Original article

The socio-economic impacts of bush encroachment in Manthestad, Taung, South Africa

Tshegofatso K.J. Sebitloane^{1*}, Hendri Coetzee², Klaus Kellner³, Pieter Malan⁴
¹Unit for Environmental Sciences and Management, North-West University, Mafikeng Campus, Private Bag X6001, Potchefstroom 2520, South Africa

²Office for Sustainability and Community Impact and Community Psychosocial Research, North-West University, Potchefstroom Campus, Private Bag X6001, Potchefstroom 2520, South Africa

³Unit for Environmental Sciences and Management, North-West University, Potchefstroom Campus, Private Bag X6001, Potchefstroom 2520, South Africa

⁴Unit for Environmental Sciences and Management, North-West University, Mafikeng Campus, Private Bag X2046, Mmabatho 2745, South Africa

E-mail address (*corresponding author): tshegofatsosebitloane@yahoo.com

ORCID iD: Tshegofatso K.J. Sebitloane: <https://orcid.org/0000-0002-4968-2626>; Hendri Coetzee: <https://orcid.org/0000-0002-9210-2797>; Klaus Kellner: <https://orcid.org/0000-0002-7502-8935>; Pieter Malan: <https://orcid.org/0000-0002-2522-3177>

ABSTRACT

Bush encroachment involves a widespread increase in, and abundance of, woody vegetation in grassland and savanna biomes. This phenomenon has a direct impact on the socio-economic well-being of rural communities and affects livestock owners and those who utilise the land for various other purposes. This study set out to evaluate and gain an understanding of how livestock owners and land users in a typical rural village in South Africa's North West Province perceive bush encroachment and the impact it has on the community's ecosystem services. A quantitative, non-experimental, cross-sectional design was used to document the perceptions of the participants regarding bush encroachment and bush control in an attempt to describe characteristics and to find answers to questions related to how local communities are affected by bush encroachment and the control thereof. The results show that encroachment has a significant impact on the socio-economic status of participants. Furthermore, it was found that the vast untapped knowledge of local livestock owners is vital to control bush encroachment, preserve the land for various types of usage and to conserve natural resources. Evaluating participants' responses and perceptions also contributed significantly to gaining an understanding of how bush encroachment and the control thereof impact rural communities socio-economically. This led the contributors to conclude that raising awareness, actively engaging with the community, imparting skills and offering educational opportunities, creating jobs, merging biophysical activities and promoting active participation are key to the success of programmes aimed at bush control and the resultant improvement of ecosystem services.

KEY WORDS: savanna biome, livestock owners, ecosystem services

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1. Introduction

The phenomenon 'bush encroachment' has been considered a rangeland problem in southern Africa for nearly 100 years (O'CONNOR ET AL., 2014). This phenomenon entails an increase in the abundance of indigenous woody vegetation in grassland and savanna biomes (TURPIE ET AL., 2017) and is caused by mismanagement, climate change and the impact of livestock. Typically, bush encroachment will result

in the densification of woody species (shrubs and trees) (ANADÓN ET AL., 2014).

Land degradation caused by bush encroachment has a negative impact on the surrounding community's ecosystem services, which often gives rise to socio-economic challenges such as a loss in income and insufficient production to keep livestock (REED ET AL., 2015). This view is supported by GRAY & BOND (2013) and HONDA ET AL. (2016) who added that woody encroachment threatens the provision

of ecosystem services such as food and clean water, grazing for livestock farming and the habitats of some of the world's last remaining mega-herbivores.

Ecosystem services (ES) range from the direct provision of goods (e.g. food, timber and medicines) to regulatory services and are often directly associated with the presence of particular species of plants and animals (CARDINALE ET AL., 2012). Typically, ecosystem changes impact biodiversity and can effectively result in these systems not supplying some goods and services, and their flows can affect not only livelihoods and income but also cause local migration and political conflict (ARICO ET AL., 2005). According to BIGGS ET AL., (2015), regime shifts often lead to abrupt changes in rural villages' ecosystem services and, as LUKOMSKA ET AL. (2014) pointed out, a decrease in ES has a negative impact on the well-being of people and affects the life of the community personally, financially and even socially/culturally.

