



## What are the alternative options for diversifying land use under forestry land restitution: A case of Limpopo Province forestry land restitution, South Africa

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### Abstract

Diversifying land use of monoculture forestry plantations in land restitution projects is very critical in achieving multipurpose production system. The purpose of this study was to investigate potential land use options desired by land claimant beneficiaries. A random sampling technique was used to select 351 and 170 households' beneficiaries in Livubu and Tzaneen communities in Limpopo Province, respectively. Data were collected using household questionnaire and focus group discussions. Descriptive analysis, Binary logistic regression and Friedman test were used to analyse data. The study revealed that over 80% of the beneficiaries desired to diversify land use options in both study communities and these potential land use options were found to be linked directly with socio-economic factors. There were significance difference among the potential land-use options for both Livubu ( $p < 0.001$ ) and Tzaneen ( $p < 0.001$ ) communities. Predominate desired land-use option was agriculture and the least was grazing. The findings reflect that the beneficiaries are willing and desire to transform monoculture forest plantation to multifunctional forest plantation. Multifunctional forest plantation such as agroforestry and eco-tourism could help beneficiaries to diversify sources of income, fight poverty, create employment and reduce the dependence on natural forests.

**Keywords:** Beneficiaries, Communities, Forestry, Land use options, Land restitution

### Introduction

The significance of the land to human life can never be underestimated as it is the primary factor of means of production of essential needs, minerals, food, forest, fuel and water (Shackleton, 2020). Worldwide, land is a significant livelihood asset, particularly in rural communities where people's survival is linked to access to land (Shackleton, 2020; Etowa & Nwiido, 2018). Although land is inelastic and fixed supply, land demand is exponential increasing due to an increase in the economy growth and human population size

(Venkatramanan et al., 2020). The future land use in South Africa after land restitution claim settlements has a serious question for future sustainable production. The questions arise, amongst others, Are the land claimants going to continue with current land use? What's going to happen to the business of the current land users?

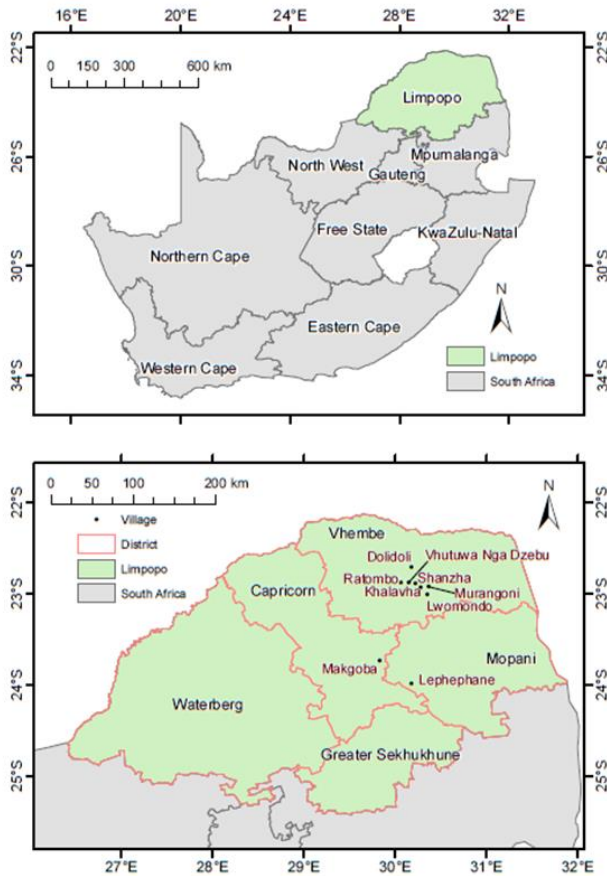
For land restitution in the forestry sector, about 40% of large private commercial forestry plantations and 70% of government plantations were under land claim in 1996 (Clarke, 2018). Generally, LRP provides a wide range of socio-economic opportunities to beneficiaries (Tjale et al., 2016). The socio-economic opportunities are generated from direct or indirect use of the land. However, very few beneficiaries livelihoods had improved through the land restitution projects (Sebola 2014; Valente, 2009), and few community forestry projects have been reported to be successful and growing in South Africa (Clarke 2018).

