respectively with an average of 18.6°C. It was warmer than normal during the years: 1992, 1998, 2000, 2002, 2003, 2008, 2012 and 2015 and relatively cooler in 2013. The mean annual maximum temperature increased to 26.3°C and the minimum temperature conversely reduced to 11.5°C by the year 2015.

The annual rainfall trends for 1985-2015 is summarised in Figure 5. The average annual rainfall over the study area is 482 mm with a standard deviation of 142.6 mm. Though the rainfall trend of 31 years shows a decrease, it is not statistically significant at $p < 0.05$. The coefficient of variation of annual rainfall of 30% is indicative of high variable from its

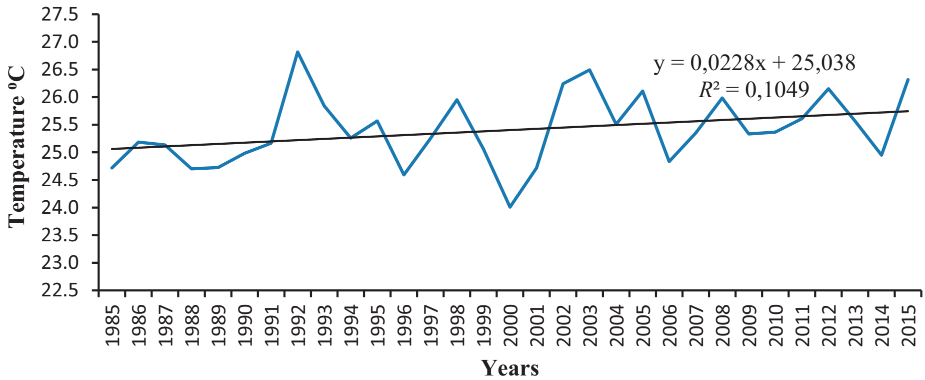


Figure 3.
Average annual maximum temperature

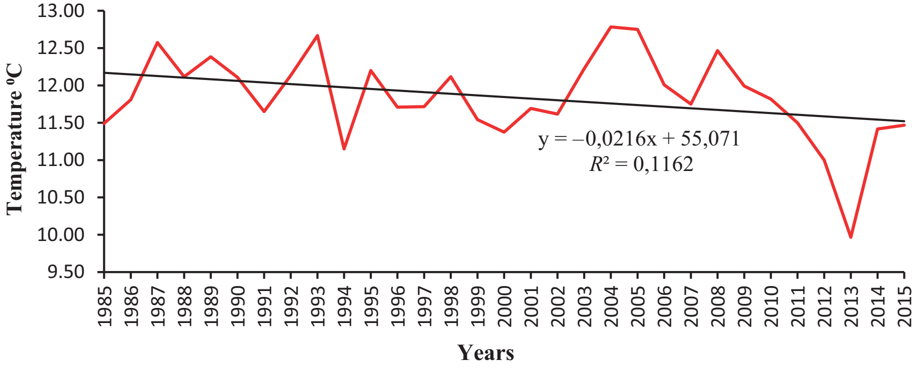


Figure 4.
Average annual minimum temperature

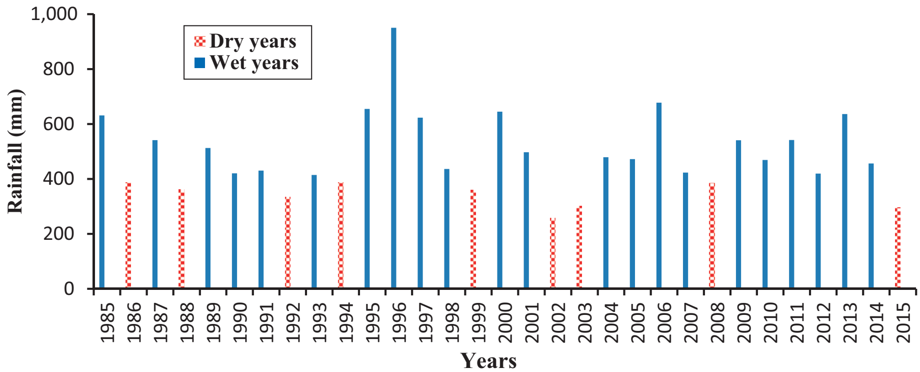


Figure 5.
Total annual rainfall highlighting dry and wet years

long-term average. The coefficient of variations of annual rainfalls of October (63%), November (49%), December (50%) and January (71%) indicated moderate variability and therefore indicated a significant relationship between standard deviation and coefficient variation observed during the months of highest rainfall.