Bush encroachment is a serious problem in and around Manthestad, a rural village in a municipal area called Taung which forms part of the North-West Province, South Africa. Classified as a savanna biome (MUCINA & RUTHERFORD, 2006), the Taung area has a long history of heavy grazing and wood cutting for heating and cooking purposes (O'CONNOR ET AL., 2014). Consequently, as early as 2012/2013, South Africa's Department of Environmental Affairs classified this area as severely degraded and characterised by heavy bush encroachment (DEA, 2013).

Bush control was implemented to address the land degradation problem and to increase grass biomass production which, in the long run, will result in a higher grazing capacity for livestock. It is envisaged that improved livestock productivity will have a positive effect on ecosystem services and, by inference, on the well-being of the surrounding community.

This study set out to gain an understanding of Manthestad residents' perception of bush encroachment as a threat to their socio-economic well-being before and after the implementation of bush control.

Note that as per the PERSPECTIVES IN GLOBAL DEVELOPMENT (2012), socio-economics in the context of this study are defined as those factors that have a negative impact on the communities' economic activities and encompass lack of education, cultural and religious discrimination, overpopulation, unemployment and poverty. Often, the latter determines socio-economic status – in other words, an individual's, or group's, position within a hierarchical social structure – which depends on a combination of variables, including occupation,

education, income, wealth and place of residence (ERREYERS, 2013).

2. Study area

Manthestad is a village located approximately 8 km north east of Taung, the epicentre of a municipal area in the North West Province of South Africa (Fig. 1). About 95% of the Greater Taung municipal area is rural and encompasses approximately 106 scattered villages (MAKGALEMANE & MOFOKENG, 2011). Approximately 98% of the population in the Taung area is Setswana speaking, and the community members own a great number of livestock including cattle, sheep, goats and donkeys on which they depend heavily for their livelihood. Bush encroachment is a serious problem in and around the Manthestad village in Taung, where the areas are not fenced off, and are accessible to the livestock. The overall site, therefore, shows a long history of heavy grazing and exploitation through cutting wood for energy. The overall site is, therefore, classified as severely degraded.

Predominantly, Taung's climate can be described as semi-arid with average temperatures of 18.7°C and an average annual rainfall of 436 mm. With its typical summer rainfall, as little as 3 mm/a on average has been recorded during July and 97 mm/a on average during January (SA EXPLORER, 2014).

3. Materials and methods

A quantitative, non-experimental, cross-sectional design was used during this study (JOHNSON, 2001). This design was chosen because the intention here was to document community members' characteristics and their perceptions regarding bush encroachment and bush control by finding answers to questions related to the dynamics thereof and particularly how this phenomenon affects local communities.

3.1. Design

Following on discussions with and approval by the North-West University's statistical consultation services, it was agreed that for ethical and scientific purposes, a sample size of 100 participants should be sourced for this research study. Consequently, a systematic method had to be employed in the field, whereby every xth household (with x being determined by the relative size of the community in relation to the desired sample size) would be selected to take part in the research. This method aimed to ensure distributive justice (e.g. equal representation) and a fair selection of participants.

Furthermore, the intention here was to distribute any potential risks or benefits across the community and to ensure that no single section of the particular community was overburdened.

3.2. Participants

To ensure that data was collected from the target population only, all participants had to reside in Manthestad and had to be either livestock owners or small-scale farmers or persons who relied on the land for other purposes such as communal farming. In short, all targeted participants

had to be in direct contact with the environment and had to depend on owning and selling livestock and/or on using the land as a means to create jobs or to alleviate poverty.

Furthermore, given the reflective nature of the study, it was agreed that participants should be of an age where they can reflect on previous and current occurrences of bush encroachment and bush control and the effect it has on productivity and biodiversity. Moreover, participants had to be reasonably knowledgeable about the value of ecosystems and must have had some experience of, or exposure to, the use thereof.

Fig. 1. Location map indicating the study area in the Greater Taung Municipality, North West Province (Source: Google Earth, Marie du Toit) (Fig. 1b: P – Plot; R – Row; 1, 2, 3 ... – Plot or Row number)

Given the above inclusion criteria, it was decided to exclude children from the study as well as the cognitively and mentally impaired. Since the nature of the study was rather complex and even though questionnaires and surveys were worded and structured in such a way that someone with a minimum level of education would be able to understand the questions, respondents still had to have the necessary level of mental alertness to listen attentively and to express themselves succinctly.