The land restitution studies have been dedicated on assessing the progress of the projects (Davis, 2019; Mudau et al., 2019), accrual of the benefits (Tshidzumba et al., 2018) and livelihoods of the beneficiaries after land claim settlements (Chikozho et al., 2018; Chitonge, 2013). There is, however, a lack of attention on assessing the land restitution beneficiaries land use desire. Therefore, studying the beneficiaries' perspective on the concept of multifunctional forest plantation land use is undoubtedly a key factor on sustainable forest management. The goal of this study was, therefore, to investigate potential land use options desired by land claimant beneficiaries in forestry land restitution. To answer this objective, the following research questions were asked: (1) What are the desired potential land use options in forestry land restitution? (2) Does socio-economic factors have an influence in the beneficiaries desire to diversify land use?

## **Materials and Methods**

### ***Study area***

This study was conducted in three District Municipalities including Capricorn, Mopani, and Vhembe in Limpopo Province (Figure 1). Limpopo Province is one of the least developed Provinces in South Africa. According to Statistics South Africa (2016) census report, the population of Limpopo Province is approximately 5.7 million with the majority of people relying on agriculture as the primary source of food. Disruption of agricultural activities was observed in Limpopo Province during land dispossession by government of apartheid regime (Fraser, 2007). The land dispossession process left millions of people landless and disoriented. After land dispossession, a large portion of the areas was converted to commercial farming (Wisborg et al., 2013). According to Isreal and Wynberg (2019), a large portion of communities' subsistence agriculture area was dispossessed and converted to monoculture forestry in Vhembe district. Many communities were displaced to dry and rocky areas, with low rainfall chances (Wisborg et al., 2013). The study communities are victims of land dispossession. However, these communities launched the land claims through the Restitution Land Rights Act, No. 22 of 1994 on land currently owned by government enterprise.



**Figure 1:** Map of Limpopo Province showing the study communities.

**Data collection**

The data were collected from seven communities in Vhembe district, and one in Mopani and Capricorn districts, respectively. The communities were grouped based on the area of a land claim forum, including Vhembe district communities grouped as Livubu communities with a total sample size of 351 drawn from seven communities, Khalavha (52), Lwomondo (70), Murangoni (23), Ratombo (49), Shanzha (40), Songozwi (80), Vhutuwa Nga Dzebu (37), and Mopani (Lephaphane (74)) and Capricorn (Makgoba (95)) districts communities grouped as Tzaneen communities with a total sample size of 170. The sample size was determined at 95% confidence level and 5% confidence interval. The structured questionnaire and focus group discussions were used to collect the data.

**Data analysis**

The Statistical Package for Social Science (SPSS) software (version 20) was used to code and analyze the primary data. Binary logistic regression analysis was used to examine the factors influencing the desire of the beneficiaries on the desired land use options. The variables with the P-values below 0.05 are considered to contribute significantly to the beneficiaries' desire. Logistic regression odds ratio (Exp (B)) and p- values were used to report the findings. In addition, the non-parametric analysis in Friedman's test mean ranking was used to rank the

respondents scores for the desired land use options, thereby determining the highest potential land use options as well as testing the significant differences among the desired land use options. The selected options were ranked “1” for most and “4” for least important. In the mean ranking analysis, the following Friedman’s test equation was adopted:

$$F = \frac{12}{bk(k+1)} \sum_{j=1}^k R_j^2 - 3b(k+1)$$

Where  $b$  represents the number of scores in a group and  $k$  represents the number of groups.

To analyse the qualitative data, content analysis was used in order to reflect the real beneficiaries’ perspectives and to achieve the truthiness of the results (Roller, 2019; Bengtsson, 2016).