The two sets of months: January, February and March (JFM) and October, November and December (OND) are the main rainy seasons in the study area. The maximum rainfall occurred during these months. November was the highest (92.3 mm) and contributed 19.16% of annual rainfall (482 mm), followed by December (18.91%), January (17.12%) and February (12.97%). Least amounts of rainfall were observed during the month of July (2.1 mm) followed by August (3.6 mm), which contributed only 0.44% and 0.75% to the annual rainfall for the period 1985-2015, respectively. After 2006, OND registered the most amount of rainfall compared to the other seasons. However, before 2006, JFM season rainfall was frequently surpassing the OND. This observation supports a change in the rainfall pattern in the region. As far as periodical rainfall distribution is concerned, April to June can be reckoned as the third whereas, July, August and September receive the least amount of rainfall (Figure 6) clearly pointing out that the month of July marks the start of rainfall cessation. The years 1992, 1999, 2002 and 2015 fell below the mean average of 482 mm per annum.

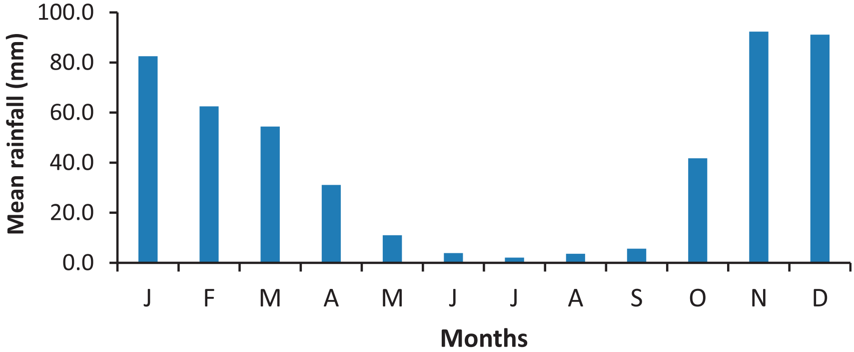


Figure 6.
Monthly mean rainfall (1985-2015)

Total annual rainfall for the farming season (JFM–OND) between 1985-2015 shows a decrease in total annual rainfall (Figure 7). Peak rainfall was documented in 1996, 2006 and 2013 whereas the least rainfall was recorded in 2002, 2010 and 2015. The decade 2006-2015 received the least amount of rainfall, complementing the observed temperature increase over the same time frame.

Comparison of farmers' perceptions of climate variability with climatological data was restricted to the past ten years (2006-2015). With respect to rainfall variability, interview data indicated that there was a decrease in total annual rainfall over the selected period. The responses of farmers were consistent with their observations of increased dry spells. The farmers' claims of decreased rainfall were equally supported by uneven distribution of rainfall events within the study area, with some communities receiving precipitation while others did not. Visual comparison with rainfall trends for 2006-2015 agreed with farmers' perceptions. Despite occasional spikes in 2006 (678 mm) and 2013 (636 mm), there was a general decline in annual rainfall compared to the previous decade. The period 2013-2015 was characterised by a sharp decline, with 2015 recording the lowest annual rainfall (296 mm), only second to 2001 (257 mm) over the 30-year period. The trends in both annual minimum and maximum temperatures showed a clear increase, which corroborated with the farmer's perceptions of increased temperature, including frequency of dry spells.

Farmers in the study area used the term "poor season" to refer to any year with reduced crop production because of unsatisfactory rainfall and other crop production constraints. The farming seasons 2006/2007 and 2014/2015 were considered the worst

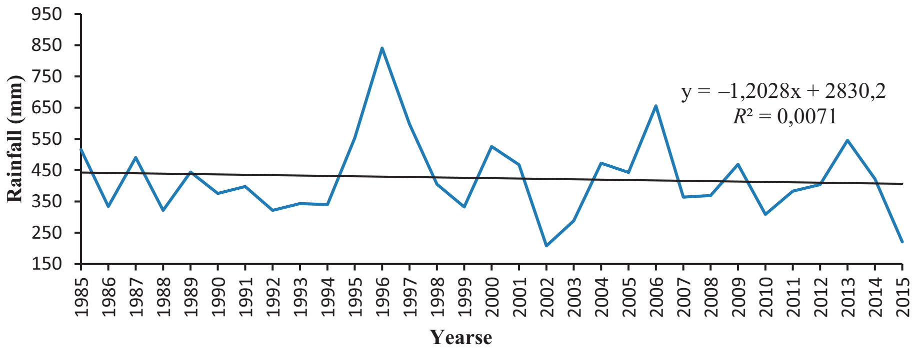


Figure 7.
Total annual rainfall for farming season

seasons by the farmers. Their characterisation of the 2006/2007 farming season as a poor season (implying unsatisfactory/insufficient amount of rainfall) however contradicted the climatological evidence, which portrayed 2006/2007 as years with peak rainfall. The reason for experiencing a poor farming season may be attributed to timing of seeding, which is informed by proper appraisal of onset, cessation and length of rainy season. Conversely, farmers' observations of 2014/2015 as farming seasons, which received the least rainfall was consistent with climatological evidence (Figures 5 and 7). According to Slegers (2008), perceptions of climate are based on the livelihood impacts the climate has on individual farmers (that is, the social and economic impacts). In this study, any season that negatively affected the farmers' livelihoods was described as poor. For example, the length of the dry spell was a major constraint in relation to crop failure as revealed by the farmers during the 2006/2007 season. In this season, 678 mm of rainfall was received, which climatologically can be classified as above average, but was characterised by long dry spells in the month of February 2007 (9.2 mm) and was therefore described as "poor" by the farmers.