3.3. Procedure

Permission to conduct this study in Manthestad had to be granted by the tribal chief. With this in mind, the researcher set out to first gain the goodwill of community leaders by making individual appointments so that these leaders could be informed about the purpose of the study and be afforded the opportunity to ask questions as well as to make recommendations on how the study should be conducted in their community.

Gaining the buy-in of community leaders was important since this study relied on them recruiting suitable “independent mediators” who could then go from house to house to identify participants who met all criteria. These independent mediators were assisted by fieldworkers who were also recruited locally.

Conversations between community leaders and potential mediators were, in all likelihood, of an informal nature but were nevertheless supported by a pre-approved flyer that could be handed out and/or posted in public places as a means to support the drive to find suitable candidates. Fieldworkers underwent training at the local tribal hall.

Informed consent. Community members acting as independent mediators were afforded two weeks to familiarise themselves with the content of the informed consent form the participants they recruited to partake in this study would be required to sign in their presence. All aspects of the research were explained in detail to the independent

mediators and they were instructed on how to explain the same in a potential participant's chosen language by avoiding jargon and/or acronyms and with due regard for that participant's level of education. Prior to distribution, the informed consent form was approved in its translated form by the Human Research Ethics Committee (HREC), North West University.

3.4. Data collection

Prior to administering the questionnaire, the independent mediators visited qualifying participants at least a day in advance to obtain informed consent. The mediators also made use of this opportunity to inform participants of any potential risks participation in the study might involve, i.e. being inconvenienced in terms of having to spend time on completing the survey.

Following on the visit by the independent mediator, fieldworkers then went from pre-identified house to house to collect social data for this study. This was accomplished by means of an HREC-approved questionnaire comprised of 22 questions aimed at gaining an understanding of the community's overall understanding of the problem of bush encroachment as well as the socio-economic impact this phenomenon has on the community of Manthestad. Data was captured and subjected to initial analysis in SPSS 25. Once data had been screened for errors and outliers, descriptive statistics such as the mean, standard deviation, skewness and kurtosis were computed for all variables (FIELD, 2005).

All completed surveys were returned by the fieldworkers to the independent mediators who immediately detached the informed consent form from the completed questionnaire to ensure that no identifiable information could be linked to a specific response.

From that point forward, all data capturing and analysis were handled by the research team and the North-West University's statistical consultation service only. The latter would also ensure that data remained secure on password-protected computers for up to seven years thereafter it will be disposed of.

3.5. Data analysis

As part of the survey, a number of socio-demographic characteristics were assessed and evaluated. This was an important step in obtaining an accurate overview of the social and demographic facets of Manthestad.

3.5.1. Gender and age distribution

In total, 100 participants were systematically, and proportionally, selected based upon community members who are livestock owners and small-scale farmers as well as those who use land for various other purposes. The participants' ages varied between 19 and 86, with an average age of 52.9 years (SD = 15.53) (see Table 1).

Table 1. Demographic characteristics of the participants

Item	Total [%]
Gender	
Male	61.9
Female	38.1
Race	
African	97
Other	3.0
Languages	
Setswana	97.7
Other	2.3
Education	
No formal education	17.5
Completed primary schooling	13.4
Some primary education	28.9
Completed their secondary education	19.6
Have some secondary education	18.6
Have some kind of tertiary education	21.0
Relationship status	
Single	29.0
Married	59.0
Widowed	29.0

In a similar study conducted by [ADMASU ET AL. \(2010\)](#) in Southern Ethiopia, the researchers found that men were seemingly much more interested in farming compared to women and may explain why fewer female participants partake in studies such as these. Nevertheless, the results of the descriptive statistics in this study indicate that both male- and female-headed households in the Manthestad community engage more in farming than in other non-farming livelihoods and that farming is the main livelihood strategy for the majority of all households. The average proportion of engagement in farming is, however, higher and statistically significant for male-headed households compared to those headed by females (94% male and 89% female respectively).

3.5.2. Ethnicity

In total, 97% of the participants – all permanent residents of Manthestad – classified themselves as African with the same percentage indicating Setswana as their home language. The average

number of members in the household amounted to five. In this regard, note that as pointed out by [MUSEMWA ET AL. \(2010\)](#), the larger the size of the households, the bigger the competition and pressure for food within that household (see Table 1).

3.5.3. Education

As found by [MARLIN ET AL. \(2008\)](#), low literacy levels not only have negative impacts on the health and well-being of individuals across all age groups but also on their ability to make use of training and skills development opportunities so that they can contribute towards the community by being part of an employed labour force that works towards increased productivity and economic development.