## Results

### *Socio-economic profile of the communities*

Table 1 highlights the dominance of the elder beneficiaries in the study communities, with highest percentage of elderly beneficiaries observed in Livubu communities (57.6%) compared to Tzaneen communities (34.1%). Additionally, the female-headed households were in a majority in both study communities, accounting for 60.1% in Livubu communities and 68.8% in Tzaneen communities. Furthermore, household beneficiaries in Livubu communities had high illiteracy levels accounting for 30.7% compared to only 12.3% of those from Tzaneen communities. Similarly, household beneficiaries’ dependency on government social grants (old age, child support grant, disability grant and foster care grant) as a primary source of income was profound in Livubu communities accounting for 56.4% compared to 29.4% in Tzaneen communities.

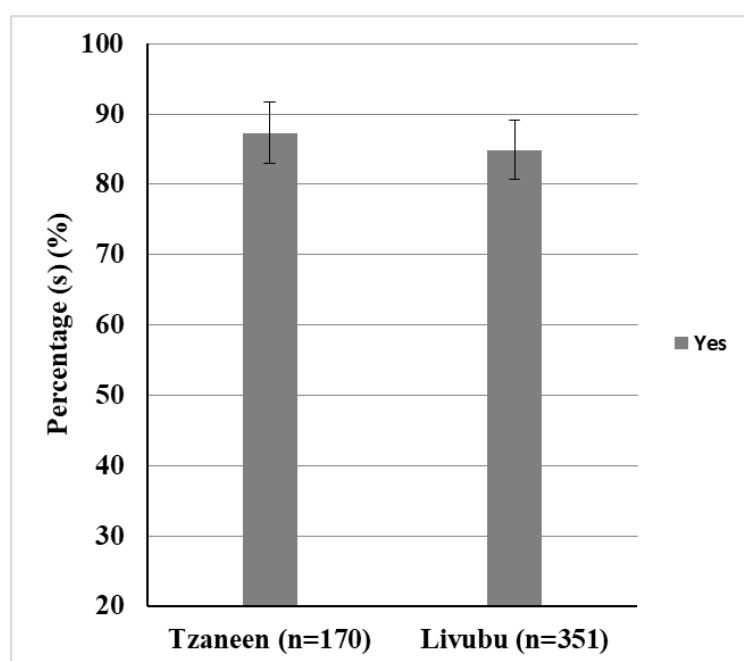
**Table 1:** Demographic profile of the households.

<b>Profile of respondents</b>	<b>Tzaneen Communities (n=170)</b>	<b>Livubu Communities (n=351)</b>
<i>Age of respondents</i>		
18-25	11.8	1.7
26-35	15.9	4.8
35-60	38.2	35.9
61 and Above	34.1	57.6
<i>Gender</i>		
Female	68.8	60.1
Male	31.2	39.9
<i>Level of education</i>		
Primary	32.4	27.1

Secondary	44.7	29.1
Tertiary	10.6	13.1
Never attended school	12.3	30.7
<i>Household source of income</i>		
Employed	2.9	12.8
Social grant	29.4	56.4
Casual job	6.5	0.9
Self-employed	2.4	9.4
No income	58.8	20.5

### *Diversification of the land use.*

There was no significance difference ( $\chi^2 = 0.709$ ,  $p=0.400$ ) between the communities on the desire to integrate different land-use options, with both study communities showing approval of above 80% (Figure 2). Willingness to diversify the land use was dependant on three reasons; first, the experience and the quality of land as the elderly beneficiaries in most Livubu communities expressed *“The land we are claiming back is very fertile and is good for agricultural farming, the plan is then not to get rid of forestry but to incorporate different activities like agricultural farming and settlements.”* Secondly, it was dependant on the land scarcity, most participants from Livubu claimed that they have a limited space of land for farming and infrastructure developments. Lastly, it was dependant on the desire that diversification would unlock multiple opportunities as young beneficiaries expressed, *“Diversification of the land use is ideal as it will create multiple sources of income and create more employment.”* Most prominently, participants felt that diversifying land use would improve their livelihoods.