The information on crop yield expectations helps inform us that farmers do not necessarily consider poor seasons strictly in meteorological terms. Even those seasons that might have a good rainfall distribution and above average rainfall (in terms of climate data) can be termed "poor" by farmers. This is partly an indication that for farmers, when evaluating cropping seasons, any problem that limits harvests leads to a bad season. The yield levels or expectations of the yield are mostly the ones that determine how to describe a season.

4.3 Influence of demographic characteristics on farmers' perception of climate variability

A correlation between farmers' demographic characteristics and their perceptions was undertaken to identify possible underlying factors influencing farmers' ability to correctly perceived climate variability. Amadou *et al.* (2015) posited that the older the farmer, the more experienced he/she is in farming activities. They argued further that, age and experience are positively correlated with correct perception of climate variability. Most farmers who positively perceived variability in climate were in the age group, 41-50 (40%) and 51-60 years (17%), compared to farmers below the age of 30 years (7%) or above the age of 60 years (8%). The reason being that farmers younger than 30 years do not have extensive farming experience while those above 60 are not as focused as they used to be.

Years of farming experience was analysed to measure its influence on farmers' perceptions to climate variability in the study area. The results showed that most of the respondents had a rich farming experience with over 63% of the smallholder farmers having invested more than 30 years in the sector. These finding are consistent with the predominant age distribution of the farmers. With regard to the farming experience, the study found out that the majority (83%) of farmers who perceived climate variability had high farming experience (above 10 years) compared to 11%, who had low farming experience (5-10 years). As 51% of the farmers with high farming experience observed that there was considerable variation in the levels of temperature, only 6% of farmers with low farming experience indicated to have noticed variation in temperature levels. Farm size was closely linked to experience and positive perception of climate variability.

There was no significant difference in perception ($p < 0.05$) of climate variability based on gender. Relative to gender, the above observation contrasted with findings by Asfaw and Admassie (2004) who argued that households headed by males had a higher probability of getting information about positively predicting variability compared to women. A similar observation is made by Tenge *et al.* (2004) who point out that female-headed households are less likely to perceive or adopt effective coping strategies as a result of restricted access to information, land and other resources imposed by traditional social barriers.

In South Africa, research by Bryan *et al.* (2009) emphasised on the importance of education and awareness building in identifying available options to enable farmers adapt to changing climate. The current study revealed that most farmers who perceived climate variability had attained post primary (61%) education compared to 33% who had up to primary education.

There is a consensus that knowledge of climate variability is related to availability of and accessibility to information (Scoones, 2004; Recha *et al.*, 2008). From the survey data, it was found that indigenous knowledge and media constituted the main sources of information on climatic conditions in the study area. The proportion of farmers that looked up to the media for information indicated that they still grappled with understanding of the concept of "climate variability". This observation maybe be considered a driving force towards an indigenous approach to mitigation and management of climate variability (Bello *et al.*, 2013). The limited presence of extension officers in the area may have provided additional impetus. Inaccessibility to information may be partly responsible for wrong perceptions by 36% of the farmers.

5. Conclusions

The aim of this study was to assess smallholder farmers' perceptions on climate variability in relation to climatological evidence in Botlokwa, a semi-arid region in Limpopo Province, South Africa. The choice of Botlokwa Village as a case study was premised on the fact that its characteristics were comparable to several smallholder farmers across South Africa, exposed to potential drought risk. Hence, findings may be generalised. This current study posits that discrepancies between farmers' perceptions and climatological evidence will negatively impact on farmer adaptation options and outcomes. To assess farmers' perceptions of climate variability, their responses were compared with linear trend and variability of historical temperature and rainfall data (1985-2015). Descriptive statistics were used to provide insights into respondents' perceptions. Findings indicated that about 64% of the farmers perceived climate variability that was consistent with the meteorological data, whereas 36% either held contrary observations or were unable to discern. Age, level of education, farming experience and accessibility to information influenced the likelihood of farmers to correctly perceive climate variability. No significant differences in perceptions based on gender were observed. The inability of over one-third of the farmers to correctly perceive climate variability is attributed to the limited presence of extension workers in the area. The latter, this study argues, represents an important arm of government responsible for oversight of agricultural activities especially in rural communities. Failure by extension workers to monitor the activities of smallholder farmers (perceptions, coping and adaptation strategies) compromises opportunities for timely interventions, where incorrect mitigative strategies have been adopted. The current practice is therefore detrimental to the drive for food security in South Africa. To guarantee sustainability of the sector, intervention by government and other key stakeholders to address underlying factors responsible for observed discrepancies is recommended.

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