Of importance here is that according to their report on poverty and inequality in South Africa, [SULLA & ZIKHALI \(2018\)](#) found that living in a household where the head has attained some tertiary education reduces the average risk of poverty by about 30% compared to instances where the head of the household has no schooling. It can thus be summarised that poor education can hinder agricultural productivity and that an improvement in educational levels has the potential to reduce poverty by means of communal farming activities (see Table 1).

3.5.4. Income

According to [MLISA \(2005\)](#), unemployment and illiteracy contribute in the main to the occurrence of many social problems such as the rapid spread of HIV/AIDS, crime, drug abuse and alcoholism as well as incidences of gender inequality and suicide among the youth. Based on the gender statistics published by STATS SA in 2011, the percentage of women and men who are employed decreased markedly across all categories and all types of geographical areas between 2001 and 2011.

Although 86.5% of the respondents in this study indicated that they were employed, 47% earned less than R2, 000 per month and relied on government grants and pensions as their main source of income.

Informal discussions with respondents revealed that many community members have multiple sources of income and often more than one grant and/or pension. This is supported by a study of four communities in South Africa's Eastern Cape Province by [KATYATIYA ET AL. \(2014\)](#) where it came to the fore that most farmers depended on grants or pensions as a source of income.

As is evident from Fig. 2, government grants and the likes contributed 46.9% to households' income followed by subsistence farming (19.8%), commercial farming (15.6%), wages (10.4%) and non-agricultural enterprises (7.3%).

Fig. 2. Participants' sources of income (Source: own elaboration)

4. Results

To assess the perceived impact bush encroachment has on the Mantstead community, participants were first asked to indicate the type and number of livestock they keep and why they keep that particular type. They were also asked whether they were aware that the type and number of livestock they keep could have an impact on bush encroachment.

Next, participants were asked whether they were affected by bush encroachment and, if so, to indicate the degree to which it affected them negatively, or positively, on a personal, financial, cultural and social level.

As a follow-up question, participants were asked whether they are aware that participating in bush-clearing projects could improve their livelihoods. Those who responded positively were then asked to what extent they are making use of invader bush to supplement their income and/or are making use of cleared bush as feed, fuel or for other purposes.

The survey was concluded by asking participants to voice their opinion on the introduction of land-user initiatives in their area. The results of this survey are reported below.

4.1. Type of livestock and reasons for keeping them

Almost 80% of the world's undernourished people live in rural areas ([UN MILLENNIUM PROJECT, 2005](#)) and most depend on agriculture, including livestock, for their livelihoods. Livestock contribute 40% to the global value of agricultural output and support the livelihoods and food security of almost one billion people ([FOOD AND AGRICULTURAL ORGANIZATION, 2009](#)).

Keeping livestock is especially central to the livelihoods of people in poor countries since their

land is often marginal and not suitable for cropping (CHIMONYO ET AL., 2000). Consequently, the impoverished has to rely on mixed-farming systems that can help to raise whole-farming productivity and provide a steady stream of food and revenue for households (TAVIRIMIRWA ET AL., 2013).

According to FAO (2009), in addition to generating food and income, livestock is also a valuable asset that serves as a source of wealth and collateral as well as an essential safety net during times of crisis. In this regard, ALARY ET AL. (2011) found that households that own more diversified livestock species are better off economically and in a better position to respond to risks than those who own a single species. In South Africa, too, communal farmers keep mixed livestock species primarily to maximize consumable products and services as well as to increase their income, savings and security (DOVIE ET AL., 2006). In this study, participants indicated that they keep cows, sheep, goats, pigs, donkeys and horses. They keep these animals for various reasons such as food security (43.3%), for financial purposes (38.1%), for transport (7.2%) or for other unspecified reasons (11%) (see Fig. 3). Moreover, most participants indicated that they sell livestock at local markets for traditional and/or ceremonial events such as weddings and funerals (MNGOMEZULU, 2010), a finding that corresponds with the results of a study conducted by SOLOMON ET AL. (2014) in communal areas of the Eastern Cape.

Fig. 3. Reasons for keeping livestock (Source: own elaboration)

4.2. Awareness of livestock's contribution to bush encroachment

As pointed out by WARD (2005), even though the causes of bush encroachment are still poorly understood, this phenomenon can seemingly be linked to climate change and poor veld management practices. With regard to the latter, 85.4% of participants in this study were aware that the type and number of livestock they keep could result in an increase in bush encroachment with only 14.6% indicating that they were not aware of this fact.