**Figure 2:** Beneficiary's willingness to diversify land-uses option.

### **Potential land-use options.**

As shown in Table 2, the results revealed that there were highly significant differences among the potential land-use options for both Livubu ( $x^2 = 370.492$ ,  $p < 0.001$ ) and Tzaneen ( $x^2 = 309.567$ ,  $p < 0.001$ ) communities. Respondents perceived agriculture as the land-use option with highest potential and was ranked (1) in both Livubu and Tzaneen communities. Consistently, unproductive land and poverty tend to have an influence on elder beneficiaries to incorporate agriculture, “*We are staying in a dry and sandy area, and we experience high temperatures (above 39°C) during summer. As a result, we are not able to use the land for agriculture or farming. Therefore, we want our land to use other portions of the land for agriculture to earn a living*”.

Forestry land use option was ranked third (3) in Livubu and fourth (4) in Tzaneen communities. Not in-depth knowledge and little understanding of forestry plantation was present amongst the majority of the beneficiaries and limited their support of forestry land use, however, youth beneficiaries expressed that “*Forestry is a high-value farming practice that has potential to change the livelihoods of the beneficiaries, many people might disregard it because they are not being involved, and they see it from the distance. However, as a young generation, we want to continue with forestry because we hope it will unlock career opportunities for many young beneficiaries.*” However, whenever information about the importance and economic value of forest plantation was provided during the FGDs, major changes in attitudes followed, and support increased.

**Table 2:** Friedman’s test mean ranking of the land use options.

Desired land use options	Livubu Communities (n=351)		Tzaneen Communities (n=170)	
	Mean rank	Rank*	Mean rank	Rank*
Agriculture	3.31	1	3.60	1
Settlements	2.38	2	2.32	2
Forestry	2.25	3	2.04	4
Grazing	2.06	4	2.05	3
<i>Chi-square</i>	370.492		309.657	
<i>Degree of freedom</i>	3		3	
<i>Asymp. Sig</i>	0.000		0.000	

\*Ranking ranging from highest (1) to lowest (4)

### **Socio-economic factors and land use options**

Table 3 presents the contribution of each socio-economic factor on the potential land-use options. The age ( $p \leq 0.05$ ) and household income ( $p \leq 0.05$ ) have shown a significant influence on beneficiaries’ choice of agriculture as the potential land-use option. Furthermore, young beneficiaries (18-35) are less likely (0.370) to opt for agriculture as a

potential land-use option than elder beneficiaries (36-above). The level of household beneficiaries' education has a significant ( $p \leq 0.05$ ) influence on preference of settlements as the desired land-use option.

In addition, gender ( $p \leq 0.05$ ) and household income ( $p \leq 0.05$ ) of the household beneficiaries have shown a significant influence on the beneficiaries' preference for forestry land-use option. On this note, male beneficiaries are significantly less likely (0.510) to prefer forestry land-use option than the female beneficiaries. In the same vein, beneficiaries who have a source of income are significantly less likely (0.468) to prefer forestry land-use option than those who do not have income.

**Table 3:** Logistic regression results on socio-economic factors and land use options.

Dependant Variable	Independent Variable	B	Sig.	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Agriculture	Age (36-Above)	.993	.009*	.370	.176	.777
	Gender (Male)	.282	.189	1.325	.870	2.019
	HH Income(NHI)	.227	.037*	1.254	.761	2.066
	Education (NE)	.084	.795	1.087	.578	2.045
Settlements	Age (36-Above)	-.228	.484	.796	.421	1.507
	Gender (Male)	-.130	.571	.878	.559	1.379
	HH Income(NHI)	-.279	.420	.757	.384	1.490
	Education (NE)	1.049	.000*	2.855	1.758	4.636
Forestry	Age (36-Above)	.748	.130	2.112	.802	5.561
	Gender (Male)	-.674	.013*	.510	.300	.867
	HH Income(NHI)	-.760	.035*	.468	.231	.948
	Education (NE)	.426	.174	1.531	.828	2.829
Grazing	Age (36-Above)	1.823	.076	6.193	.827	46.406
	Gender (Male)	-.143	.687	.867	.433	1.737
	HH Income(NHI)	.411	.513	1.509	.440	5.177
	Education (NE)	.244	.515	1.276	.613	2.657
	Constant	-4.538	.000	.011		