This is supported by the findings of a study conducted by TOKOZWAYO ET AL. (2018) in the Eastern Cape where pastoralists indicated that they did indeed notice that continuous grazing resulted in a loss of perennial grass species and that this loss caused a shift from a grass-dominated to a bush-dominated ecosystem. As observed by both ANGASA ET AL. (2012) and MEGERSA ET AL. (2014), due to extensive observations over many generations of the impact their herding practices have on the environment, pastoralists by now have acquired a wealth of knowledge to sustain their livelihoods in arid environments.

This view is supported by NGULUBE (2003) as well as ANGASSA & OBA (2008) who reported that communal farmers, too, regard bush encroachment as a major contributor to the deterioration of rangelands. These farmers correctly attributed a decline in forage production and a change in species composition to a rapid increase in woody plants and were also able to indicate when their rangelands are most likely to be affected and what the extent of the deterioration is likely to be. Furthermore, as ANGASSA & OBA (2008) pointed out, communal farmers have the ability to distinguish between invasive and non-invasive species, a finding that is supported by SIVE (2016) who found that these farmers knew which encroaching woody species have a tendency to suppress the growth of palatable herbaceous plants and to create conditions in which unpalatable ones thrive.

4.3. Impact of bush encroachment on participants

Given that the majority of participants were seemingly aware that bush encroachment can, in part, be attributed to poor land management practices, they were asked to indicate whether this phenomenon affected them negatively, positively, or not at all. As depicted in Fig. 4, only 6.2% of respondents indicated that they were not affected at all. Surprisingly, though, the difference in percentages between those who indicated that bush encroachment affects them negatively (50.5%) and those who indicated that it affects them positively (42.3%) was rather slim.

Fig. 4. Impact of bush encroachment on participants (Source: own elaboration)

Even though bush encroachment reportedly has negative effects across all types of ecosystem services, both ALLSOPP (2013) and VETTER (2013) found that by adapting to bush encroachment, pastoralists will typically use different ecosystem services to support their livelihoods in a dynamic manner. In so doing, they derive a number of benefits from ecosystem services such as forage for goats, fuel and charcoal for cooking and heating as well as materials for fencing and livestock corrals which, in some cases, may offset some of the negative impacts.

In this study, too, those participants who were positively affected by bush encroachment reported that they use the bush for various purposes that proved beneficial, for example selling the wood to use as fuel or using it to make furniture or to build kraals for livestock.

4.3.1. Negative impact of bush encroachment

To interrogate the response of those who indicated that they experience bush encroachment negatively, participants were asked to indicate on a scale ranging from 1 (not at all) to 5 (to a great extent) the degree to which this phenomenon affected them negatively on a personal, financial, cultural and social level. The results are reported below.

Personally. Most participants (44.2%) indicated that they are not personally affected by bush encroachment in a negative manner. However, some participants did indicate that they are affected to a small (31.6 %) or moderate extent (9.5%), with 13.7% indicating that they are affected to a great extent (Fig. 5).

Fig. 5. Negative impact of bush encroachment on a personal, financial, cultural and social level (Source: own elaboration)

Financially. In this regard, too, 44.2% of participants indicated that bush encroachment does not have a negative impact on them financially. Of the remainder, 24.2% said they are affected to a small extent, 16.8% to a moderate extent and 12.6% to a great extent (Fig. 5).

Culturally. Most participants (45.3%) indicated that bush encroachment does not have a negative impact on them culturally. Of the remainder, 38.9% said they are affected to a small extent, 9.5% to a moderate extent and 6.3% to a great extent (Fig. 5).

Socially. As was the case with the negative impact of bush encroachment on a cultural level, 45.3% of respondents indicated that this phenomenon does not affect them negatively on a social level. However, some participants did indicate that they are affected to a small (33.7%), or moderate, extent (9.5%), with 8.4% indicating that they are affected to a great extent (Fig. 5).

4.3.2. Positive impact of bush encroachment

As to the possible positive impacts of bush encroachment, respondents were also asked to indicate on a scale ranging from 1 (not at all) to 5 (to a great extent) the degree to which this phenomenon affected them positively on a personal, financial, cultural and social level. The results are reported below.

Personally. Most participants (60.8%) indicated that they are not personally affected by bush encroachment in a positive manner. However, some participants did indicate that they experience the positive effects to be small (24.2%) or moderate (9.5%), while 3.2% indicated that they experience the positive effects to be great (Fig. 6).

Fig. 6. Positive impact of bush encroachment on a Personal, Financial, cultural and social level (Source: own elaboration)

Financially. Asked whether bush encroachment had a positive impact on their finances, 61.1% indicated that this was not the case. However, there were those who indicated that this phenomenon had a positive effect on their finances to a small (20.0%) or moderate extent (4.2%), with 10.5% indicating that it had a positive impact on their finances to a great extent (Fig. 6).

Culturally. In this instance, too, 61.1% of participants indicated that bush encroachment did not have a positive impact on them culturally. There were, however, those who indicated that they experienced a small (28.4%) or moderate

(7.4%) positive effect culturally, with 3.2% indicating that they experienced a great positive effect (Fig. 6).

Socially. In response to the question as to whether bush encroachment affected them positively on a social level, 61.1% of respondents yet again indicated that this was not the case. However, there were those who indicated that they experienced a small (26.3%) or moderate (3.2%) positive effect socially, with 6.3% indicating that they experienced a great positive effect (Fig. 6).

4.4. Awareness of bush-clearing projects' ability to improve livelihoods

As pointed out by [BIRCH ET AL. \(2016\)](#), bush control not only benefits livestock production since it helps to preserve biodiversity and recharges groundwater but also helps to facilitate several opportunities to stimulate the economy and, by inference, employment. According to the latter, these opportunities extend well beyond the obvious heightened tourism attraction and can even involve using woody biomass to produce and sell charcoal, firewood, supplementary feed and furniture.

Asked whether they were aware that participation in bush-clearing projects could improve their livelihood in general, 89.5% of the participants responded positively. Nevertheless, 10.5% indicated that they were not aware of this fact (Fig. 7).

Fig. 7. Awareness of bush-clearing projects' ability to improve livelihood (Source: own elaboration)

4.5. Opinion with regard to land-user initiatives

As pointed out by [BIGGS ET AL. \(2015\)](#) changes experienced in savanna systems warrant a more adaptive, experimental approach to the management of encroachment. In response, the South African government deployed land-user initiatives in rural areas to create employment and skills development opportunities through implementation of the environment sector employment programmes broadly. Furthermore, the South African presents an opportunity to contribute significantly to job

creation, social inclusion and the low carbon green economy.

Most participants in this study (62.1%) were positively inclined towards the introduction of land-user initiatives in their area, although 34, 7% were not aware that these initiatives have been introduced (Fig. 8).

Fig. 8. Opinion with regard to land-user initiatives (Source: own elaboration)

5. Discussion

According to [CARPENTER ET AL. \(2009\)](#), different land users are likely to respond differently to changes in ecosystem services. For this reason, acquiring a deeper understanding of how land users perceive and rely on ecosystem services has been identified as a critical research priority.

The aim of this study was to investigate and document the socio-economic factors that influenced the community of Manthestad before and after the implementation of bush control activities. Bush encroachment can threaten the livelihoods of any rural community; however, the focus of this study was particularly on livestock owners and community members who interacted directly with their environment in an attempt to ascertain the overall effect bush encroachment had on their socio-economic status.

According to [ANDREW ET AL. \(2003\)](#), the type of livestock held by rural households is influenced by gender roles and the composition of the household. In this case, the majority of the livestock owners were mostly male as compared to females.

[ANDREW ET AL. \(2003\)](#) reported that the majority of South Africa's poor rural residents derive their livelihoods from a number of diverse on-farm and off-farm sources. The off-farm sources include wages, remittances from migrants and commuters, and income from informal economic activities and from state welfare grants. With regards to the latter, [CHITONGE \(2013\)](#) reported that most rural households, including many land reform beneficiaries, are relying increasingly on social grants.

In terms of income status, even though most of those who participated in this study were employed,

they indicated that their income proved to be insufficient and not nearly enough to sustain their households and day-to-day expenses. As was the case in most surveys of a similar nature, they too indicated that they largely rely on government grants as their main source of income.