\* denotes significance difference at  $p < 0.05$ , HH=Household, NHI=No Household Income, NE=No Education

## Discussion

### *Diversification of the land use.*

Generally, commercial forestry plantation are a monoculture of exotic species, whose purpose is the economic value rather than ecosystem services, however, any type of forest plantation can be multifunctional in terms of incorporating other activities like agriculture (Guerra-De la Cruz and Galicia, 2017). Diversifying land use of monoculture forestry plantations in land restitution projects is very critical to achieve multipurpose production system (Clarke, 2018), thus benefitting beneficiaries in the short and long run. The benefits of multifunctional forestry plantation could be extended to the natural forests adjacent to the

communities, as the MLU could ease the pressure on the natural forests (Martynova et al., 2020). The MLU has a potential to increase production of the woody and non-woody products (Martynova et al., 2020). The plans and desires of the land reform beneficiaries before land claim settlement are critical. This study revealed that both beneficiaries from Tzaneen and Livubu communities desired to diversify the monoculture to MLU. The beneficiaries stressed the issue of shortage of land, and many victims of land dispossession are situated in areas of limited space and very low productivity land (Chirwa et al., 2015; Wisborg et al., 2013). Eventually, with land scarcity, the natural forest land becomes the solution.

### ***Potential land use options.***

The most desired land-use option was agriculture, this perhaps considered unsurprising as it is not a new practice in these communities and thus, reflecting the agricultural history of the communities. This finding is in line with Lahiff (2007) who highlighted agriculture as a strongly preferred land-use option in land reform. Agriculture practice is very crucial to rural communities of South Africa (Oluwatayo and Rachoene, 2017), livelihoods of rural communities depend on agricultural production and natural resources for survival (Rankoana, 2016; Musakwa et al., 2020). Shortage of land for rural communities' livelihoods activities has a negative impact not only to rural livelihoods but to the forest and biodiversity (Rankoana, 2016). A study by Musakwa et al. (2020) reported that overharvesting of natural resources and agricultural expansion has an impact on forest landscapes, though the communities embark on these activities to find a living. Kosenius et al. (2019) reported that timber and non-timber forest products in monoculture plantations are often not available for communities, and increases pressure on the natural forest. The desire to incorporate agriculture in forest plantation or to change monoculture to multifunctional landscape by beneficiaries could be a breakthrough in reducing high dependence on forest land for agriculture expansion. And also could reduce anthropogenic pressure in the forest, thereby promoting sustainable forest use and regeneration.

### ***Socio-economic factors and potential land use options.***

Diversifying/change landscape could bring negative or positive effects on the beneficiaries' livelihoods and landscape production (Musakwa & Wang, 2018). This study found that socio-economic factors such as lack of income, age, level of education and gender have a major influence on beneficiaries potential land use options. In support of these findings, Musakwa et al. (2020) reported that among the drivers of landscape change which can also relate to diversification of land use are socio-economic drivers. In general, land use corresponds with the socio-economic conditions of the beneficiaries (Etowa & Nwiido, 2018; Mkondzongi, 2013). Older beneficiaries tend to keep their old ways of farming while the young beneficiaries tend to be more disregarding farming. Young beneficiaries' disregard of agriculture perhaps may be associated with negative perception that agriculture has lack of employment opportunities and mostly young generation prefer non-farming activities (Kumar



et al., 2017; Maele et al., 2015).

## Conclusion

Diversifying land use in Limpopo Province and South Africa as whole is a huge challenge given that there is a limited space of land in rural communities. The lack of income, growing population, poverty, unemployment and land scarcity are among the drivers that influence the diversification of the land use. These socio-economic factors often compel rural communities to engage in livelihoods activities that negatively affect the natural forests. Subsequently, if these challenges are addressed through landscape multi functionality use, the dependence to the natural forests could be reduced. The findings reflect that the beneficiaries are willing and desire to transform monoculture forest plantation to multifunctional forest plantation. Multifunctional forest plantation such as agroforestry and eco-tourism could help beneficiaries to diversify sources of income, fight poverty, create employment and reduce the dependence on natural forests.

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