Of significance in this study was the data relating to the types of livestock kept and the reasons why respondents keep those types of animals. SHACKLETON ET AL. (2011) argue that rural people have a range of reasons for keeping the types of animals they do and that these reasons are subject to change. As a result, every survey will rank the reasons why people keep livestock differently (SCHMIDT, 1992). According to ANDREW ET AL. (2003), generating cash from sales including the sale of hides, producing milk for home consumption, providing meat for home consumption as well as for funerals and feasts and paying dowries (lobola) have been cited as some of the reasons why rural people keep livestock while some also said that they regard keeping livestock as a form of investment and/or protection against drought or keep their livestock as a means of employment and to help others.

In this study, participants indicated that they keep cows, sheep, goats, pigs, donkeys and horses and that they primarily do so for the purposes of food and financial security as well as to provide a means of transport to a lesser extent. A closer interrogation of the data suggests that the majority of the participant are using their land and are producing an array of crops and livestock products mainly for home consumption.

Most respondents in this study were fully aware of the fact that the type and number of animals they keep could contribute to an increase in bush encroachment. Their responses in this regard support the view held by ANGASA ET AL. (2012) and FERNANDERZ-GIMENEZ (2000), namely that community-based knowledge can play a significant role in rangeland resource management and that the participation of local communities is vital to combat changes in the delivery of ecosystem services.

According to RATAJCZAK ET AL. (2011), bush encroachment can undermine the livelihoods of a community since it can effectively result in a permanent reduction in the provision of ecosystem services from the land (including provisioning, supporting, regulating and/or cultural services). In this study, too, participants were of the opinion that bush encroachment has an overall negative effect on them on a personal, cultural, social and financial level.

Given that they were aware of the negative effects of bush encroachment, the majority of participants indicated that they are aware of the fact that their participation in bush eradication projects could very well improve their livelihoods. In this regard it ought to be noted that FARQUHARSON ET AL. (2010) are of the opinion that government-sanctioned removal of woody vegetation, including shrubs and trees, may have social benefits such as improving the visual amenity of, or leaving, the property in a good state for the next generation.

Undoubtedly, active participation by the community in the eradication of woody mass can contribute to an improvement in their socio-economic status. This is probably why most participants were positively inclined with regards to the introduction of the land-user initiatives in their community since these initiatives are likely to create jobs and opportunities to acquire skills that may well result in alleviating poverty.

6. Conclusion

Using a quantitative, non-experimental, cross-sectional design, this study set out to investigate how the Manthestad community is affected socio-economically as a result of changes in the ecosystem services they derive from an environment that is impacted negatively as a result of poor land-use management practices resulting in bush encroachment.

As pointed out by REYERS ET AL. (2013), there is a growing consensus that managing anthropogenic impacts on ecosystems and the services they provide necessitates a better understanding of the interactions between ecological and social systems. However, most studies examining the impact of woody encroachment on ecosystem services have focused on the biophysical and economic implications only without examining the land users' perspectives (ELDRIDGE ET AL., 2011, ANADON ET AL., 2014). This could well be why interventions often fail since they were implemented without consulting land users and because they did not take land users' perceptions and needs into consideration (MENZEL & TENG, 2009; MCNALLY ET AL., 2016). To this end LUVUNO (2019) added that in South Africa, broader social and economic changes also affect encroachment and ought to be taken into consideration when devising strategies to combat this phenomenon, particularly in rural areas.

As illustrated in this study, land users in the Manthestad community are quite knowledgeable about, and have a great deal of insight into, the phenomenon of bush encroachment and the

impact it can potentially have on them socio-economically. Given that gaining insight into land users' perspectives can guide the design and implementation of policies or programmes that are consistent with the biophysical, social and economic needs of people who are dependent on socio-ecological systems (MENZEL & TENG, 2009), community participation and involvement are vital if ecosystem services are to be improved.

In sum, as much as changing human behaviour is important, cultivating shared knowledge and gaining an understanding of the drivers that cause stakeholders to behave in a certain manner will most definitely contribute towards gaining insight into why people are willing to become involved in projects to counter bush encroachments and will be a key determinant in the outcome of projects such as the one undertaken in Manthestad.

Recommendations

- Awareness should be raised among livestock owners and land users in order to improve socio-economic status and livelihoods.
- Traditional knowledge regarding rangeland management should be revisited and exploited
- Government should provide socio-economic incentives that would encourage pastoralists' participation in restoring land and improving livelihoods.
- Rural and poor communities should be consulted about land-use changes and plans that have an impact on their access to resources

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